On the Atomic Carcinogenic Mechanism and Cure for Cancer: Ferrochemistry for Cause of Warburg Effect

Reginald B. Little
Department of Chemistry
Stillman College
Tuscaloosa, Alabama 35401

Abstract

Cure for cancer is formulated on the basis of a new theory for the origin of cancer on the basis of Ferrochemistry and Laws of Ferrochemistry for disrupting the Kreb Cycle (Citric Acid Cycle) and accelerating the glycolysis process due to enzymatic substitutions alterations of primordial ^{12}C, ^{14}N, ^{16}O, ^{24}Mg, ^{31}P, and ^{32}S nuclides by less healthy nonprimordial ^{13}C, ^{15}N, ^{17}O, ^{25}Mg, ^{30}P, ^{32}P, and ^{33}S nuclides for suppressing normal enzymatic activities of the Kreb cycle due to the differing spin and magnetic moments of these isotopes on the basis of the Little Effect. The replacement of the primordial ^{12}C, ^{14}N, ^{16}O, ^{24}Mg, ^{31}P, and ^{32}S by these nonprimordial isotopes of high spin is caused by eating plants and animals wherein the environmental change since the industrial revolution with further effects of the nuclear industry and the chemical industry have increased levels of traces of CO_2 , SO_2 and PH_3 gases in the atmosphere for lightning transmuting ^{12}C to ^{13}C, ^{31}P to ^{32}P and ^{30}P, ^{32}S to ^{33}S along with natural ^{14}N transmutation to ^{15}N by lightning; transmuted ^{16}O to ^{17}O in cooling water associated with nuclear power plants; testing of nuclear weapons; the isotopic enrichment of fertilizer with ^{15}N relative to ^{14}N by Haber Bosch process; lightning striking the earth's crust to transmute ^{24}Mg to ^{25}Mg; increase in human life span and population; and recycling fertilizer from human and animal waste. The shift in nucleic acids of plants since the industrial revolution for greater uptake of nonprimordial ^{13}C, ^{15}N, ^{17}O, ^{25}Mg, ^{30}P, ^{32}P, and ^{33}S isotopes relative to primordial healthier ^{12}C, ^{14}N, ^{16}O, ^{24}Mg, ^{31}P, and ^{32}S isotopes has increased these unhealthy ^{13}C, ^{15}N, ^{17}O, ^{25}Mg, ^{30}P, ^{32}P, and ^{33}S isotopes in animals from eating the plants and in humans from eating both the plants and animals during the last 200 years since the industrial revolution. The ^{13}C, ^{15}N, ^{17}O, ^{25}Mg, ^{30}P, ^{32}P, and ^{33}S isotopes in digested carbohydrates, proteins, fats, and nucleic acids from plants and animals cause the human anabolic and catabolic metabolism to alter the nature and structure of protein and nucleic acid anabolisms for building organelles, cells and tissues in the body and the consequent alteration of the catabolic processes of the enzymes for supplying energy for functioning within organelles within cells, cellular production, tissue formation and function, organ function and life. Such alterations of the cell are reasoned in this work by dynamics on the molecular, atomic and nuclear levels by changes in isotopic abundance in organisms for causing diseases (cancer and diabetes) as discovered and described in this work in 2016. The different nuclear spins of the C, N, O, Mg, P, and S atoms composing the protein alter the physical and chemical dynamics of the protein on the basis of the collective magnetism of many such isotopes organizing structural, physical, chemical and enzymatic properties by altering atomic and molecular orbitals associated with those processes on the basis of the Little Effect for changing the protein enzymatics for constructing nucleic acids for mutations, for altering the enzymatics for catabolizing glucose and pyruvate in the glycolytic process and Kreb cycle for altering the

enzymatic binding of sugars for causing diabetes and for suppressing the Kreb cycle for causing cancer. In this work, it is reasoned that the nuclei fractional fission and fuse for transmuting to quantum fields and L continua and the QF and L continua fractionally fission and fuse to magnetic fields and electric field and thesefission to gravity and thermal space. The nuclei are reasoned integer fractional hetero magnetic multidipoles and the QF are reasoned as homo integer magnetic multimonopoles and the L continua are reasoned hetero fractional magnetic dipoles; electric is integer homo electric monopoles; magnetic is integer hetero magnetic dipoles; gravity is reasoned fractional, homo, irrational magnetic monopole and thermal space is reasoned fractional hetero, irrational electric monopoles. The ^{13}C, ^{15}N, ^{17}O, ^{25}Mg, ^{30}P, ^{32}P, and ^{33}S isotopes fractionally fission to produce different QF (magnetic multimonoploes) and L continua (fractional magnetic dipoles) for different enzymatic activity and biochemistry on the substrate for nuclear spins altering the chemical machinery and chemical operation of the cellular physicochemical chemistry for the origin of cancer. A theoretical cure for cancer is discovered by using these malfunctioning ^{13}C, ^{15}N, ^{17}O, ^{25}Mg, ^{30}P, ^{32}P, and ^{33}S isotopes to selectively energize them in strong static magnetic fields and many dynamic magnetic fields so as to selective kill the cancer cells containing these malfunctioning isotopes in high relative amounts. The theory for cure has fewer side effects as patients are given the same food but only modified by these isotopes for fewer side effects and future health issues relative to supplying the body with gold nanoparticles with other undesirable effects. The theory for cure also is not destructive to normal cells as normal cells have far less ^{13}C, ^{15}N, ^{17}O, ^{25}Mg, ^{30}P, ^{32}P, and ^{33}S isotopes.

Introduction

A deep and broad new hypothesis is needed to explain the origin, history, habitat and sickening of cancer cells. Such new concept for carcinogenesis should have an integrating perspective on the older origins, causes, habitats and treatments of cancer and the new origins, causes, habitats and treatments of cancer for a new dawn for curing cancer. This work aims for providing a new theory for the broad and deep cause of cancer, the flourishing of cancer from its birth from normal cells and the self destruction of cancer with the unfortunate death of the host. Moreover, this work provides a new basis for killing cancer cells based on this new understanding while sparing normal cells for saving the lives of the victims of cancer. This theory is scientific in nature and grounded in prior science of biology of cancer with prior science of chemistry and physics with some new ideas in chemistry and physics as by Ferrochemistry and the Little Effect [1] as succesfully demonstrated in inorganic chemistry and physics of nuclei, nucleonic, quark, gluon spins and multi-orbitals and also atomic electronic spin, valence and core configurations. This work determines such Ferrochemistry also within biochemical molecules, enzymatic complexes, organelles, cytoplasma, cells and tissues and even organs for greater understanding of biological process and the alterations of biological processes in organs as for this here determined novel innovative origin of diseases like cancer and diabetes on magnetic bases. The organ behavior and malfunctioning is determined by the Ferrochemistry of the organ as determined by the interactions between cells. The interactions between cells is here reasoned and determined by intercellular Ferrochemistry. The intracellular behaviors and structures are reasoned in this work to be determined by Ferrochemistry within cells, which is determined by intracellular Ferrochemistry. The intracellular Ferrochemistry is in this work determined by Ferrochemistry of biomolecular complexes and interactions between biochemical molecules of similarity to nanoparticle and single domain ferromagnetics, antiferromagnetics and

ferrimagnetics and the Ferrochemistry thereby. Such biomolecular Ferrochemistry is determined in this work to be manifested and determined by the atomic composition, constitutional arrangement of atoms and conformations, configurations and enantiomeric arrangements of atoms for varying Ferrochemistry thereby in space and time. The Ferrochemistry of the biomolecules as reasoned in this work further flows from the nature of the elements and their valence electronic angular momentum and core angular momenta as coupling to the spin angular momentum of valence and core electrons and their nuclei (hadronic) angular momenta and spin angular momenta (as given in gyroscopic ratio). So, that the Ferrochemistry of the atoms are here reasoned to be determined by valence, core electronics fermions and nuclear fermions as by their rational motions (discontinua) of orbits, orbitals and spins of luminous natures and their irrational motions (continua) of fractional orbits, orbitals and spins of superluminous natures.

Such Ferrochemistry of discontinua within atoms is hereby reasoned to be determined by complex patterns {in huge imbalance between nucleus and electron lattice} of integers and/or fractional rational composite magnetic fields, electric fields and many electromagnetic waves (of quantum fields [multimagnetic monopolar fields] and composite homo-quantum fields for leptons {of divided +/- nested, centered multimonopolar spheres} and composite hetero-quantum fields for quarks {of undivided +/-, nested (concentric), centered mixed multimonopolar spheres}) of the confining in space and manifestation in time as by the limiting speed of light. Such Ferrochemistry of continua within atoms is here reasoned to be determined by complex patterns {in huge imbalance between nuclei and electronic lattices} of integer rational hetero-composites and fractional irrational composite dipolar magnetic fields, electric fields and electromagnetic waves (of L continua fields [integer fractional monopolar fields] and composite homo-L continua fields for weak fields {integer fractional irrational homomultimonopolar fields} and composite hetero L continua fields for nuclear fields {composed of integer fractional irrational L continua of unnested heterocomposites) for nuclei {as nuclei are composed of nuclear fields and hadrons and the hadrons are composed of integer fractional irrational quarks and strong fields (of integer fractional irrational nested separated heterocomposite) and the quarks are composed of quark layers and quark fields (of integer irrational nested unseparated heterocomposites) [2]. So that unlike gases, liquids and solids of conventional inorganic chemistry, the biochemistry as involving nanoscale volumes of atoms in nanosize molecules manifest novel dynamics due to different nuclear compositions, structures, and configurations even for nuclei of the same element as isotopes having the same atomic number.

In this work the emergent isotopic Ferrochemistry is determined that the varying nuclear neutron content for the same element like C (^{12}C and ^{13}C), N (^{14}N and ^{15}N), O (^{16}O and ^{17}O), P (^{31}P and ^{32}P) and S (^{32}S and ^{33}S) alters the spin and angular momenta of nuclei of the different isotopes such that in electronic exchange within single domain of nanosize these nuclei couple by exchanging electrons of conventional bonds for nuclear orbitals (as already published and in analog to proton orbitals) for altering the properties of macromolecules and nano-complexes having these changes in isotopic distributions with greater change causing more dramatic changes in the chemistry, physics and biology of the domain of the material. It is on this basis that this work determines the origin, cause and habitat for cancer as by the accumulation of magnetic isotopes of elements of C, N, O, P, and S within the biomolecules of cells for carcinogenesis.

Cancer has been determined to manifest in the mummies of ancient, so it has been around for a long time. But what could have caused such cancer in the earliest humans? This work proposes the natural phenomena of lighting striking the farming ground and the unfortunate ingestion of plant, dirt or animals consuming that ground soil caused earliest cancers in humans as this exposed these earliest humans to lightning transmuted nonradioactive elements. Whereby the lightning strikes transmuted primordial isotopes of ^{12}C, ^{14}N, ^{16}O, ^{24}Mg, ^{31}P and ^{32}S to nonprimordial isotopes of ^{13}C, ^{15}N, ^{17}O, ^{25}Mg, ^{30}P, ^{32}P and ^{33}S. People living near active volcanoes may also have been subject to more probable cancer in the old ancient times as under such unusual environments as determined in this work the elements of life may have been isotopically altered. But it seems that since ancient times the incidence of cancer has increased in humans. In particular, in the last 150 years the incidence of cancer in humans has spiked [3]. Why? This work points to the industrial revolution and consequent automotive industry, chemical industry, nuclear industry and coal burning generations for electricity. These consequent industries have dramatically changed the environment so that as determined in this work the environment and man have altered isotopic distributions of elements like C, N , O , Mg, P and S so that the plants, animals and humans are consuming more of these nonpromordial distributions for altering their internal biomolecular contents by these nonprimordial isotopes for causing the malfunctioning of protein, nucleic acids, enzymes and co-factors for consequent altered anabolism and catabolism for causing disease like cancer and diabetes. This work develops evidence of such cause for cancer and gives a theory for curing cancer.

Some have reasoned that cancer in the last 150 years has increased in occurrence as technology has increased life expectancy and people live longer and with increase life span the cells and molecules increase genetic alterations and rearrangements for malfunctioning for cancer [4]. This is so and is consistent with the theory given here as for longer lifetime, the host is more likely to accumulate more and more nonprimordial isotopes within his cells for developing cancer. But what about during pregnancy? Are mothers likely to pass on cancer causing materials? The younger mother is not likely to pass on cancer causing isotopes, but there is evidence that older mothers subject their children to greater incidence of cancer as the tissue of the child forms from the mother's cellular content [5]. And recent experimental evidence shows that weak magnetic field can cause increase probability of abortion [6]. Such new study is consistent with the theory here as the rapid cellular changes in the egg and weak external magnetic field may pull more magnetic isotopes from mother to developing fetus resulting in abortion. Likewise, the rapidity of the cancer glycolysis may pull in magnetic nuclei and radicals from sytoplasma.

There have been many other reasoned causes of cancer. Some propose cancer is caused by eating the wrong foods. This is consistent with the theory here. Others have reasoned and gotten data that lack of exercise causes cancer. Other have reasoned that stress causes cancer. The ingestion of many chemical substances has been associated with cancer. These are all consistent with the theory given here. The chemicals causing or having electronic radicals for example have been called carcinogenic. Asbestos has been determined carcinogenic. Polyaromatic hydrocarbons have been determined carcinogenic. The chemicals and the wrong foods and lack of exercise can cause this nuclear isotopic fermions and magnetic moments to pull in other nuclear magnetic moments and free radicals electrons from chemicals to form a tumor or group of cancerous cells. Nuclear radiation has been determined cancer causing.

Magnetic fields have been determined to cause cancer. Viruses have been determined possibly carcinogenic. The nuclear radiation can cause electronic radicals and also transmute nonmagnetic nuclei to nuclei with magnetic moment and the consequent cancer. Viruses may be evolved protein with different magnetic nuclei. In this work the study of viruses with altered nuclear isotopes is proposed for virus coming fromregular protein or parts of proteins as by the isotopic shift of the primordial isotopes to nonprimordial isotopes in the virus protein so the virus protein cannot support life as the primordial orginal protein did. But the nonprimordial isotopic protein of virus still has somethings in common with normal proteins of the host so thevirus can exist in the cells and alter cellular mechanics in much the same was but less deadly as cancer originates from many viruses of many altered proteins.

In this work, a new cause is given as by variations in isotopes of C, N, O, Mg, P, and S within humans as has increased in the last 150 years due to the industrial revolution. This new cause embraces and explains prior reasoned causes of cancer. The industrial revolution causes the alteration of primordial ^{12}C, ^{14}N, ^{16}O, ^{24}Mg, ^{31}P and ^{32}S in the environment by combustion of fossil fuels of hydrocarbons for energy with production of CO and CO_2 in the atmosphere of earth. The fossil fuels also contain P and S containing materials as these are the remains of ancient living organisms. The coal fire burning plants, automobiles, buses, trucks and organisms release oxides of these elements and hydrides of phosphorus into the atmosphere. This release C, N, O, P and S trace atmospheric gases mix with the more abundant N_2 and O_2 gases of the atmosphere where they are transmuted during lightning strikes during thunderstorms to change ^{12}C to ^{13}C, ^{14}N to ^{15}N, ^{31}P to ^{32}P (β process) and ^{30}P (electron capture), ^{32}S to ^{33}S [7]. Lightning strikes the ground transforms ^{24}Mg in earth's crust to ^{25}Mg. The oxides of these gases $^{15}NO_2$, $^{13}CO_2$, and $^{33}SO_3$, and hydrides$^{30}PH_3$, $^{32}PH_3$ mix with water of rain whereby they fall to the trees and plants and the crust of the earth to fertilize the vegetation of trees and plants just as acid rain of primordial ^{12}C, ^{14}N, ^{16}O, ^{24}Mg, ^{31}P and ^{32}S elements form acids in the rain to affect the trees and plants. But the transmuted nonprimordial ^{13}C, ^{15}N, ^{17}O, ^{25}Mg, ^{30}P, ^{32}P and ^{33}S isotopes in these acid rains affect the plants and trees in more internal ways (leading to disease) relative to prior acid rain eroding the leaves.

In this work, it is presented that the compounds of nonprimordial ^{13}C, ^{15}N, ^{17}O, ^{25}Mg, ^{30}P, ^{32}P and ^{33}S in the rain fertilize the plants and become a part of the sugars, carbohydrates, proteins and nucleic acids in the plants as by photosynthesis and other anabolism within the plants. Overtime plants and trees have accumulated more and more of these nonprimordial unhealthy isotopes of ^{13}C, ^{15}N, ^{17}O, ^{25}Mg, ^{30}P, ^{32}P and ^{33}S relative to the primordial healthy isotopes of ^{12}C, ^{14}N, ^{16}O, ^{24}Mg, ^{31}P and ^{32}S. The plants have shorter lifetimes so they take in less of the nonprimordial isotopes before they are consumed by animals and humans. Trees take in more of these nonprimordial isotopes as they live longer. But fewer animals and humans eat trees. But the mole rats eat tree roots [8] (and this is discussed more later) as genetically mole rats (consistently with the theory here) have more rapidly adapted to these nonprimordial isotopes relative to other animals and humans as they have been exposed to these nonprimordial isotopes earlier in terrestrial history by eating them as concentrated in tree roots; so the mole rats have genetically adapted to these nonprimordial isotopes by eating tree roots which the trees eliminate these nonprimordial isotopes as waste from their roots and the mole rats have resilience to cancer as their diet rushed their genetic adaptation to these nonprimordial isotopes. This points to the possibility that humans can adapt genetically in the future to cancer and maybe the industrial revolution is the spike for such. But the other animals eat tree leaves and plants and the animals

develops high amounts of nonprimordial isotopes over time with exponential increase since the start of the industrial revolution.

It is important to note that the ancient volcanoes brought up gases like CO_2, SO_2, NO_2 PH_3 (magnesium compounds) and these gases where struck by lightning within volcanic eruption to produce nonprimordial isotopes. Such nonprimordial isotopes of ancient cause cancer and other diseases in ancient animals and humans who unfortunately ate the food near volcanic soil. But during modern times man's fire has overwhelmed volcanic exhausts to increase natural content of these gases isotopically altered in the air before the ocean can dissolve them. As the ocean becomes more and more acidic since industrial revolution less of these gases are dissolved. The ancient primordial gases in the ocean buffer against dissolving the recent nonprimordial gases of anhydrous CO_2, SO_2, SO_3, PH_3, NO_2, and NO_3, so fish have been exposed to less nonprimordial isotopes and are healthier to eat. So, more gases of CO_2, SO_3, NO_2, and PH_3 exist in atmosphere to be transmuted by lightning. It is estimated that millions of lightning strikes occur on earth around the globe [9] so these gases so the atoms in these polluting gases are daily transmuted to ^{13}C, ^{15}N, ^{17}O, ^{25}Mg, ^{30}P, ^{32}P and ^{33}S.

It is also important to note that the change in agricultural industry has accelerated the uptake of nonprimordial isotopes into plants and live stocks of farm animals as the fertilization of farming soils for nitrogen and sulfur has shifted away from ancient animal deposits as from salt peter mines since the early 1900s since the discovery by Fritz Haber of ways to covert N_2 to NH_3 via high pressure and high temperature (HPHT) catalytic mechanism [10]. On the basis of RBL ferrochemistry such HPHT ammonia synthesis is magnetically selective with faster kinetics for ^{15}N relative to ^{14}N [11]; so the ammonia is enriched with $^{15}NH_3$ relative to primordial ^{14}N so that by use of HPHT $^{15}NH_3$ in fertilizer has (since the industrial revolution) accelerated the exposure of plants and livestock foods to ^{15}N. Also, the practice of using animal and human waste as fertilizer has increased nonprimordial isotopes in vegetation and animal live stocks as the waste recycles the nonprimordial isotopes that caused disease and death in the source of the waste. Animal and plant sources of sulfur tend to be richer in HS-C and thioesters, R-S-C(O)(C) type compounds with more ^{32}S relative to ^{33}S. sulfates SO_4^{2-} tend to be richer in ^{33}S and such SO_4^{2-} fertilizer expose plants and livestock to more nonprimordial ^{33}S; as based on the Ferrochemistry here as with PO_4^{3-} the positive magnetic moment of ^{33}S favors the energetics relative to zero magnetic moment in ^{32}S. The nuclear industry since the industrial revolution has engineering nuclear reactors and submarines with exposure of cooling water to neutrons for production of ^{17}O from ^{16}O in the cooling water of the nuclear power plant and the submarines.

The buildup of these nonprimordial isotopes in plants, vegetations and animals of live stocks leads to humans eating these plants and animals and the nonprimordial isotopes accumulating in biomolecules, cells and tissues and organs of humans. The function of the normal cells was created and slowly evolve for anabolism and catabolism by and of biomolecules by enzymes involving primordial isotopes of ^{12}C, ^{14}N, ^{16}O, ^{24}Mg, ^{31}P and ^{32}S within the substrates and enzymes. With the accelerated uptake of nonprimordial isotopes of ^{13}C, ^{15}N, ^{17}O, ^{25}Mg, ^{30}P, ^{32}P and ^{33}S in the last 150 years by the industrial revolution the enzyme in many animals and humans have not been able to adjust, adopt and evolve. In this world, it is discovered and presented that cancer is one disease that results from the accumulation of nonprimordial ^{13}C, ^{15}N, ^{17}O, ^{25}Mg, ^{30}P, ^{32}P and ^{33}S within the enzymes of animals and humans. Such buildup of nonprimordial isotopes cause altered physicochemico-biology of the anabolism

and catabolism by the many enzymes causing normal cells to malfunction for transforming normal cells to cancerous cells. The altered physicochemical biology by the nonprimordial ^{13}C, ^{15}N, ^{17}O, ^{25}Mg, ^{30}P, ^{32}P and ^{33}S arises within the animals and human cells overtime with accumulation as these nonprimordial isotopes as by biochemically replacing primordial ^{12}C, ^{14}N, ^{16}O, ^{24}Mg, ^{31}P and ^{32}S in amino acids and these amino acids anabolize within enzymes associated with DNA and RNA translation, transcription and replication so they accumulate in nucleic acids and nucleic acids alter to select and use nonprimordial in constructing protein for accumulation of nonprimordial isotopic contents in amino acids for syntheses of protein and enzymes of nonprimordial isotopic contents. These altered enzymes of nonprimordial isotopes cannot carry out normal cellular biochemistry (for example the catabolism associated with glycolysis and the Kreb cycle) with consequent suppressed Kreb and accelerated glycolysis process for Warburg Effect [12] for the transformation of normal cells to cancerous cells on the basis of this presented work. In this work, the details physics and chemistry of how the nonprimordial isotopes alter biochemistry of each step of glycolysis and each step of the Kreb cycle are given.

Prior work by the author points way to this influence of fermionic and magnetic nonprimordial isotopes on the enzymatics of Kreb cycle and glycolysis. In 2010 it was discovered that magnetic spectator ions of alkali Na^+ and K^+ magnetically couple with graphene and permanganate, NO_3, SO_4^{2-} ions during the explosive oxidation of graphene so as to slow oscillate the oxidation hysterically magnetically [13]. Such phenomena were further experimentally demonstrated as nonmagnetic Ca^{2+} and Mg^{2+} (negative magnetic moments) did not manifest the same magnetic hysteretic properties on the oxidation [14]. Such entrainment of Na^+ and K^+ positive magnetic cations in the redox chemistry in acidic solution on nanocarbon as graphene was reasoned many body effect and coupled to external weak magnetic field. Macroscopic graphite did not exhibit such hysteric and magnetic suppressive oscillation of explosion.

Prior proposed proton orbital dynamics on nano-volumes of amino acids residues as confided by graphene diamond like backbones was further reasoned to involve similar phenomena during enzymatic catalyzed oxidation of carbohydrates during glycolysis and Kreb cycle so that varying magnetic spins may varied the reaction dynamics [1]. The explosive oxidation of graphene was reasoned more activated by potential energies of reactants and such violation of second law of thermodynamics under conditions of reactions, as by the reactants (due to strong internal fields) organizing and using thermal energy to organize the reaction. Similarly in enzymes in this work, it is that enzymes provide potential energy to lift reactants and substrates to transition states for catalyzing transitions to products. Just as magnetic nuclei were observed to alter the dynamics of oxidation of graphene, in this work changing and replacing nuclei from primordial to nonpromordial is reasoned to alter the dynamics of enzymatics of glycolysis and Kreb cycle. In this work, it is reasoned that the proton orbitals in different regions of proteins can have different local patterns and global patterns for explaining the enzymatics as in α helical regions many hydrogen bonds in nano-volumes manifest proton orbitals of more local denseness for proton orbital rearrangements manifesting more local bonding and bond rearrangements and more global unsaturation for compositional anabolize type enzymatics. But for β pleated regions in protein, this theory determines that the hydrogen bonds and proton orbitals are locally more unsaturated and globally saturated for more local catalyzing substrate bond breakage (and coupling many pieces of fragmented substrate more globally) for local catalyzing enzymatics of decompositional catabolic dynamics on large substrates (and for

catalyzing enzymatics of compositional anabolism globally nonlocally). On the basis of this theory of protein enzymatics on the basis of ferrochemistry, β pleated regions contribute more local decompositional dynamics in glycolysis process and Kreb cycle and α helical regions of the enzymes contribute to more local compositional dynamics in the glycolysis process and Kreb cycle. On the basis of such, the enzymes of the glycolysis process and Kreb cycle are analyzed in this work to determine how the changing primordial ^{12}C, ^{14}N, ^{16}O, ^{24}Mg, ^{31}P and ^{32}S with nonprimordial ^{13}C, ^{15}N, ^{17}O, ^{25}Mg, ^{30}P, ^{32}P and ^{33}S isotopes alter the decompositional Ferrochemistry nature of β pleated regions and compositional Ferrochemistry of α helices in various enzymes of the glycolysis process and the Kreb cycle. On the basis of this work, it is determined that the nonprimordial ^{13}C, ^{15}N, ^{17}O, ^{25}Mg, ^{30}P, ^{32}P and ^{33}S suppress the Kreb cycle and accelerate the glycolysis process by altering the Ferrochemistry of various enzymes.

In addition to the cause and habitat of cancer on the basis of the nonprimordial magnetic isotopes suppressing the Kreb cycle and accelerating the glycolysis process, this work further determines new methods to selectively couple to the accelerated glycolysis process in cancer cells on the basis of their unusual amounts of nonprimordial isotopes so as to selectively starve or overheat to kill cancer cells in new ways without harming normal cells for curing cancer with fewer side effects. For instance, it may be possible to feed cancer cells primordial isotopes in regular food and by appropriate static magnetic field and multiple dynamic magnetic field reignite their nonclassical Kreb cycles with eliminating the harmful nonprimordial isotopes for curing cancer on the basis of this work. It may be possible to selectively measure multiple dynamics magnetic coupling to nonprimordial enzymes of the cancerous classical glycolysis process to suppress and/or over accelerate and heat the cancerous glycolytic process to selectively kill cancer cells without harm to normal cells. The multiple dynamics stimulation in static fields is introduced in this work on the basis of its determination that QF involve multiple internal photons in static electric and magnetic fields so better stimulations of enzymes require multiple light waves. The new cure as introduced in this work has many advantages over prior treatments which were efforts to eliminate cancer but not involving the cause as until this work the cause has been unknown. Prior treatment of nuclear radiation, chemotherapy, metal nanoparticles [15] and even recent single electric fields [16] to kill cancer as well as normal cells without true knowledge of the genesis of the cancer from normal cells without a basis for distinguishing cancer from normal cells and without selectively killing cancer so the prior treatments did not cure and also harmed normal cells as they killed cancer cells for painful side effects. But this new theory offers better treatment and potential cure without side effects.

Hypothesis and Theoretical Mechanism for Cancer

So now this new theory proposes these nonprimordial isotopes cause malfunctions of the proteins, nucleic acids, carbohydrates and fats within cells to cause disease. Previously it was thought by scientists that the isotopes of elements beyond hydrogen caused negligible conventional mass isotope effect. Recently Buchachenko [17] discovered the magnetic isotope effect whereby nuclear spin pair with electron spin to slow electronic radical pair recombination chemistry. In the current work the author develops the newer ferrochemistry as discovered in 2000 [18] whereby many spins or few relativistic spins couple to alter the orbital dynamics or vice versa orbital dynamics alter spins. So that in this current development and application many spins in enzymes can couple under reaction conditions. By the Laws of Ferrochemistry [19] so

as to alter the quantum field and atomic orbital and molecular orbitals dynamics and kinetics. On the basis of such Ferrochemistry as the nonprimordial isotopes are replaced by nonprimordial isotopes, the dynamics and kinetics of various metabolic processes of anabolism and catabolism are altered, accelerated and/or decelerated. In this work, such acceleration of Ferrochemistry of enzymes of glycolysis and suppression of enzymes of the Kreb cycle are reasoned to cause cancer as anabolism causes mutations of nucleic acids due to accumulation of nonprimordial isotopes which cause alterations of proteins and nonprimordial isotopes in proteins for such acceleration of glycolysis and suppression of Kreb cycle.

On the basis of the Ferrochemistry of enzymatics as presented here the substrates and enzymes by 1st Laws of Ferrochemistry follow preservation of orbital angular momentum if the coupling of activation conditions to the internal momenta is too small. But if the coupling of the activation fields and internal momenta of substrates and enzymes is beyond a certain threshold for the 2nd Law of Ferrochemistry then the Ferrochemistry between the enzymes and substrates occur. By the 3rd Law of Ferrochemistry under slow rotational activating conditions and/or strong magnetization the substrates and enzymes change their internal angular momenta relative to initial momenta by trading momenta with the surroundings even in hidden superluminous ways. By the 4th Law of Ferrochemistry under fast rotational activating conditions and/or weak magnetization the substrates and enzymes decrease their net angular moment relative to initial internal angular momenta by trading momenta with the surroundings.

So the activating conditions of slow rotational motion involves dense thermal space field for the 3rd Law of Ferrochemistry and the activating conditions of fast rotational motion involve rarer thermal space fields for 4th Law of Ferrochemistry. The enzyme regions and substrates may manifest various internal hybridizations. By such Laws of Ferrochemistry, the proteins of enzymes would manifest highest transient magnetization in the backbone -C-C=N- such that the slight thermal perturbations alter the backbone by 2nd Law of Ferrochemistry. The nature of the functional group R (residues) also manifest next strongest alterations of the backbone. The hydrogen bonding of the backbone to more local backbone sections manifest the next highest energy interactions after the residue and after the backbone of the highest transient magnetization. The interactions of the backbone with nonlocal backbone sections via hydrogen bonding and proton orbitals manifest the next highest energy interactions. So the R group can frustrate the local hydrogen bonding of the backbone sections for β pleats for more local unsaturation of proton orbitals. The functional groups can also allow local hydrogen bonding of the backbone sections for α helices and more nonlocal unsaturation of the proton orbitals. The variation in the residues can result in dynamical nature of the protein as by surrounding thermal perturbations driving shifting weak acid weak base and polar and nonpolar interactions of the various functional residues as held by the backbone and modulated by the backbone motions by changing proton orbitals for the time crystallization. The activating conditions and altered backbone for local and nonlocal proton orbitals can alter the residue interactions and motions superluminously so that the fields of proton orbitals (hydrogen bonds) are released (fissioned) from the proton orbitals of the backbone with translation and rotation of the quanta fields from the proton orbitals due to the superluminous motions of the fragmented protons relative to the changing backbone and residue so as to sum and differ many such fissing fields in translating and rotating with consequent fusing of these field pieces about internal moieties like substrates so as to give potential fields from the fissed, translated and fused enzymatic fields to the

substrates so as to lift the substrates across reaction coordinates, the enzymatics are such that the substrates and enzymes have larger internal angular momenta after transformation for 3rd Law of Ferrochemistry. Under conditions of the substrates and enzymes have smaller initial angular momenta after the transformation for endothermic processes by local β pleats. On the other hand, different activating conditions may involve substrates and enzymes with smaller internal angular momenta after the transformation for exothermic process by local α helices. So now the fissed, translated, fused fields of the many pieces of the bonding proton orbitals of many local α helices (nonlocal global β pleats) provide dense local bonding for the substrates for compositional enzymatics. But the fissed, translated and fused of the many pieces of distant α helices (local β pleats) manifest changing unsaturation of proton orbitals for local nonbonding potential energy for substrates for decompositional enzymatics. It is important to note that in addition to the enzyme fractional fissing, translating and fusing the internal substrate fractional fissing, translating and fusing to certain more local 'prime' amino acid residues. These prime enzymes are those usually identified to the catalytics by older mechanism prior to this mechanism. But this mechanism provides more detailed broader mechanics down to the ncueli and involving the whole enzyme for nuclear and molecular orbital theory rather than a valence bond fashion of the older enzymatics. Recent experimental observations of protein structure by cryo-microscopy [20] help but as not realistic as the low temperatiure relaxes many important structures and motions of crucial importance under biological operating conditions. So that the chemical reactions of the substrates involve reaction coordinates that of conventional chemistry are thermally activated by kinetic energy. But in the enzyme the transition state of substrate accommodated by potential energy from the fraction fission, translation and fusion of nuclei, electrons, nuclear fields, quantum fields for complex magnetic, electric, gravitational and thermal fields from the enzyme that translate and fuse about the substrate to lift the substrate to the transition state and relax the transition state to the products as the backbone proton orbitals as patterned by residues so as to lock and key fit the substrates (locally and in this new way nonlocally and globally) over larger space time for selectivity catalyzing the substrates by certain residues constitutional isomeric linkages.

On the basis of this theory, fissioned reactant pieces are as fields of excited states of the whole enzyme by Laws of Ferrochemistry. Also the relativistically hidden fissing of many α helices with translating and fusing are as excited states to couple the two substrates along the reaction trajectory for combining the reactants to the substrates by Laws of Ferrochemistry. So the continuum states of the substrates as they cross the reaction coordinates are constructed from fissed, translated and then fused fields from the enzyme in hidden relativistic manner so that the activation energy for the conversion of the substrates are lowered by the enzymes given energy relativistically via the fragmented fields for catabolism and anabolism of the reactants to products. Bonds are momentarily broken in the reacting substrates by the conformational changes in the enzyme as the α helices fiss, translate and fuse to intermediary β pleated regions that break bonds in the substrates to achieve the transition states as the transition states then go to products by the intermediary β pleated regions reforming α helical regions by rebonding the broken fragments but in different constitutions of bigger products than either reactants. By this new theory, the fused fields about the substrates are altered by the fissioned, translated and fused fields of the enzymes and the resulting altered substrate fields for transition states are then altered to products by different fused, fission translated field within the enzymes.

This mechanism and theory thereby discover and introduce a macromolecular catalysis by many, many atoms on many atoms. Such catalysis in biochemistry is different from prior nanoparticle catalysis as the nanoparticles are crystalline. The protein and enzymes are amorphous in space and quasicrystal in time on subnanoscale. So the many bodies in the subnano-quasi time crystal enzyme can catalyze noncrystal product molecules. This mechanism introduces how catalysts can be time crystal and spatially amorphous so as they can catalyze amorphous substrates in time and space and the amorphous causes nuclear fission and electron fusion so nuclei wavefunctions catalyze many nuclei in high energy ways. Amorphous causes nuclear fission and nuclear particle wave dynamics. But crystal cause electron particle wave. Prior catalysis has involved forming repetitive crystal and the periodic electron wave was involved. But I this work a new theory is given for forming amorphous structures in space and time crystal for nuclear waves are required. The enzymes behave by nuclear waves and this discovery introduces how isotopes of nuclides have different nuclear waves and organize electron waves about amorphous nuclei of substrates for totally new way of reasoning and understanding enzymatics.

The amorphousness as discovered here is an amorphousness in space but the discovery here introduces a crystallization in time. So that the catalysis in this new way also involves a time crystal catalyst acting on a time crystal substrate for new enzymatic bond rearrangements. This work discovers how varying different chemical elements in covalence can via molecular orbitals of the whole fractional fissing to fields in space for acting on a nearby substrates in a nonregular anisotropic manner of the fields to alter the atomic orbitals and molecular orbitals on the substrates in specific manners as occurring as enzymes act on the substrates as during Glycolysis and Kreb cycle. So now how do whole enzymes catalyze the substrates as introduced here by RBL in molecular orbital sense as oppose to the prior effort of biochemists in a valence bond type fashion? Valence bonds put pieces together. But molecular orbitals have the whole molecule integrating pieces. So by RBL the whole molecule fragments by each atoms fractionally fissing into smaller particles goto waves with translating the resulting wave and fusing of the complex waves as seeded internally by substrates. The fissing wave relative to the many source kernel particles translates relative to the particles due to the superluminous nature of the kernels relative to the fissing waves for translating of the fissing waves before they can refuse and such is hidden and a large scale continua as buy many spinrevorbitals of large nanoparticles, liquids and gases going to the classical frame (C-frame) [19]. Such is in analog and just as the electrons fragments in particles to go to waves sense for a fuller quantum mechanical nature of the molecules just as the electron particle wave duality causes the orbital rather than the orbit. The enzymatic particles go to wave for fuller quanta for molecular orbitals and the molecular orbitals fragment for magnetic orbits and gravity bends and electric stretch compressions for refusing with shift (translation) to the substrates to compress, bend, spiral, and coil to L continua about the substrates for exciting the substrates with needed potential energy for causing catalysis as the substrates are lifted to transition states by potential energy rather than kinetic energy of thermal energy and heat or waves of photons. So the substrates are catalyzed to products. So this effect of the enzyme depends not only on the electronic wavefunctions but the nuclear wavefunctions as the nuclei particles fission so that the ^{12}C would contribute differently relative to ^{13}C, and ^{14}N differently relative ^{15}N and ^{16}O differently relative to ^{17}O, and ^{24}Mg differently relative to ^{25}Mg, and ^{31}P differently relative to ^{30}P and ^{32}P, and ^{32}S differently relative to ^{33}S. So unlike nanoparticle of old with same atoms. The enzymes have varying protein residues so the fission molecular orbitals present irregular pattern.

The chemical dynamics of breaking and forming bonds covalently can be reasoned as here by RBL of many electromagnetics in the enzymes or many vibrations in the enzymes or many heats in the enzymes or many heats in spaces among many atoms in enzymes as equivalent to many heats in times at spaces between two atoms. So now the role of the enzymes is to manifest many vibrations, rotations in space as RBL already noted many vibrations and rotations in time of L continua. So L continua has gravitational fields and thermal fields and thermal fields at a space or irrationality at a space; but now C frame is gravitational and thermal fields at a time. And such thermal and gravitational fields at time can fission into space and such thermal and gravitational fields at space can fuse into time. Space goto time and time goto space. So the enzyme space of thermal and gravitational fields fuse and the enzymes time of thermal gravitational fields fissions to space. So now that enzymes fiss, translate and fuse and the fused is or can be space time patterns of the residues to activate {give field force motion} to atoms to break or to form bonds. And this is physics and chemistry requiring RBL Ferrochemistry and Laws. So the given amino acid residues are important but the rest of the enzyme is important as it gives time crystal from space crystal from space amorphous to time amorphous to seed residue to shape the substrates or shape both substrates and residue. It shapes substrates as residues are not irreversibly alter.

The push pull rate superluminous of the surrounding is as fast as the fissed fields and α helical regions; the fractional fissions of the source particles cause its v>c so it moves before the field can recollapse so the fissed fields translate and revolve relative to the source nuclei and electrons. But the backbone holds it in the protein and this is why proteins are so unique they are made of the strongest chemical bonds of graphene and diamond like carbons so they can hold these transient huge fissing, translating fusing kernels of many atoms. This is a discovery as the source moves before the field can move this is a new superluminous spectroscopy, photophysics and photochemistry! The fissed, translated and fused fields of outer unsaturated p^+ orbital and inner saturate p^+ orbitals mix with residues of the back bone and fuse to the smaller spaces of L frames (the frame of the molecules and atoms). The substituted can induce the fusion of such fissioned and translated enzyme fields. The resulting fusing enzymatic fields with its local saturation and global unsaturation of proton orbitals induce catalyze more local saturation and bond formation in the substrates and reactants to cause the compositional anabolic nature of the fields from the α helical regions of the enzyme. As the substrate falls to the decomposition products the activation field is fissioned back to C frame where it couples to intermediate state of the enzyme so that the intermediary state of the enzyme pulls in the fission state from the substrates to energetically restore the enzymes to their native states completing the cycle and determining a time crystallization for enzymatic activity for α helical regions of the enzyme .

But the β pleats have residues local unsaturation and global saturation of proton orbitals in C frame. The β pleated regions of enzymes also in the C frame have less local hydrogen bonds (proton orbitals) relative to α helices and more global hydrogen bonding proton orbital patterns. Thereby the fractional fission of the β pleated regions produce uncoiled stretched regions of more local unsaturation of proton orbitals and global saturation of proton orbitals. The fissed fields from β regions with unsaturated local and more saturated global proton orbitals mix with fission fields from residues of the backbone to fine tune the catalytic enzymatics field. So now the seed sources in fissing becomes superluminous and shifts in internal motions relative

to the fissed fields to translate the fission fields. Encapsulated substrates can act as seeds to induce the collapse and fusion of fissed and translated and rotated enzymatics β pleated fission fields about the interior substrates. The fusion field from the fiss, translate and rotate of β pleated regions collapse to L frame fields having more unsaturated local and more saturated global proton orbitals which interact with the substrate to fragment and decompose the substrate due to the local unsaturating activation field as fused from fission state of the enzyme. The fragmenting local proton activating orbital lift the substrate to transition state along decompositional reaction coordinate for decompositional reaction. As the substrates fall to the decompositions products the activation fields are fissed back to C frame where they couple to intermediary states of the enzymes so that the intermediary states of the enzymes pull in the fissing states from the substrates to restore the enzymes to its native states completing the cycles and determining time crystallization for the enzymatic activity for β pleat regions of the enzymes.

But as fission of many and compression to L frame from C frame (note the attraction in C frame becomes repulsive within an L frame and the repulsion in C frame becomes attraction within an L frame so that + (positive) ---- - (negative) in compression in C frame repel within an L frame; and N (north) ---- N (north) in repulsion in C frame becomes attraction within an L frame and like wise for North south interactions and positive positive interactions and negative negative interactions they become contravariant in an L frame relative to C frame; so the continua in C frame goto fragments within L frame as electronic quantum fields (QF) cancel nuclear QF and electronic N pole binds nuclear N pole for S pole as charge is different. Such fragmented field would disrupt fields in substrates by the surrounding enzyme causes the substrate to decompose. So C frame dipole would form separated L frame multimonopoles of N and S in isolation and net neutral charge in C frame would form + and – separate charge in L frame just as nucleus and e^- lattice.) The interactions between the pieces can have nuclei of denseness and electronic QF of rareness for imbalance for the formations of fragmented with unbalanced charges and net spins from β pleated regions in C frame can collapse in their entanglement about substrate for fractional QF and L continua to disrupt QF in a big molecule so as to activate catabolism of the substrates to induce bond breaking to many smaller species.

So thereby the enzyme β pleated structures are reasoned to induce and host fragmentation of large substrate in a catabolic manner by the fusing of many β pleated regions from the C frame of the enzyme to L frame of substrate in interior of the enzyme. Such fused β pleated regions of charge neutrality and balanced magnetic dipoles would form separated charges in L frame with separated magnetic multimonopoles. Such fused β structures of fractional QF and lepton and nuclei would interact with substrates to cause decompositional reaction trajectories. The diamagnetic hydrophobic neutral C frame residues would fragment and fuse pieces out of position and motion relative to a substrate. This is unlike charge imbalance and paramagnetism of C frame magnetic helical fragment and renucleate as they would nucleate fuse to whole denser QF in L frame for compositional enzymatics. It is as if charge separation global unsaturated proton orbital of α helices in C frame goto whole QF in L frame. But charge neutral unseparated in C frame for rarefied separated QF in L frame. Such β pleated regions fuse to L frame with compression of spin up spin down with consequent fractional fission of electron to electron kernels and superluminous QF and dense QF and nuclei interactions as the QF is diminished in rare rhythmic way by nuclei it various distance and thermal agitations. The β pleated in this way accommodates MO of smaller size molecules providing reaction coordinates for substrates to

decompose. Therefore the resulting nuclear strong field (SF) and electronic weak field (WF) and QF are rarefied and reduce the integrity of covalence between atoms in molecules of substrates; it is as if the enzymes cause the atoms of the substrate to lower ionization energies and reduce their e^- affinities for weaker covalence bonding.

Thereby in this discovery it is reasoned that the β pleated are fissional imbalance quanta states from L frame wherein the imbalance of nuclear quantum field and electron quantum field manifest separated spin up spin down electrons within separated gerade regions of multimonopolar magnetic fields of - and - and separated nuclear charge field and electron charge field from which the β pleated structures fiss with expansion and uncoiling translating and fusing to more balanced nuclear fields and electrons fields and charge distributions with paired spin up and spin down electrons with consequent imbalance on substrates. But what would cause the stable native β pleated to fuse to unstable L field state. The β pleated regions of enzymes manifest its catalytic properties by transiently fusing to this L frame imbalanced charge field separated with dipolar separated magnetic multimonopolar quantum states whereby it destabilizes more stable charge and fields and magnetic multimonopolar quantum states in the substrate for providing reaction coordinates as PE to propel the substrates along path of specific decompositional catabolic processes along enzyme driven reaction trajectories as by potential energy from charges between the substrate and enzyme as enzyme transiently fuse and substrate transiently uses the fused QF of the β pleated enzyme regions to fiss along the reaction coordinates to its transition state. Whereby the enzyme re-fisses to its native state β pleated states pushing the substrate into other regions of the enzyme as α helical regions whereby the α helical regions then transmute to fiss and fuse its many pieces to more balanced quanta fields (relative to fused β pleated regions) whereby the reaction coordinates are given to fuse the many fragments of the transition state to products along reaction trajectory.

Thereby such α helical regions are reasoned in this discovery as fissing balanced quanta states from L frame wherein the balanced quanta states from L frame wherein the more balanced nuclear quantum field and electron quantum field (relative to β pleated) manifest less separated spin up and spin down electrons (relative to fused β pleated) within less separated gerade regions of multimonopolar magnetic field of + and – and less separated nuclear charge field and electron charge and field (relative to fused β pleated) from which α helical structures fissing with expansion and uncoiling tranalating and fusing to less balance nuclear and electron fields and charge distribution with unpaired spin up and spin down electron and electric field separation for α helical native states. The α helical regions of the enzyme manifest its catalytic properties by transiently fusing to this L frame magnetic multimonopolar quantum states whereby it stabilizes less stable fragments of charges and fields of intermediary pieces of transition states to bind anabolize the many species to a bigger product for providing reaction coordinates as PE to propel the many reactants substrates and/or transition state pieces along a path of specific composition anabolic process along enzymatic driven reaction trajectory as by potential energy changes between the substrate and enzyme as enzyme transiently fuse and substrate transiently fissed and use the fused QF of the α helicals of the enzyme to fission together and fuse along the reaction coordinate to its transition state.

It is important to note that this is totally new as the catalytic mechanics as by Little Effect and Ferrochemistry is totally potential energetics with less kinetic energetics which is unorthodox as conventional mechanisms are driven by motions, heat, thermal activation but here it discovers and introduces reaction diagram driven by potential fields and waves adiabatically as

fields / waves change about particles before the particles can change positions and motions. The fields are so strong or weak that v>c and v of particles are v~c for superluminous fields relative to particles so substantial field alterations occur before particle can respond for the slow rotational limit of activation and 2nd Law of Ferrochemistry. So thereby the field assume product configurations before particle so then the particles instantly re-position to product without intervening stochastics. The dynamics occur adiabatically without heat without intervening disorder. Whereby the enzyme re-fisses to its native α helical state pushing out the substrate into other regions of the enzyme as the β pleated are a form more processes or even out of the enzyme into the other enzymes. It is important here to note that by such processes two enzymes can interact as the fused state of one enzyme can reversibly interact with the fission state of nearby enzyme so as to push substrates out of one enzyme into the nearby enzyme. So now the discovery here gives crucial coupling between enzymes. The mistake of prior scientists is that they try to study the enzyme in isolation. But the properties of an enzyme depends on its substrate and environment.

So it is that enzyme with substrate can do what the two individually cannot do. Surrounding enzyme also cause the enzyme to emerge new properties. The fission states of β pleated regions and/or α helical allows the enzyme subunit to interact nonlocally by its fissioned state with other subunits or even the whole enzyme to couple interact with nearby enzymes. So now the amino acid residues have the properties of fusing to interact with the substrate and fissing to interact with other subunits or even other enzymes. Such effects are due to the 2p nature and the large effective nuclear charges of atoms composing the backbone and some residues. The large effective nuclear charges cause the particles to pull in order heat and prevent heat frustrations for purely potential energy dynamics. So quantum properties can manifest at higher temperature even room temperature. s and p orbitals fission to protein properties and fuse to catabolic and anabolic.

In reasoning these interactions between the enzymes and substrates it is important to involve size effects as enzymes approach nano-size and macroscopic and substrates are molecular sizes. It is important to consider these different frames of C frame, L frame, LS frame, NS frame, RS frame and QS frame. The L frame has different push pull relative to push pull relative to L frame and C frame. Prior to this work, this has not been reasoned by other scientists. The C frame is the lab frame of macroscopic perspectives on size scale and time of the earth and motion of the earth. The C frame attractions transform contravariantly to repulsions in an L frame and C frame repulsions goto contravariantly attractions within an L frame. But between two or more L frames the C frame interactions are maintained as attractions in C frame transform covariantly to attractions between L frame and repulsions in C frame transform covariantly as repulsions between L frames at threshold distances. But if the L frames are pushed together then a larger L frames can merge for transformations as within one L frame such that pushing the many covariants induces contravariance in limit of v goto c. The interactions also depend on the numbers so that few L frames at proximity below the threshold proximity manifest as one large L frame with contravariance of fields. So few L frame would correspond to a push luminously of many ($N< 10^{23}$) so the few contravariant would be as luminous motions of many in contravariance; because of the huge number not allow self interactions for the maintenance of contravariance so contravariance goes to go variance. But if there are of order $N >10^{23}$ then the L frames manifest as in C frame in covariance in luminous motion. But the $N>10^{23}$ would have to move v>c to maintain contravariance; because moving faster than light of $N>10^{23}$ causes the huge number to maintain self interactions so

contravariance remains contravariance. Hidden superluminous motions manifest within L frame for L continua wherein superluminously fields act as in C frame as contravariance of L frame transforms to covariance but at luminous motions the fields invert so attractive (continua) goto repulsive as speed slows to c so repulsive and repulsive (continua) go to attractive with slowing to luminous. The LS frame is within the L frame contains the leptons. From L frame to LS frame repulsions (N---S) transform rationally to attractions (N---S) and attractions (N---N) transform to repulsions (N---N). So N --- N attract transforms rationally N --- N repulsion by v>c from L to LS frames; and (+ ``` +) attraction in L frame transform rationally by v>c to repulsion in LS frame. The weak field is a transitory superluminous quanta from lepton to quantum fields as weak fields {N---N attraction goes to N----N repulsions due to v>c} manifest irrational transformations as quantum fields superluminously transform to weak field but with slowing these transformations as by many many quantum fields (10^{23}) then themany superluminous in repulsions and v>c slow and in slowing become rational and attractive to form leptons for internal lepton interactions. From L frame to NS (nuclear) frame, repulsions transform to attraction but irrationally and nonsmoothly as jerky as the repulsions are modulated by momentary attractions so S/N---N/S fractional repulsion in L continua goes to nuclear frame in jerky manner as v>c and many many fractional such repulsions slow to nuclear fields in jerky manner. And Nuclear field attraction S/N----N/S goes to strong field of repulsion in jerky manner as v>c of the nuclear fields and as N>1023 of such v>c nuclear fields or N>1023 of repulsive strong field goto attractive quark fields. From NS frame to RS (strong field and hadron) frame attraction transform as v>c to repulsion in RS frame and vice versa attractions in NS frame transform repulsion with RS frame. From RS frame of repulsion as v>c attraction in QS frame (quark interior and quark fields). From RS frame to QS (quark) frame repulsions transform to attraction and attraction transform as repulsion with quark field superluminously manifesting hadron field transformations which slow to QF frame interactions at light speed. The NS frame is also within the L frame and contains nuclei and nuclear fields and nuclear quanta fields. The NS frame is relativistic frame of proton and neutrons with continua of nuclear fields relative to outer L frame of electronic QF and L continua and even relative to outer most L frame of electronic QF and L continua and even relative to outer most C frame The RS frame is an inner relativistic within hadrons of quark, gluons with continua of strong field relative to outer NS frame of proton, neutrons and nuclear fields. The QS frame is relativistic frame within quark layer with discontinua of quark fields and forward and reverse dynamics relative to out RS (hadronics) frame of quarks and gluons within continua of strong field. This work presents these different frames for a comprehensive model of the universe so as to give a broader deeper understanding of macroscopic phenomena of the basis of atomic, nuclear, leptonic, hadronic and quark content and dynamics. This model gives here deeper, broader mechanism, distinction and cure for cancer.

On the basis of these different frames particles, fields and waves manifest for composing living and dead matter. The normal cells and cancerous cells have many complexes of enzymes, proteins, nuclei acids, fats, nano-water, carbohydrates with outer interactions of thermal spaces of electric space (van der Waals and London fields) and gravitational fields of monopolar fractional magnetic and magnetic dipolar fields of C frame and more local macroscopic fields and motions on nanosize and internal fused magnetic integer multimonopolar fields of separated N and S for quantum fields (QF) and fractional magnetic multidipolar magnetic irrational superluminous fields of L continua of L frame and integer fractional magnetic multimonopolar

irrational superluminous fields of weak fields and e^- leptons of the N integer multimonopolar fields (QF) and nuclei (NS frame) of hadrons of S/N integer multidipolar rational luminous fields (L continua) and nuclear fields of S/N integer fractional multidipolar irrational superluminous fields. Quarks and Strong fields can be composed of hadron and nuclear field in a similar manner but stopping at the hadron and nuclear field level fits the purpose here. The QF are multimonopolar homo magnetic N field which are excessive of irrational WF (roto-translations) (uncentered rotation) which are excessive of rational electron lepton centered rotations. And the L continua are multidipolar magnetic hetero S/N fractional irrational superluminous magnetic field which are excessive of irrational superluminous NF (un-nested, centered CW/CCW rotational) (of NS frame) which are excessive of rational hadrons of protons or neutrons (of RS frame) un-nested centered rotations of quarks (of QS frame).

So now the L frames fiss, the RS frames fiss the LS frames fiss to produce fields in the C frame. RS frames fragment due to surrounding disorder as by surrounding thermal space and gravitational fields; LS frames fragment due to surrounding order as by surrounding quantum fields and magnetic fields and electric fields. RS frames fuse due to surrounding order (surrounding quantum fields magnetic fields and electric fields) and LS frames fuse due to surrounding disorder (thermal space and gravity). So RS and LS frames fragment at different times under different conditions. LS frames fragment together and they all perceive order with induction of fragmentation by ordered surroundings as surrounding order QF. RS frames fragment together or at different times due to the random perturbation of disorders. RS is fragmented by thermal space and gravitational space; so thermal space is out of rhythm so nuclei fragment at different times for continua. But LS frames fragment due to order and they tend to fiss together. So random nuclei as in gas fragment randomly for continua. LS frame has same rhythm different space; RS frame has different rhythm same space. But nuclei in molecules or molecules coupled by electrons may fragment with more order in synchrony. What about macroscopic particles and objects? So electrons fragment together due to crystal order. So this leads to many possibilities. Nuclei in heavy metals are shielded by surrounding electrons from disorder so they are particulate. But small nuclei like H, He, Li, Be, B , C, N , O , F, Ne are not shielded so they are more subject to fission due to exposures to dense surrounding thermal space and they alter their electronic lattices accordingly as these nuclei fiss in same space out of rhythm. Such fiss of these smaller nuclei are the basis presented in this disclosure for life and the basis by which in this life can become cancerous by altering isotopes of nuclei. The electrons collapse (at different times) in these 1s 2s 2p elements with the fractional fission of nuclei as the electron fuses (at different times) in the disorder of fission nuclei (at different spaces) and the resulting particle ordered electrons induce fusion of the nuclei and the fused nuclei cause fission of the electron particles for cyclic time patterns of repeating nuclei fractional fissions inducing electron fusion and electron fusion inducing nuclear fusion and nuclear fusion inducing electron fission and electron fission induce nuclear fission and the cycle repeats. Whereas nuclei induce mutual time disorder electrons cause nuclei to manifest space disorder (jerky in nuclear positions). Also whereas electrons induce space disorder the nuclei induce electrons to manifest time disorder (jerky in time). Electrons in heavier nuclei fuse more as they see less order in C frame and nuclei in heavier elements see less disorder as surrounded by core electrons. But as H penetrates the core more disorder fissions the heavier nuclei and fission p^+ and fuse electrons and unconventional nuclear reactions occur. Can random fission of nuclei transform nonrandom fission? If thermal gets dense then many nuclei can fission. Thermal space by its nature is random so it cannot cause nuclei to simultaneously fission. Can anything cause nuclei to

simultaneously fission? Strong field can cause nuclei to simultaneously fission and this is the cause of black holes. Heat causes electrons to fuse but heat is random so many electrons cannot simultaneously fuse. But weak field can cause many electrons to fuse and this is the origin of the neutron star. Weak field causes many electrons to fuse. Many electrons cause electrons to wave and fission. The relative motions can randomize the electron to random nuclear agitation. So many nuclei can fission due to many random motions of order or to motions of thermal space.

So these different frames and the fractional fissions of particles to fields and waves and fractional fusions of fields and waves to particles are considered in this novel ways so as to gather a new understanding here of life and to reason atomic basis of cancer. So the chemistry of organics and biochemistry have been understood by only e^- and its fragmentation moving in L frame constructing valence and bonding nuclear for ionic, covalence and metallic bonds for compounds until the discovery of Ferrochemistry [1,18]. But in this work the fractional fission of nuclei is also introduced (as by perturbation by disorder in surroundings as thermal and gravity fields) for explaining new chemistry and physics of Ferrochemistry as the wave nature of the nucleus by its fractional fission even if hidden causing + nucleus quantum fields from nuclei with positive magnetic moments and for some nuclei fiss to negative quantum fields in L frame (from nuclei having negative magnetic moments) for altering L frame electronic QF and L continua of even isotopes of the same elements so that the chemistry and physics and even the biology involved with these isotopes of these elements are different. So for elements of life C, N, O, Mg, S, and P have isotopes with nuclei of different spin and magnetic moment ^{12}C and ^{13}C; ^{14}N and ^{15}N; ^{16}O and ^{17}O; ^{32}S and ^{33}S so that the fractional fission of the nuclei cause superluminously altered electronic QF, L continua of the L frames and even magnetic field, gravity, electric and thermal space of the outer C frame; so as to alter momentarily the bonding and dynamics between atoms in molecules to alter chemical and biochemical dynamics to alter the biology.

But why, when these ^{13}C, ^{15}N, ^{17}O, ^{25}Mg, ^{30}P, ^{32}P, and ^{33}S fragment within enzymes is there such a large effect and what is it about enzymes and proteins that cause larger fragmentation. So gravity causes the fragmenting of nuclei atoms of life so as ice rises to different heights ^{16}O fragments more or less so water nanodroplets freeze and melt and charge to cause thunderstorms and charge separation by gravitational induced alterations of covalence, hydrogen bonding and melting and freezing of H_2O in the atmosphere. The water in living organism would have different fragmenting if it has ^{17}O verses ^{16}O so this can kill cancer if the host is dropped out of a plane or parachutes. So now on surface of earth and away from earth the nuclei fragment more or less to alter biomolecules. Astronauts have different tissue changes in outer space due to this effect. So now the biomolecules have their nuclei fractional fiss translate and fuse to alter L frames and to alter the enzymatics so now if the ^{12}C is substituted for ^{13}C then the fragmenting causes alter biochemical dynamics; so if expose cancer cells to strong gravity then maybe to kill cancer as the altered gravity may damage the cancer cell. But how cancer cells may fragment more due to their nonprimordial magnetic moments and larger changes in QFs in their bio molecules due to gravitational changes or normal cells may fragment less under strongly changing gravity. President George Bush parachuting may have killed tumors in his body. Parachuters may suffer fewer incidence of cancer. But gravity fragment nuclei and the fragmented nuclei alter the glycolytic and Kreb cycles so the fissioned α regions and fissioned β regions are not as able to fuse and for compositional fields and/or decompositonal fields for catalyzing substrates.

It is important to note the here discovered and published magnetic rational luminous multimonopolar field as the nature the QF. The isolated integer monopoles in C frame is unstable and hidden. It is determined here that gravitational field is fractional magnetic monopolar field (integer fractional magnetic imbalanced dipolar field) and superluminous in motion. The C frame magnetic field is a rational integer dipolar field. Thermal space of the C frame is irrational fractional superluminous magnetic dipolar field. But as here reported where as individual integer magnetic monopoles are hidden in C frame many, many magnetic monopoles can stabilize and manifest relativistically in L frame to manifest QFs (wavefunctions) as with denseness it is determined here that N/S magnetic dipole in C frame compress and spiral so in a limit beyond a threshold radius of the spiral causes N --- N repulsive interactions and S ---- S repulsive interaction with N --- S attractions. But for motions approaching the speed of light the size of the spiral is less than the threshold size for insuffcient denseness for dipole the N --- N and S ---- S repulsions as the N---N and S----S repulsions become so huge that they transform to attractions and S---N attractions transform to repulsions so the C frame transforms to L frame so N N N in excessive repulsion bind to form multimonopolar fields for a quantum field and imbalanced S/N --- S/N ---- S/N in excessive repulsion flip to weakly bind to form N N N QF of electron and imbalanced S/N S/N S/N (L continua) {as in denseness of nuclear fields the S has some N amalgam in denseness with slightly excess S for integer fractional magnetic monopoles (or fractional magnetic dipoles in differences) for L Continua which in denseness forms nuclear fields} The nuclear QF s in denseness form p^+ and n^0 hadrons and the hadrons in excess form strong field of S/N and N/S neutrons and or S/N protons. The protons have more S/N S/N with few N/S as compositing its two up quarks and one down quark. The neutrons have more N/S N/S with a few S/N as composing its two down quarks and one up quark. And the strong field forms up quarks (S/N) (of CW) and down quark (N/S) (of CCW). So the p^+ of 2 up and 1 down and neutron of 2 down and 1 up and they fiss to produce different nuclear fields of different magnetic moments (spin / angular momentum) so that with more p^+ of nucleus angular momentum is + with more CW and with more neutrons in nucleus angular momentum (–) with CCW. So nuclei with "+" angular momentum fission to L frame to cause attractive CW whereas "+" CW in nucleus is of repulsive nature; But the neutron fragments to L frame to cause repulsive CCW where "-" CCW in nucleus is of a binding nature. So magnetic nuclei by fractional fission cause their new novel alterations of L frame. So as fractional fissions of ^{13}C, ^{15}N, ^{17}O, ^{25}Mg, ^{30}P and ^{32}P and ^{33}S occur in protein and substrates of glycolysis and Kreb cycle, the fissions alter L frame of QF and L continua in the proteins and substrates in different ways relative to fractional fissions of the ^{12}C, ^{14}N, ^{16}O, ^{24}Mg, ^{31}P and ^{32}S.

Likewise the pieces of many amino acids residues fractionally fiss with a surrounding C backbone of C-C=N graphene/diamond with magnetic NV fractional fiss and fuse in new locations so mixing of many residues with backbone pieces fuse to in α helical regions of separated + and - and N/S fields to compose QF of C-C-N, C-O, C-H, O-H, C-C as in the backbone so as to give reaction trajectories for substrate to enzymatically compose anabolic substrate to products. On the other hand, the enzymes of β pleated regions of up down spins diamagnetism and neutral charges fractional fission with their C-C=N backbones to overcompress and imbalance nuclear fields and electronic fields for fractional QFs which give reaction coordinates for substrates to decompose.

These are very strong covalent bonds between C, N and O but protons can break them. How do proton orbitals differ from electron orbitals? The proton breaks such bonds as it lacks core electrons so it is not shielded so surrounding disorder can more fiss the p^+ relative to nuclei of larger atomic numbers having core electrons to shielded their fissing. The fields released are stronger as the proton is hadron and it fractional fissing release more QF relative to fractional fission of lepton electrons! Likewise the fractional fission of the muon releases more QF relative to the fractional fission of electron which can have dramatic effects of tiny electric fields to explain the muon physics. These effects explain acid catalysis as in, acidity disrupts π bonds and disrupt π bonds alters proton orbital shifting residues and fragmenting proton orbitals to fission translate fuse as proton orbit. The fission, translation and fusion about protein manifest QF of proton orbitals across regions of protein which can disrupt bonds in substrate decompose and/or form bonds in substrate! In the β pleated regions, hydrophobic regions fuse (after fission and translating) to overly overlap imbalance nuclear L continua and e^- QF for fractional QF reactions coordinate that decompose substrates. And α helical regions fuse (after fission and translating) to overlap separated +/- and paramagnetic to form QF reactive coordinates that compose substrates. After fissing the many diamagnetic field (paramagnetic) and +/- neutral charged fields of β pleated, (α helical) regions shift in positions about the seeds (as the groups move v>c due to the strong interactions as held by the back bone) and fuse together so thermal → E → G → P → L continua → QF → WF so that the L continua and QF from the enzyme (β and/or α) interact with the QF and WF, NF, e and nuclei of the substrates for alterations of the substrate QF (by the Little Effect) with fraction QF fractional multimonopole of β pleated regions decomposing substrate QF and integer QF integer magnetic multimonopoles from α regions composing substrates.

Therefore on the basis of this work, the many atoms composing the enzyme by thermal and gravitational agitations fractionally fiss for transforming tiny fragments of quarks to strong fields between the QS and RS frames with superluminous motions of the quarks. The agitated strong field fragment into the nuclear field for tiny agitating the nuclear field of the NS frame by the internal RS frame and QS frame. The agitated NS frame and accelerated hadrons fractionally fragment into the L frame with tiny agitation of the quantum fields and L continua. Such tiny agitations of the quantum fields and L continua are small relative to nuclear fields and energies but huge for the L frame quantum fields and L continua. The agitations from the QS to the RS to the NS to the L frames are hidden and reversible and the hidden natures result from the luminous and superluminous speeds of agitated quarks, strong field, hadrons, nuclear fields, and L continua. The hidden agitations relative to C frame are responsible for the production of the gravitational fields of bright matter as all the nuclei of all the atoms composing the matter release agitated L continua superluminously and with stretching and uncoiling in denseness from the atoms the fragments from many atoms sum in stretching to produce the gravitational field and bent space caused by the matter. But such is discussed by author in other manuscripts but here these agitated nuclei are emphasized to alter the chemistry of the atoms as the nuclei fractionally fragment into L frames the QF of atomic orbitals and therefore molecular orbitals are disrupted. Such disruptions alter the dynamics of electron rearrangement during changing covalence.

The critical point of the theory is the isotopes of C, N, O, Mg, P, and S having isotopes of different nuclear magnetic moments causes different fractional fissing of these different nuclear magnetic moments into the L frames for affecting the atomic orbitals and molecular orbitals and L continua in different ways. ^{12}C has zero nuclear magnetic moment but ^{13}C has positive nuclear

magnetic moment of 0.702 so the substitution of ^{13}C for ^{12}C in biomolecules on the basis of this theory should affect the metabolism and enzymatics. ^{14}N has a positive nuclear magnetic moment of 0.403 but ^{15}N has a negative nuclear magnetic moment of -0.283. ^{16}O has a zero nuclear magnetic moment but ^{17}O has a negative nuclear magnetic moment of -1.894. ^{24}Mg has a zero nuclear magnetic moment but ^{25}Mg has a nuclear magnetic moment of -0.855. ^{31}P has a positive nuclear magnetic moment of 1.131 but ^{30}P and ^{32}P have nuclear magnetic moments of 0 and -0.252 respectively. Also injecting tumor with $^{32}PO_4^{3-}$ can kill the cancer cell as the ^{32}P would disrupt the ATP in the cancer cell relative to ATP in normal cells by its different Ferrochemistry. Moreover, the ^{32}P leaves no waste as it decays to ^{32}S with halflife of 14.28 days. The ^{32}S is a normal PO_4^{3-} would likely form SO_4^{2-} in the body. The PO_4^{3-} has to be localized in the tumor to avoid its action on normal cells. But as the $^{32}PO_4^{3-}$ seep in the body it dilutes and has much tinier effects on surrounding tissues and it beta decays in a matter of 14 days so even that tiny amount disappears. But the local injection on the tumor can kill the tumor. ^{32}S has a nuclear magnetic moment of 0 but ^{33}S has nuclear magnetic moment of 0.644. Therefore the large changes in magnetic moments of nuclei for isotopes of C, N, O, Mg, P, and S cause large differences in nuclear fields released during fractional fissing for different L frames for different chemistry and biochemistry on substrates and enzymes.

Some may wonder why these effects are not as pronounced in inorganic chemical reactions. The reasons involve the second and third row elements of life and the 2p and 3p orbitals so that these elements are not as shielded from the nuclear fields and the thermal and gravitational fields from outside the atoms of these smaller atomic number elements can penetrate more deeply to the nuclei causing agitations for more tiny fractional reversible fissing of these nuclei and the tiny nuclei rotate and revolve rapidly in the resulting released nuclear fields and dense quantum fields and the carbon and nitrogen back bones are able to hold these transient high energy states in close proximity in proteins and nucleic acids so that the fractional fissed nuclei rotate revolve and translate to reversibly release the fractional nuclear fields and the stretched uncoiled nuclear fields alter the electronic wave functions and the electronic wave functions fractional fragment into the C frame from many internal L frames and the many fragments of L frames sum and differ in the C frame and translate as the underlying L frames and RS frames and LS frames move relative to the fields and the fields can pull into substrates to alter the reaction trajectories of substrate for enzymatics. The enzyme interior is a novel environment a novel solvent of superluminous changing proton orbitals hydrogen bonds changing polarity of such denseness ripping chemical bonds. But if the isotopes are changed to isotopes to different nuclear magnetic moments then the fragmented fields translate and fuse in incompatible ways about the substrates to alter the enzymatic activity. In the next section these effects of changing isotopes of C, N, O, Mg, P and S are presented for enzymes of the Kreb and Glycolysis processes and it is demonstrated how the change from primordial isotopes of ^{12}C, ^{14}N, ^{16}O, ^{24}Mg, ^{31}P and ^{32}S to nonprimordial isotopes of ^{13}C, ^{15}N, ^{17}O, ^{25}Mg, ^{30}P, ^{32}P and ^{33}S suppresses the Kreb cycle and accelerates the glycolysis process for cancer genesis. Finally based on the habitat of cancer with these nonprimordial ^{13}C, ^{15}N, ^{17}O, ^{25}Mg, ^{30}P, ^{32}P and ^{33}S isotopes a theory of cure of all cancer is given.

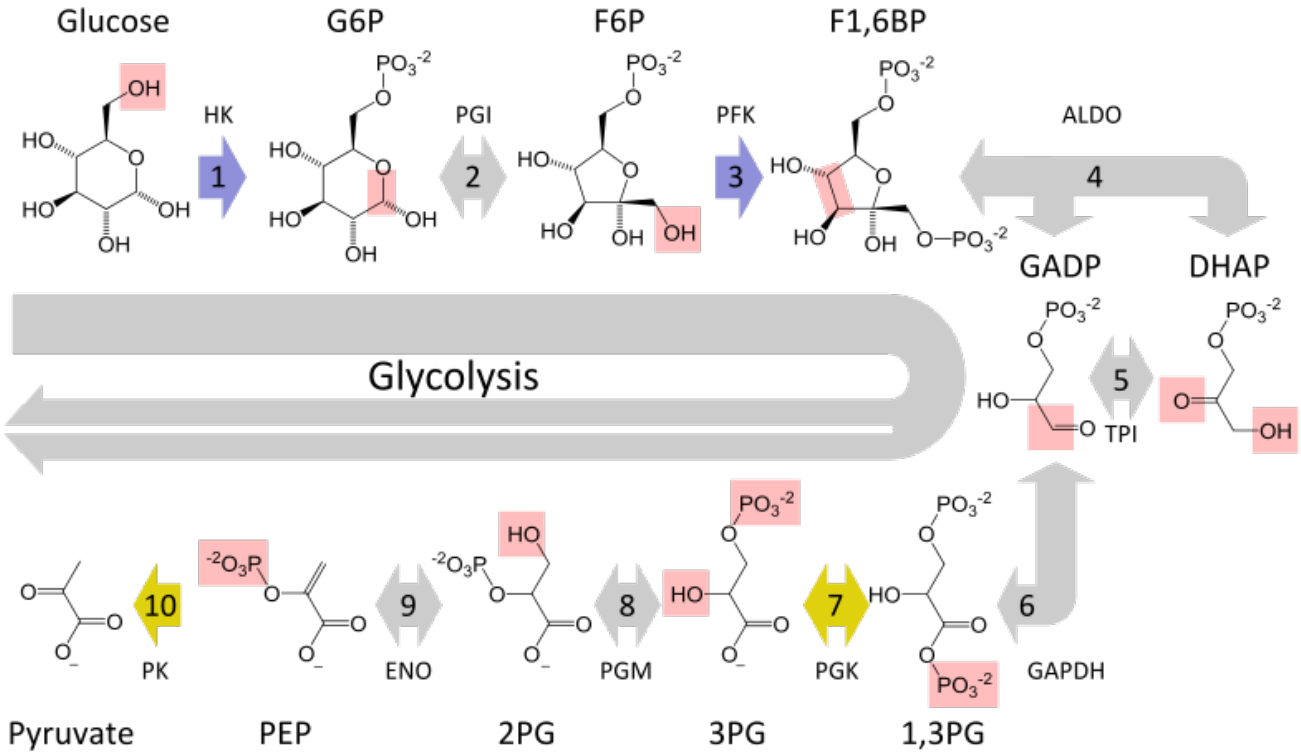
First Step of Glycolysis

The 1st step of glycolysis involves the transformation of glucose to glucose 6 phosphate as catalyzed by the enzyme hexokinase. See Figure 1 [21]. The reaction is endothermic and it

uses one ATP. This reaction regulates glucose levels in the cell and the transport of glucose into the cell. The reaction is a phosphorylation. The purpose of this step is to prepare glucose for oxidation and cleavage into pyruvate. This first step couples with the second step as it places a phosphate on the glucose for providing internal π bond resonance for resonating bonds in the glucose for catalyzing the second step of transforming 6 carbon ring (glucose) to 5 carbon ring (fructose). Forms of hexokinase have been determined bound to outer membrane of mitochondria. Such mitochondrially bound hexokinase has been correlated with efficient aerobics of tumor cells operating by high glycolytic rates. Here it is determined that the mitochondria may modify the hexokinase and the hexokinase may modify the mitochondria so the Kreb cycle cannot operate normally. The mitochondria may be operating with cyclic Kreb mechanism but the coupling to the hexokinase may energize the hexokinase for its accelerated phosphorylation of glucose. The magnetized mitochondria may couple to hexokinase to magnetically accelerate the phosphorylation of glucose (c carbon sugar) just as citric acid is six carbon. But the coupling drives the hexokinase and stops the Kreb cycle. So rather than cycling the Kreb. The hexokinase causes a cycle with glycolysis. As glycolysis forms pyruvate the pyruvate goes in to the mitochondria and the mitochondria begins forming citric acid and the citric acid dynamics couples with the hexokinase dynamics so the citric acid is partially converted and form ATP and the ATP fuels hexokinase and the products of the citric acid are converted to glucose to feed back to the glycolysis to close the loop.

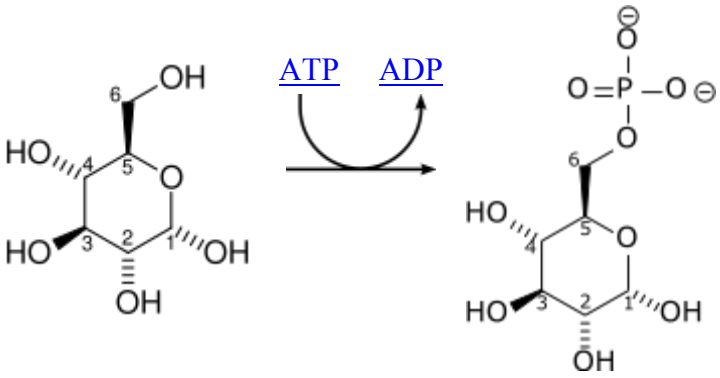
The hexokinase has molecular weight of 50,000 Daltons and is composed 448 amino acids with 13 α helices and 5 β pleats. It has a binding site for phosphate. The binding site is composed of 5 β pleats and 3 α helices for more β pleats as by the model given here decompositional local chemical change requires local β pleats. The 5 β pleats are active in bond breakage as the first step involves fragmenting the ATP molecule at the site by breaking the γ phosphoryl group of the ATP for forming bond to oxygen of the C6 of the glucose substrate. The α helices at the site further associate and bind Mg^{2+} to the ATP for shielding charge. The α helices simultaneously (with the β pleats) induce bond forming nucleophilic attack of the hydroxyl of the glucose on the terminal phosphoryl group of the ATP molecules as the β pleats stretch bonds about the phosphoryl group and alter bonds in the attacking OH of the glycolysis. The phosphoryl group transfer from ATP to glucose forms glucose 6 phosphate and ADP. Asp 205 {-- COO^-}, Lys 169 ($-NH_3^+$), Asn 204 {–CH2 –C (NH2)(O)}, Glu 256 { -C-CH_2-C(O)(O^-)} and Thr 168 {--C(H)(OH)(CH_3)} are important local residues at the active site. Asp 205 is active in detecting glucose and inducing conformational change as glucose is bond. The Asp 205 has proton orbitals within the site but as glucose enters it develops proton orbital with glucose to alter the hydrogen bonding in the site to alter the conformation of the protein. Vice versa, the alter conformation further pulls in the glucose. The conformational change prevents hydrolysis of ATP. The amino acid residues of greater importance in the active site have these residues with C, N, O, P and Mg are important in the binding of ATP. Changes in primordial to nonprimordial isotopes will alter the dynamics of the phosphorylation of the glucose. $^{25}Mg^{2+}$ due to its negative nuclear magnetic moment may push electrons from $^{25}Mg^{2+}$ relative to $^{24}Mg^{2+}$ for less shielding of the phosphate by $^{25}Mg^{2+}$ to hinder the glycolysis. The replacement of ^{17}O and ^{15}N for ^{16}O and ^{14}N on these residues may accelerate the nucleophilic attack of OH on the gamma phosphorus as the ^{17}O and ^{15}N push electrons onto the OH of the glucose making it a better nucleophile to attack the ATP. This change of primordial isotopes to nonprimordial ^{15}N and ^{17}O accelerates this first step of glycolysis. The ^{15}N and ^{17}O are better nucleophiles so their

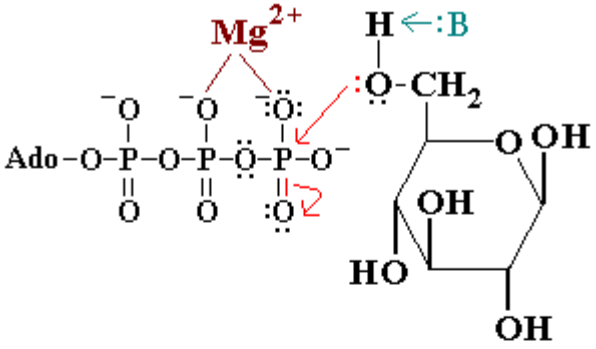
interactions with the OH via proton orbitals cause the nucleophilicity of the OH of the glucose to be better.

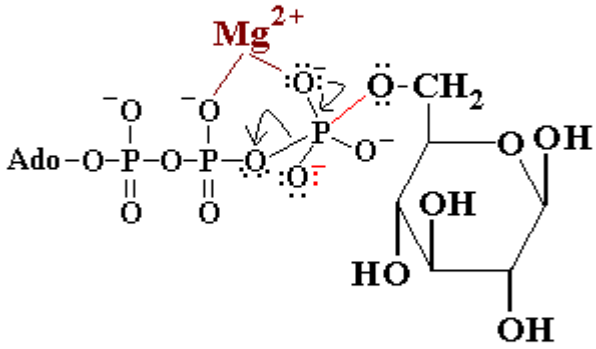


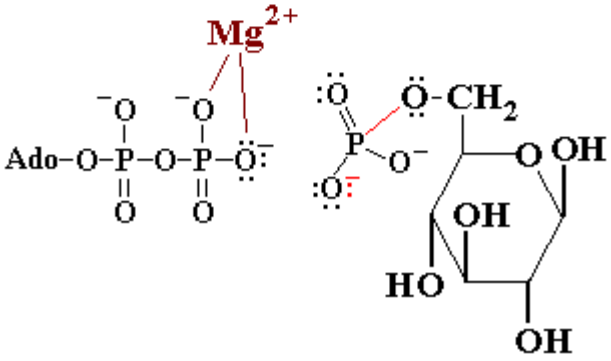
{https://commons.wikimedia.org/wiki/File:Glycolysis_metabolic_pathway_3.svg}; Thomas Shafee

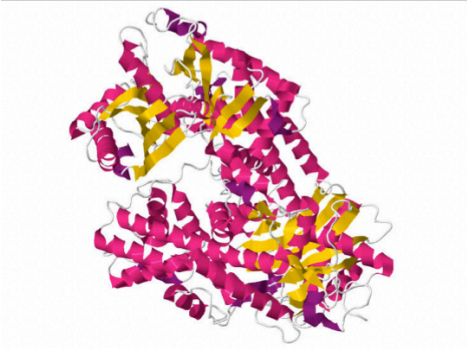
reference 21a




Mg2+
H ← :B
Ado–O–P–O–P–O–P–O⁻
CH2
OH
OH
HO
OH


Mg2+
Ado–O–P–O–P–O
P
O⁻
CH2
OH
OH
HO
OH


Mg2+
Ado–O–P–O–P–O⁻
P
O⁻
CH2
OH
OH
HO
OH



By Hexokinase.pdb2.jpg: Jmol development teamderivative work: Boghog (talk) - Hexokinase.pdb2.jpg, CC0, https://commons.wikimedia.org/w/index.php?curid=12012673

See Reference 21b.

Figure 1

The ATP is magnetic as its 3 phosphates monomers are polymerized and have 3 magnetic ^{31}P centers and are exchanged by O ligands and resonating double bonds to alter the exchange of the magnetic moments of the ^{31}P centers. On the basis of such magnetic ATP and the needed holding of it and bond rearrangements within it during this 1st step of glycolysis, the positive charged $^{24}Mg^{2+}$ and nucleophile ^{16}O-$^{12}CH_2$ of glucose and Asp ($^{12}C^{16}O^{16}O$-) are diamagnetic (electronically and nuclearly) so the positive Mg^{2+} shields the -PO_4^{3-} from the incoming nucleophile so the nucleophile can get to the positive P center for bond rearrangement, the nucleophile further experiences magnetic repulsion as the P center is magnetic and the ^{16}O-^{12}C is diamagnetic. There would be a Meissner Effect of the diamagnetic ^{16}O-^{12}C being repelled by the magnetic ^{31}P center as the opposing charge (nucleophilicity and electrophilicity) of valence pulls them into bonding. The change of the nonmagnetic nuclides to magnetic nuclides would eliminate this diamagnetic repulsion of the bosonic ^{16}O-^{12}C and magnetic ^{31}P center so that changing the primodial isotopes ^{12}C, ^{14}N, ^{16}O, and ^{24}Mg to nonprimordial isotopes of ^{13}C, ^{15}N, ^{17}O, and ^{25}Mg would accelerate the attack of the OH-C of glucose on the carbon center to accelerate this reaction. And this is how the Little Effect and Ferrochemistry accelerate glycolysis for an atomic basis for Warburg Effect. The cure as reasoned by RBL would involve rotations of the nonprimordial isotopes or altering their magnetic attractions so they magnetically repel or do not magnetically attract so as to suppress the attack of the OH-C of glucose on the phosphate of ATP to terminate this step in cancer cells. An external static magnetic field and/or many dynamical magnetic fields tuned by RF radiation will alter such magnetic interactions to terminate the nucleophilic attack and thereby turn off this energy source for the cancer cell and starve and kill the cancer cell. This first step is endothermic and high energy for easy of coupling for cure. This invention further notes that the selective use of monochromatic X-rays as tuned specifically to the ^{13}C-^{17}OH and P-^{17}O and ^{25}Mg---OPO_3^{2-} interactions would selectively demagnetize the complex to eliminate the step. The RF and X-rays can penetrate the human

body and reach the cancer in deep tissues and bones. The normal cells of different isotopes would not be affected by the X-rays. Typically people think of X-rays as causing cancer but in this discovery the soft low frequency X-rays are employed without ionizing core electrons but exciting to upper quantum levels and obeying selection rules for specific nuclides so that the nuclides in cancer cells can be excited and the nuclides in normal cells would be not excited and the x-rays pass un absorbed by normal cells. The procedure would be like typical X-rays at the dental procedures.

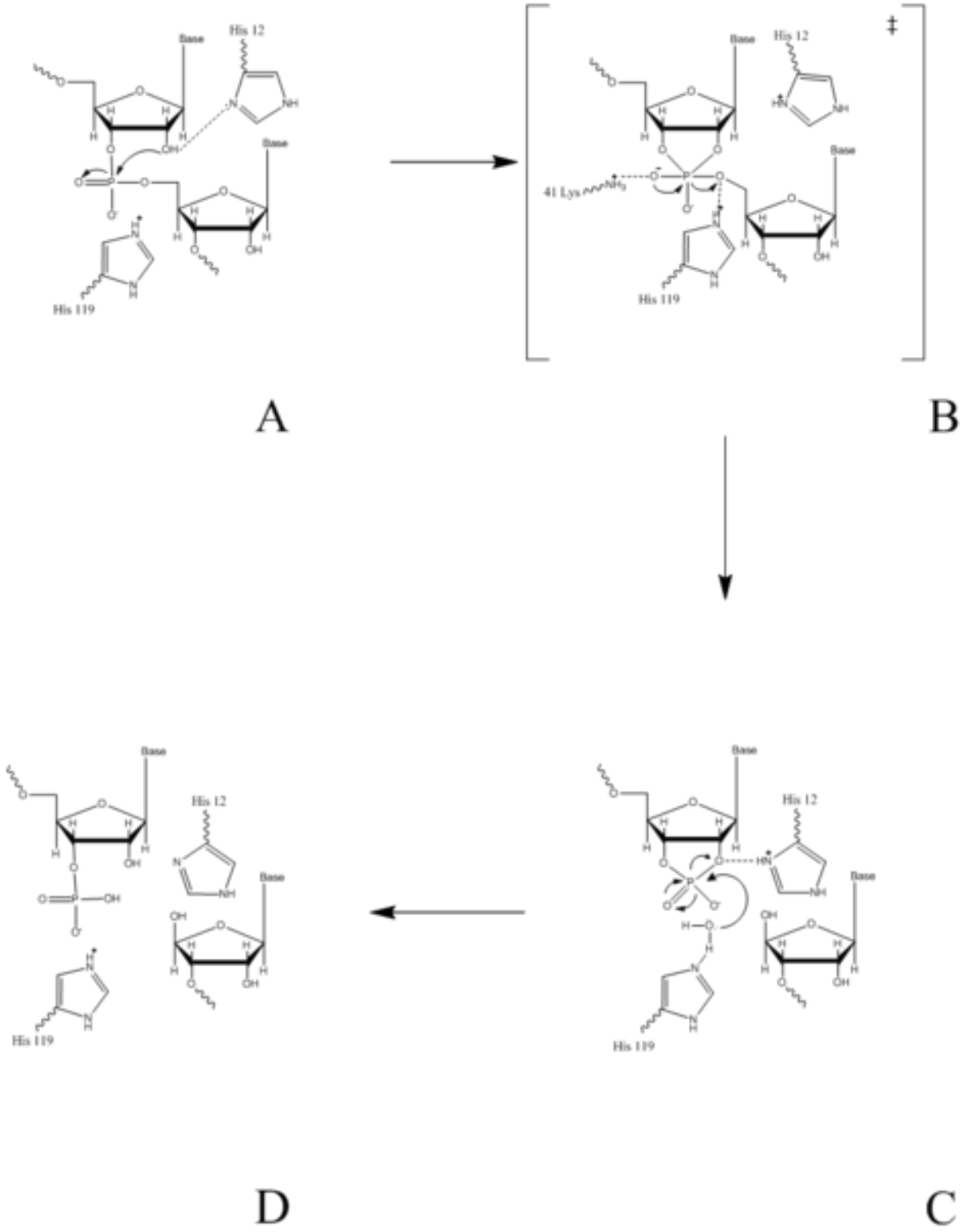
Second Step of Glycolysis

During the second step of glycolysis, the α D glucose 6 phosphate is converted to β D fructose 6-phosphate by enzyme glucose 6-phosphate isomerase. There are three sub-steps associated with the mechanism for this 2nd step. The glucose ring opens in the first sub-step. The isomerization of glucose to fructose is the second sub-step. The closing of the fructose ring is the third sub-step. See Figure 2. The mechanism is consistent with the enzymatic theory for α helical causing composition and β pleated causing decomposition as the opening of the ring is a decomposition and the rearrangement involves both decomposition and composition. The α helical regions catalyzes the ring closure as such is compositional. The mixed α helical and β pleated enzyme also induces the composition beyond the transition state and β pleated induces decomposition to the transition state. The glucose 6 phosphate isomerase has two active domains. The smaller active domain has 5 parallel β pleats. And the larger domain has 6 parallel antiparallel β pleats. The enzyme has molecular weight of 55,000 Daltons. The active site has important residues of Lys 210, Gln 353, Gln 511, Lys 518, His 388. See Figure 2. [22]

The purpose of this second step is the altering of the 6 member ring to five member ring with the location of an OH group at the other end carbon outside the ring. This step integrates with subsequent steps as the end OH in the next step is substituted for phosphate and the resulting phosphate in the step 4 facilitates cleavage of two bonds in the strained smaller five carbon ring.

The general objective of this step among the 10 steps is to rearrange the end of the sugar from larger closed ring to smaller closed ring with a second OH off the ring so that later step can phosphorylate the second off ring OH. The purposed is to also alter substrate to smaller ring so ring strain can later cause internal ring cleavages. On basis of these different steps and enzymes for these purposes how would enzymes interact and couple? The fields from the enzymes would have to fiss to not only fuse on the changing substrate but also to interact with each other for an internal spiraling macrofield as previously proposed by the author as a chemical wave. The chemical wave of glycolysis is linear. The chemical wave of Kreb is rotational and nonlinear so it self-interacts in space where as glycolysis self-interact in time. The nonlinearity of Kreb chemical wave causes its nonclassical nature. Enzyme interactions can be accumulated or compressed to kill cells. A dead cancer cell be used to find fields that are disruptive in cancer cells.

Phosphoglucose isomerase



From { http://proteopedia.org/wiki/index.php/Image:Mech.png}

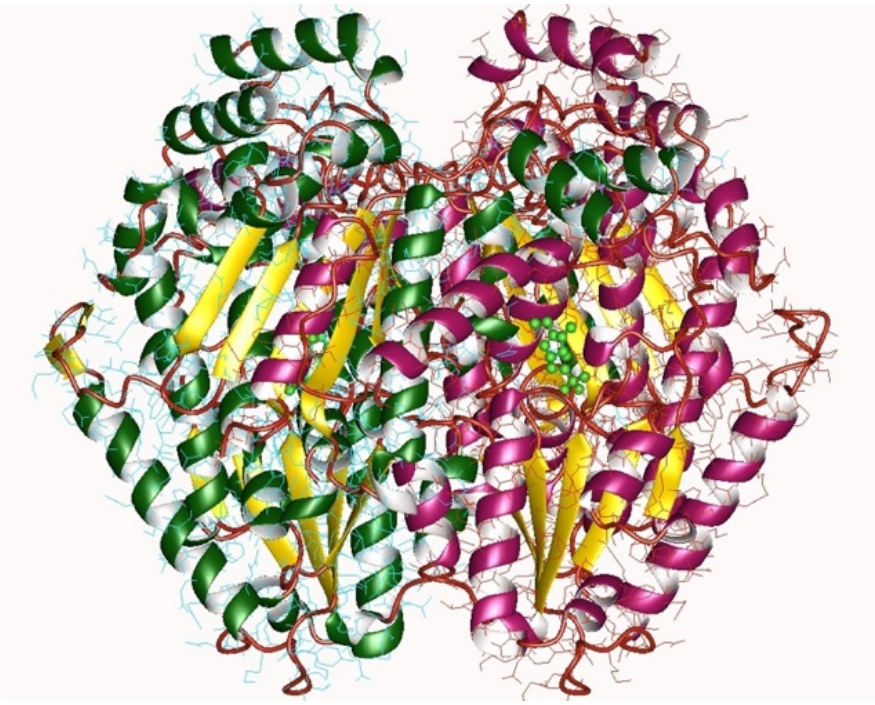


Image from Wikipedia (https://en.wikipedia.org/wiki/Glycolysis)

By Richard Wheeler (Zephyris) - en:Image:Alpha-D-glucose-6-phosphate wpmp.png, Public Domain, https://commons.wikimedia.org/w/index.php?curid=1551876

By Deposition authors: Jeffrey, C.J., Lee, J.H., Chang, K.Z., Patel, V.;visualization author: User:Astrojan - http://www.rcsb.org/pdb/explore/explore.do?structureId=1hox, CC BY 3.0, https://commons.wikimedia.org/w/index.php?curid=48668746

→

By Rob Hooft, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=920748

http://proteopedia.org/wiki/index.php/Image:Mech.png

See Reference 22.

Figure 2

The glucose 6 phosphate is bounded by the glucose 6 phosphate isomerase in the pyranose configuration. The active site has important residues of Lsy210, Gln 353, Gln 511, Lys 518, His 388. The ring opening is initiated by Lys 210, His 388, Glu 357. The other residues stabilize and orient the substrate! α helices of the enzyme locally bind the substrate to the enzyme. And β pleats nonlocally bind the glucose 6 phosphate to the enzyme. The C5 oxygen is protonated by His 388(-cyclo-pentyl (NH)NH^+) as β region locally breaks N-H bonds in His while α regions hold the transition state of deprotonated His + p^+ + C5-O as local α helices induce bonding of p^+ to C5-O to cause push and pull interactions for opening the ring. Isotopic change to ^{13}C with more acidity and consequent more basicity of N weakens the binding by His 388 (-cyclo-pentyl (NH)NH^+). Isotopic change of ^{16}O for ^{17}O also cause stronger bonding to His. The push pull interaction of the enzyme on the substrate for ring opening is induced globally by α regions and locally by β regions of enzyme. Isotopic substitution of ^{16}O for ^{17}O causes more basicity of the ^{17}O for greater proton acceptance due to the spinophilicity of the proton interacting with the ^{17}O magnetic moment. The hydroxyl of C1 is deprotonated by Lys 518 (-NH_2) by β regions locally on C1-OH and globally by β locally by α acting on p^+ + C-O + NH. In this protonation of Lys, the α helical regions to fission, translate and fuse to induce bonding of proton to NH of Lys after cleavage from C-OH.

The phosphoglucosoisomerase is also involved in binding of phosphate sugars in nucleic acids. This is important as it demonstrates how the same ferrochemistry of the catabolism is involved in the anabolism of nucleic acids and how substituting isotopes of nonprimordial replacing primordial can alter nucleic acid transcription. For instance, in the catabolism and anabolism of nucleic acids, the phosphate on C4 is protonated and deprotonated by two surrounding bases to induce the C3 C-OH to attack the P center for penta-coordinated intermediate with binding of the phosphate between two fructose rings. The protonation of the O linking of the P center linking to the second fructose ring (with simultaneous protonating the C3 of the first fructose ring by His 12) brakes the phosphate linkage to the second fructose rings. The His 12 releases proton to the first fructose ring while His 119 is protonated by H_2O and the Water His 119 attacks the phosphate center to break P-O to C3-O as His 112 release proton to C3-O- and OH binds phosphate leaving protonated His 119.

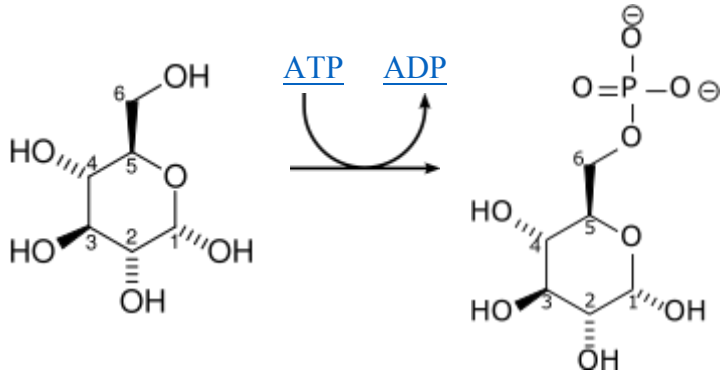
Changing the ^{16}O to ^{17}O may cause difficult deprotonation of this hydroxyl. Substituting ^{15}N for ^{14}N on the Lys 518 (-NH_3^+) causes more basicity of the Lys (-NH_3^+) for better deprotonation of the hydroxyl group. This accelerates the 2 step of glycolysis for causing cancer. Rotation occurs about the C3-C4 bond to form the isomer. Glu 357 { -C-CH_2-C(O)(O^-)}deprotonates C2 to form cis-enediolate intermediate which is stabilized by Arg 272 {--C(NH-

$C(NH_2)NH_2^+$} . C2-OH is catalyzed by global α and local β to break O-H and local α induce p^+ + Arg –NH. The isomerization occurs by rotation about C3-C4. C2 is deprotonated to form cis enediolate intermediate deprotonation by Glu 357 { -C-CH_2-C(O)(O^-) } and the resulting cis enediolate is stabilized by Arg 272 {--C(NH-C(NH_2)NH_2^+} by the global α and local β of enzyme breaking C2-O-H as local α nonlocal β induce p^+ on to Arg 272. Isotopic changes of ^{12}C to ^{13}C at C2 allows easier deprotonation at C2. C1 receives proton from Glu 357 { -C-CH_2-C(O)(OH)} and the hydroxyl of C2 is deprotonated with conversion to open chain ketose as fructose 6 phosphate. Changing ^{12}C to ^{13}C at C1 allows less difficult to accept proton from Glu 357 { -C-CH_2-C(O)(OH)}. ^{16}O to ^{17}O at C2 leads to more easier protonation by Glu 357 { -C-CH_2-C(O)(OH)}. The deprotonation of C5 hydroxyl by Lys 518 (-NH_3^+) induces rotation about C3-C4 for the closure of the ring. By global α regions and local β regions breaking C5-OH as local α and global β for p^+ to Lys.

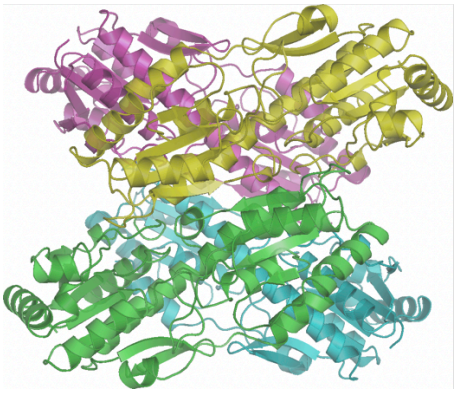
Replacing ^{12}C to ^{13}C at both C2 and C3 then the rotation is less able due to the magnetic field of the polarized magnetic centers. The bond rearrangement is induced in the mechanism by the protonating and deprotonating of C2 and protonating C1 during which there are no rehybridizations as the intermediates change of ^{12}C to ^{13}C manifest different dynamics. Rotation about C2 and C3 bond is hindered by ^{13}C. Changing ^{14}N to ^{15}N in Lys (-NH_2) can strongly influence the acid base catalysis as the Lys (-NH_2) is heavily involved in deprotonating C1 hydroxyl group. The surrounding β regions help break O-H bonds. The surrounding α regions help form N-H(H); near by bond breaking backbone of β break O-H of C1-O. The broken C1-O couples to NH of Lys by nearby global unsaturated proton orbitals of α regions; the transition state of broken Lys + - C1-O + p^+ are pushed into local bonding activation of saturated α regions to collapse protonating of Lys. And bond forming of α for N(H) H + O^-; the global β bond break can disrupt C-O-H and the local bond form of α region can induce Lys (-NH_3^+). Cancer may be caused by environmental enrichment with ^{15}N as the ^{15}N promotes glycolysis. The ^{15}N in Lys would cause ease of the α region of the enzyme to catalyze binding p^+ to ^{15}N as the ^{15}N has negative magnetic moment and pushes its e^- into p^+ for ease of protonation of NH_2. The proton is internalized to ^{15}N. This would really alter X-ray absorbance. This second step is not the rate determining step for glycolysis. The substrate is allowed to enter the glycolysis by the rearrangement of 6 membered ring to 5 membered ring. This second step is reversible. So if the product is not consumed, this step can go in reversibly. The cure would involve use of static magnetic fields to orient proton from C1 to Lys nuclear magnetic moment to hinder the proton transfer. The external magnetic field can orient ^{17}O moments with protons to hinder transfer to form the cis enediolate. Dynamics magnetic fields can be used to alter the magnetic moments of N and O in the Lys and His and Glu to prevent magnetic accelerated enzymatics. Neutrons can be tuned to ^{15}N and ^{17}O to transmute selectively transmute these nuclides for killing cancer. The X-ray excitation would also selectively demagnetize the enzyme to disrupt this step for a cure.

Third Step of Glycolysis

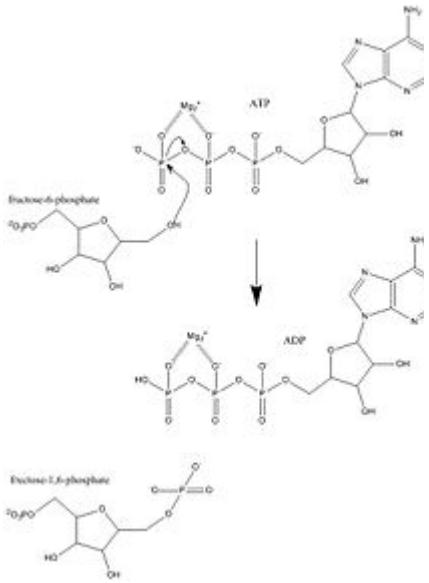
During the 3rd step the β D fructose 6 phosphate is energized by adding ATP. The second step produced an end primary alcohol where the phosphorylation occurs in this third step. An unstable molecule is formed by this third step with consequent irreversibility. The third step is rate limiting and glycolysis is committed. Mg^{2+} is important in this mechanism. Asp 127 {--COO^-} and Arg 171 {--C(NH-C(NH_2)NH_2^+}are important at the active site. See Figure 3 [23] {Image from Wikipedia (https://en.wikipedia.org/wiki/Glycolysis) }.



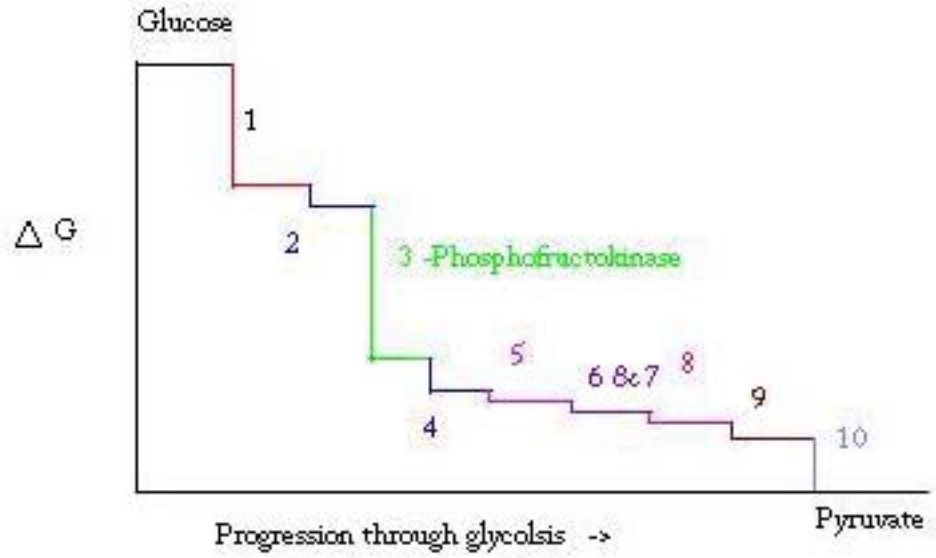
From { http://proteopedia.org/wiki/images/3/3f/Hexokinase_mechanism2.GIF}



by Richard Wheeler (Zephyris 2006)



See Reference 23



(ΔG = 25.9 kJ/mol)

See Reference 23b

Figure 3

The purpose of this 3rd step is the addition of a second phosphate to the C-OH end OH. This step allows the next step of cleaving the 2 bonds in the ring as the two phosphate groups resonate the bond cleavage in addition to the surrounding enzyme. This step also is couple to the 2nd step whereby the 6 member ring is alter to 5 member ring.

The sugar is carried along the reaction coordinate by the enzyme, which is crucial for the causing the transition state of the reaction. This third step is allosterically regulated as high levels of ATP/ADP slow the activity of the enzyme. The discovery in this work determines that during the mechanism the structures of the different enzymes are as hidden fissioned pieces, substrate pieces and the fissioned substrate pieces are as fused enzyme excited states. The structure and shape of the enzyme for this step is consistent with the theory here as the many α helical regions cause combination of the substrate and phosphate for anabolic process.

In order to assume this role, the enzymes have to have certain compositions and structures to fit the substrates and reactants to enzymatically transform the reactants and substrates to products. In this case the α helical structure is consistent with this discovery as such α helical structures provide compositional environment for combining the phosphate and the fructose sugar to form product. The reactants are transformed to products by the enzymatics on the basis of the reactants fitting within the enzyme and on the basis of this discovery reported here the α regions and β regions providing the proper compositional and decompositional bond rearrangements in the substrate. For this 3rd step of glycolysis, the enzyme substrate interactions are consistent with the theory here as the 3rd step composes bigger product of β D fructose bis phosphate from the two precursor reactants of D fructose 6 phosphate and ATP as catalyzed by the α helical regions of the enzyme prevalent in the enzyme. By this theory, if the substrates or the enzyme are changed by isotopic change of primordial ^{12}C, ^{14}N, ^{16}O and/or ^{32}S to nonprimordial ^{13}C, ^{15}N, ^{17}O and/or ^{33}S then the substrate enzyme chemistry is changed to possibly accelerate or decelerate the reactions. If the nonmagnetic ^{12}C and/or ^{16}O are changed to magnetic ^{13}C and/or ^{17}O then the fission of the enzyme and fusion of its fragments may yield a potential energy field that alters the substrate in different ways or the substrate itself may fission to alter the enzyme in different ways. So the enzymatics are sensitive by the theory here to the different magnetic moments of the isotopes composing the atoms in the enzymes. Furthermore, in this work it is determined that external electromagnetic fields can couple to these isotopically defected enzymes and substrates can suppress or accelerate the enzymatics. The application of an external electromagnetic field will cause the ^{13}C to orient to oppose the applied magnetic field; so the external magnetic field can alter the substrate enzyme interactions. The external magnetic field may cause the re-ignition of the Kreb cycle. β pleated regions exist in the enzyme so such regions help break bonds in the reactants to catalyze the formation of the transition state. The enzyme has α helical regions for coupling to such fragmented intermediates of net positive and negative charges and magnetic nuclei and magnetic electron radicals for giving potential energy to bond the unsaturations to products. The substrate in its activated state and the transition state are highly reactive and the enzyme shields the transformation substrate from surrounding solvents and artifacts of stray fields and atoms.

This allosteric enzyme manifests as inactive T state and active R state. The active R state has greater binding of the substrate. A shift in the enzyme from the inactive T state to the active

R state is induced by binding of the substrate fructose 6 phosphate. This is consistent with the new theory presented here by RBL as the new nuclei in the substrate causes a different amorphous environment of fields for inducing different nuclear waves by different nuclear fragmentations and these different nuclear fragmentations cause the different T state and R state. In the active R state the enzyme transfers phosphate to fructose 6 phosphate. The different amorphous fields induced by the substrates for the active state R allows both ATP and Mg^{2+} fructose 6 phosphate binding by the Asp 127 {-- COO^-} and Arg 171 {--$C(NH\text{-}C(NH_2)NH_2^+$}. As local α regions and nonlocal β regions of the enzyme fission translate and refuse about the fructose 6 phosphate and the residue Arg 171 to bind them. The amorphous nuclei of the substrate cause fission of the enzyme and translation in the activation and the fission fused by some crystal field after translating. The translating causes a fusion and the fission in the amorphous causing imbalance as the fission field is pushed or pulled into a crystal field (of the electrons) and the crystal field (electron) fuses the nuclei. The fused nuclear field causes the electron field to fission and the fissioned electron field alters the configuration and refuses to products and the fused products fission the nuclear fields and the fissioned nuclear field fuses to new enzyme configurations that pull new reactants inside and then the cycle repeats.

The active site binds both ATP-Mg^{2+} and fructose 6 phosphate in the active R state with Asp 127 {-- COO^-} binding the phosphate and Arg 171{--$C(NH\text{-}C(NH_2)NH_2^+$} binding the fructose 6 phosphate. Local α regions and nonlocal β regions induce binding of Arg 171 and fructose 6 phosphate. Negatively charge phosphate are bound by Arg 162 {--$C(NH\text{-}C(NH_2)NH_2^+$} of the fructose 6 phosphate. The $^{24}Mg^{2+}$ may have $^{25}Mg^{2+}$ and ^{14}N may have ^{15}N for negative nuclear magnetic moments with better consequent binding of the phosphates. As the negative nuclear moment presses e^- into PO_4^{3-} for stronger binding and more nucleophilicity of P center. ^{17}O may replace ^{16}O with consequent enhanced nucleophilic attack on β phosphate of ATP to accelerate the glycolysis. As the ^{17}O has negative magnetic nuclear moment and pushes sigma electrons onto ^{31}P to make it more negative so local α regions can prepare P of PO_4^{3-} for attracting electrophile as associated by nonlocal β induced bond formation. If ^{13}C is also substituted, then the ^{17}O bonded to ^{13}C causes one electron of the covalence pushed and one pulled internal to the covalent bond due to differences in nuclear magnetic moment of positive on ^{13}C and negative on ^{17}O so the ^{17}O becomes a stronger one electron nucleophile to push one electron into magnetic P center and the positive ^{31}P is more receptive to one electron from ^{17}O than 2 electrons from ^{16}O so this is the basis for the magnetic nuclei accelerating glycolysis. Such acceleration is not found in Kreb but hindrance is found in Kreb. The author introduces this important electron field induced fission of nuclei and subsequent nuclear induced fusion of electron and then electron induced fusion of nuclei for a totally new physicochemistry! The d orbital of P can accelerate the electron from ^{17}O. Such push of electron into P may not be in Kreb as here in glycolysis. Or an antibonding orbital in the PO_4^{3-} may accept the single electron. The one electron on ^{17}O on C1 attacks the one electron on phosphate as accelerated by ^{13}C and ^{17}O and ^{31}P magnetically to accelerate the phosphorylation of this step by the nonprimordial isotopes in cancer cells. It has been shown how Asp can be enriched with ^{17}O so as the sugar has ^{13}C an acceleration can occur. A cure for cancer may involve the selective frustration of this magnetic driven attack of the ^{17}O on C1 to the phosphate center. The host eating ^{17}O in sugar and the enzyme having ^{17}O in Asp and ^{15}N in Arg accelerate the glycolysis in cancer cells. The cure would selectively suppress the action of these magnetic isotopes in cancer cells to suppress glycolysis in the cancer and to not affect the normal cells.

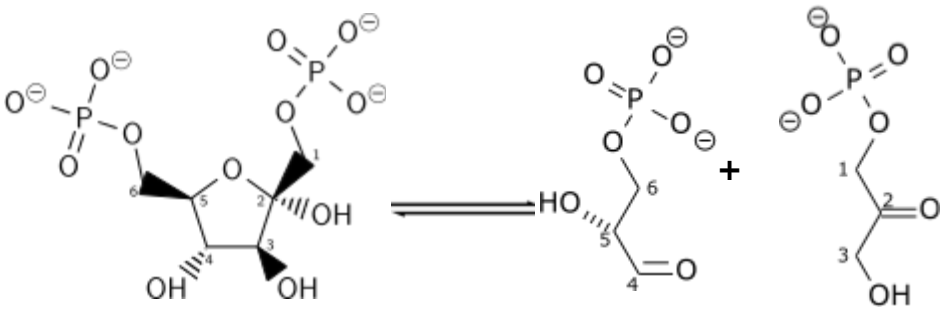
Electron density flows to the anhydride oxygen between the β and γ phosphates of ATP. The role of the amino acids Arg {--C(NH-C(NH_2)NH_2^+} in binding the substrate is increased by ^{15}N from the environment and in cancer relative to ^{14}N in normal cells so the cancer is accelerating glycolysis by better holding the fructose 6 phosphate and Mg^{2+} ATP in the active site relative to the normal cell. Anhydride oxygen of the β and γ phosphate of ATP receive electron density. The ^{15}N from the environment in cancer relative to ^{14}N in normal cells cause local α and nonlocal β regions of enzyme to induce increase Arg {--C(NH-C(NH_2)NH_2^+} binding of substrate by the ^{15}N in Arg {--C(NH-C(NH_2)NH_2^+} of cancer cells for better holding the fructose 6 phosphate and Mg^{2+} ATP to accelerate the glycolysis in cancer cells relative to normal cells. The ^{15}N in the Arg push single electron into the magnetic ^{31}P centers of ATP and causes stronger spinophilicity for nucleophilic attack by the P center to phosphorylate the sugar and induce rehybridization in the sugar during the attack. The change from ^{16}O to ^{17}O induces stronger binding of ^{15}N to phosphates. The ^{15}N and ^{17}O cause strong electron density in the β and γ phosphates for accelerating the attack of the sugar magnetically. The R active state is more strongly induced by the cancer cells due to stronger binding of the substrate. As the substrate induces T state to R state by binding the enzyme for more committing the substrate to glycolysis. Such stronger binding in cancer cells due to ^{15}N and the strong activating the R state explain why cancer cells have such voracious appetites for glycolysis. The change from ^{14}N to ^{15}N cause the weaker basicity to accommodate the strong phosphate acid to alter the chemistry in the normal cells to cancerous chemistry.

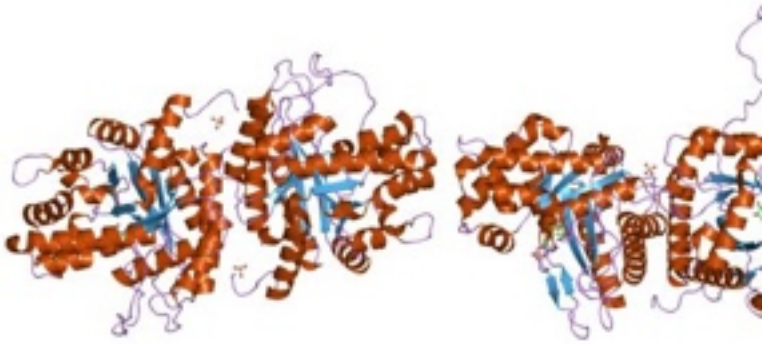
The ^{15}N and ^{17}O support cancer via the change of the N isotopes from ^{14}N to ^{15}N and change of the O isotopes from ^{16}O to ^{17}O. The discovery here not only determines the distinct carcinogenic origin and chemistry but further gives a basis for distinction from normal cellular chemistry and carcinogenic chemistry so as to accelerate or suppress carcinogenic chemistry selectively without altering normal biochemistry. Such selective suppression or acceleration of the carcinogenic chemistry may be done by use of external electromagnetic waves to suppress or accelerate this rate determining step so as to selectively suppress the ^{17}O and its attack on C1 from attacking the phosphate of ATP. External magnetic fields may be applied to rotate the ^{17}O so as to pull in electrons so the phosphate cannot be attacked by the ^{17}O as the rotation rehybridizes the ^{17}O so it cannot transfer its electrons from sp^3 to d orbitals of P or to spd hybrids of phosphates. The magnetic phosphate nucleus can be caused to repel the electron of the ^{17}O if it is flipped by a magnetic field. Also the ^{13}C in the cancer cells can be rotated by external magnetic fields for inducing transferring both electrons as one from O and the other from P to it. The nucleophilic (spinophillic) attack on the P can be prevented by such magnetic excitations with the resulting killing of the cancer cells selectively. The normal cells are not affected as they have ^{12}C and ^{16}O and are not excited as the ^{13}C and ^{17}O in the cancer cells so that the glycolysis in the cancer cell would be manipulated it only for killing cancer and not affecting normal cells. The binding in the active site of the enzyme for the substrate can be altered by replacing ^{14}N with ^{15}N in the residues Lys (-NH_3^+) and Arg {--C(NH-C(NH_2)NH_2^+}. The large free energy change for this reaction and the enzymatics makes this enzyme more subject to external magnetic field and this step 3 is critical to selectively suppress glycolysis in cancer cells to kill cancer cells. The carbon bonds are highly rehybridized in forming product as driven by the two phosphate groups in the molecule. See Figure 3. The enzyme is mostly α helical and these α regions promote the bond forming to the products for explaining the compositional chemistry of the enzyme for this step. The use of near edge X-ray absorbance to selectively excite the ^{15}N and

^{17}O bonds between residue and substrate for altering the enzymatics is a step in the cure of cancer by suppressing glycolysis for this step. The use of neutrons to selectively transmute ^{15}N and ^{17}O in the residues of cancer cells will suppress the residues to terminate glycolysis in the cancer cell.

Fourth Step of Glycolysis

During the 4th step of glycolysis, β D fructose 1,6 bisphosphate is transformed to D glyceraldehyde 3 phosphate and dihydroxyacetone phosphate. The phosphates facilitate the bond rearrangement to cleave the C-C bond as by the Little Effect. See Figure 4. [24] This reaction and its enzymatics are consistent with the theory of this discovery as the decomposition of the β D fructose 1,6 bisphosphate to D glyceraldehyde 3 phosphate and dihydroxy acetone phosphate occurs by enzymatics of β pleated regions for inducing the decomposition of the substrate.





http://www.ebi.ac.uk/pdbe-srv/view/images/entry/1fdj600.png

See Reference 24

Figure 4

The purpose of this 4th step is the cleavage of the 6 carbon sugar into two 3 carbon sugars. This cleavage allows subsequent steps to chemically alter both smaller 3 carbon sugars and this step is in tune with prior steps 2 and 3 which prepare the 6 carbon sugar for this cleavage by phosphorylating, and changing from 6 carbon ring to 5 carbon ring to induce strain in the ring to cleave it.

The fructose-bisphosphate aldolase is a class I protein involving a protonated Schiff base intermediate wherein the DHAP carbonyl carbon is interacting with a highly active lysine (-NH_3^+). In the mechanism, the fructose 1,6 bisphosphate (FBP) is transformed into glyceraldehyde 3 phosphate and dihydroxyacetone phosphate (DHAP) by the enzyme (of the cytoplasmic type). During photosynthesis a reverse carbon fixation path occurs for the Calvin cycle of gluconeogenesis. 9 α helices and 8 β pleats fold to form a closed barrel of each monomeric subunit; so the active sites tightly hold the substrate. 1 phosphate group is held by Ser 271 and Gly 272 and the 6 phosphate group is held by Lys 41, Arg 42 and Arg 303 in the active site. These residues are near Lys 229. Tyr 363 is also involved as substituting it reduces enzymatic activity. Two Cys are also important in the enzymatics. This reaction is of the general type of aldol cleavage. The nucleophilic amine group of Lys 229 attacks the carbon of the substrate (FBP) as modulated locally by α helices and globally by β pleats of the enzyme. Electron pair is pushed to the oxygen of the carbonyl during attack with protonation with leaving as water. In this process a protonate Schiff base is produced as ketone and amine form imine. The open ring form of FBP is stabilized by Asp 33 deprotonating a C3-OH group on the open ring. GAP and enamine precursor to DHAP are produced by aldol cleavage of C3-C4. The positive charge Schiff base induces the cleavage of C3-C4. The DHAP is produced by tautomerism, protolysis and hydrolysis of the Schiff base. The Lys (-NH_3^+) is closely associated with DHAP carbonyl carbon for the formation of this carbonyl carbon from fructose 1,6 bisphosphate.

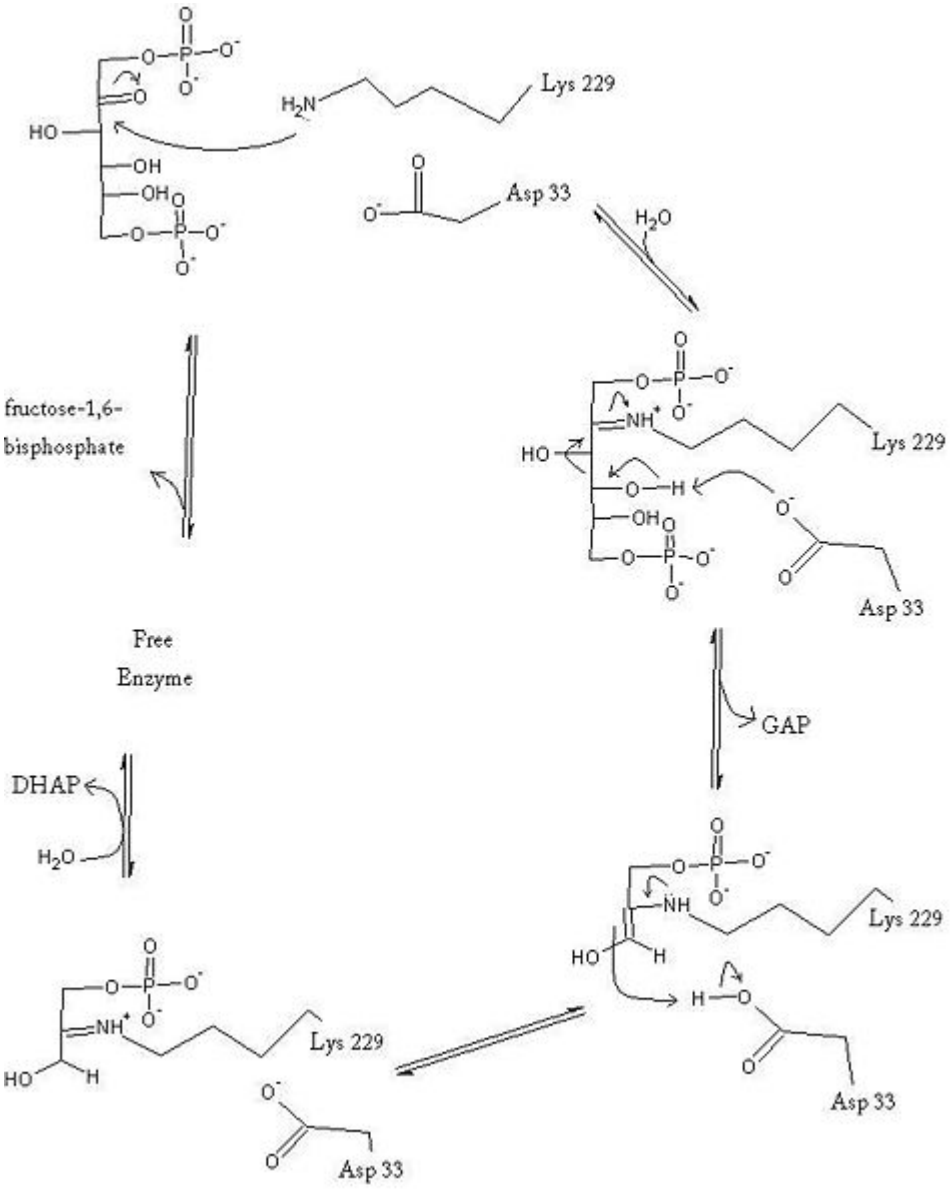


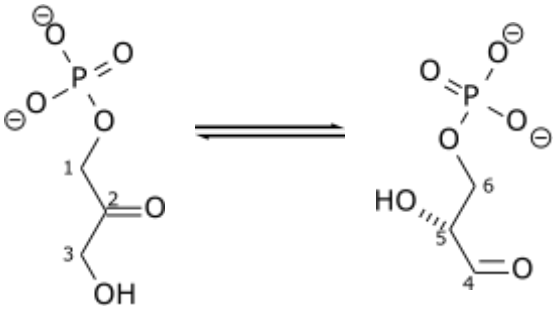
Figure 4B See Reference { http://proteopedia.org/wiki/index.php/Image:Aldolase1.jpg }

There by if ^{14}N is replaced by ^{15}N then the more basic (and stronger nucleophilic) ^{15}N interacts more strongly with the carbonyl with consequent acceleration of the cleavage for driving the glycolysis for the ^{15}N substituted Lys relative to ^{14}N in Lys ($-NH_3^+$). The ^{15}N causes more basic carbon in the attacked carbonyl for causing shifting of electron density toward the oxygen of the carbonyl. A shift of ^{12}C to ^{13}C causes the carbonyl carbon to pull one electron more strongly than the other electron for internal magnetics of the C-O carbonyl bond. This internal electron spin separation can be driven maybe with higher energy fields not absorbing by other carbon---carbon, carbon---oxygen, carbon---hydrogen, carbon---nitrogen bonds. This can be a reason for cancer as the substituted isotopes and the internal magnetics of the covalence can cause an absorbance of the bond at longer wavelengths with the heating in a non-second law of

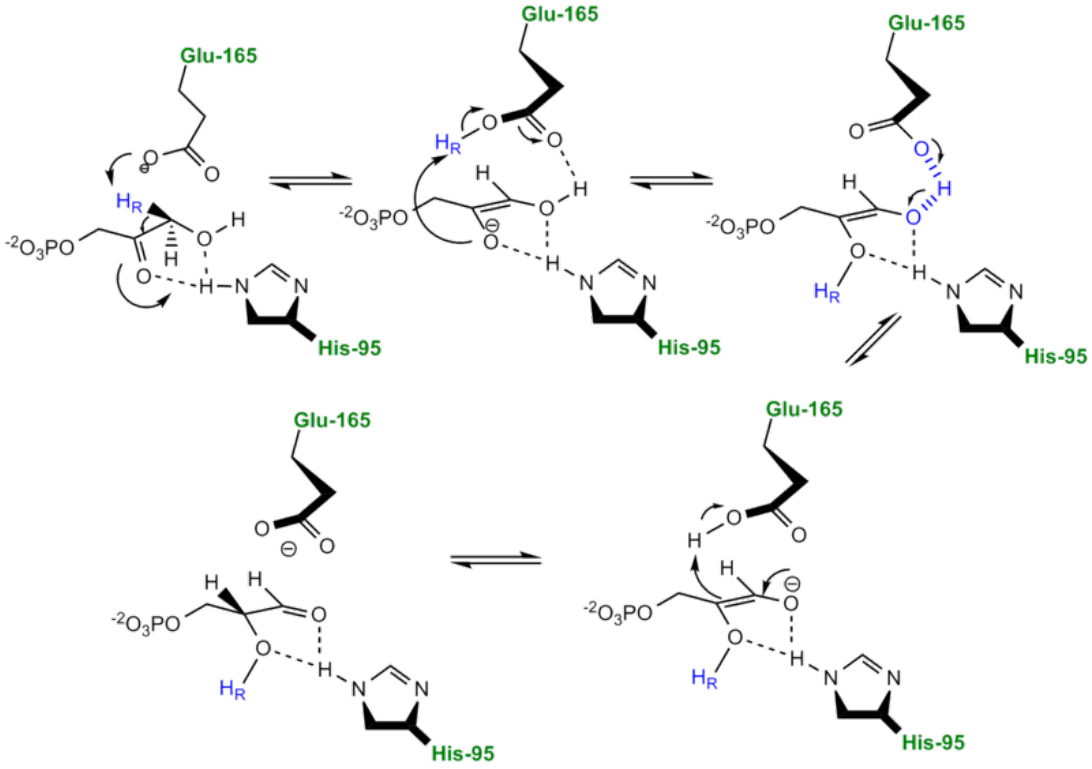
thermodynamics fashion/manner to break bonds or affect the chemical reactivity. Such phenomena can explain why the cancer cell is so sensitive to heat; the cancer cell can can transmute heat to biochemistry due to the magnetic isotopes so as to kill cancer. This step of the glycolysis in cancer cell can be hindered by use of many dynamics magnetic waves that suppress the attack of the Lys 229 on the FBP as by revolving the ^{15}N of the Lys to diminish and terminate its basicity. The substitution of ^{16}O with ^{17}O causes the Asp 33 to become more basic due to the negative nuclear magnetic moment of ^{17}O whereas the ^{16}O has zero nuclear magnetic moment. Such negative nuclear magnetic moment and strong basicity causes the ^{17}O of the Asp 33 to more tightly bind the C-OH of the open ring intermediate as the ^{17}O in the Asp pulls the proton inward and pushes electron into the proton for stronger hydrogen bonding with the acceleration of the 4th step for causing cancer of normal cell. The cure for cancer uses dynamics magnetic fields and strong magnetic fields to disrupt the interaction of ^{17}O of Asp 33 with the open ring intermediate. The cure further uses specific wavelengths of soft x-rays to specifically excite the ^{17}O in the Asp 33 and the ^{15}N in the Lys 229 so as to only kill cancer cells and not affect the ^{14}N in Lys and ^{16}O in the Asp of normal cells as the x-rays demagnetize the enzyme during the aldol cleavage only in cancer cells and the x-rays prevent the nucleophilic attack of Lys 229 and prevent the Asp 33 from binding the resulting open intermediate. A third part of the cure is use of neutrons of specific energies for transmuting the ^{15}N in the Lys and the ^{17}O in the Asp 33 so as to form ^{16}N and/or ^{17}N in Lys which transmute to ^{16}O (in 7.13s and 4.17s) so as to transform the Lys residues only in cancer cells and not affect normal cells which will selectively kill the cancer; while the ^{17}O in Asp 33 by neutron absorption forms ^{18}O which is similar to ^{16}O and or ^{17}O transmutes to ^{19}O (within 26.9 s) forms ^{19}F to transform the Asp residue only in the cancer cell to kill the cancer cell not affecting the normal cell not absorbing the neutrons.

Fifth Step of Glycolysis

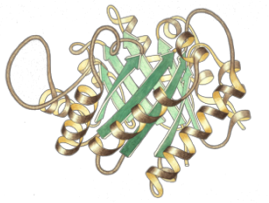
Step 5th involves the isomerization of the products from step 4. D glyceraldehyde 3 phosphate is formed from dihydroxyacetone phosphate by triose-phosphate isomerase enzyme with high efficiency as limited by diffusion of substrate. Such efficient isomerization drives the product from step 4 down the glycolysis pathway and the enzyme of step 5 is here reasoned to couple by fission to the prior enzyme from step 4 to induced the catalysis as inspired internally by the moving transforming substrates between the two enzymes. This is a new aspect of the enzymatics as presented here for explaining the diffusion limited process between the two enzymatics of the step 4 and step 5. See Figure 5. [25] The theory in this work is consistent with the shape of the enzyme for this 5th step as the reaction is isomerization as the isomerization involves both decomposition and composition so the enzyme has both β pleated regions for decomposing the substrate to the transition state and α helical regions for binding the pieces of broken species of the transition state to the isomeric product. So in this step show how α and β regions fiss, translate and fuse to catalyze substrates as substrates fuse to residues.



triose phosphate isomerase



See Reference { http://proteopedia.org/wiki/index.php/Image:Crisscross2.png }



https://commons.wikimedia.org/wiki/User:Dcrjsr

See Reference 25

Figure 5

The purpose of this 5th step is the isomerization of the two products from step 4 for the production of two reactants for step 6. The step 5 is thereby integrated with step 4 and step 6 as the dynamics of step 4 caused the bisphosphate with strained ring to fragment the ring and the two products are made the same in this step 5 and the step 6 produces energy from the two products by adding second phosphate group to each. So the similar phenomena are connecting each step phosphorylation stressing bond and breaking bond and oxidizing or adding OH and deprotonating and protonating for the glycolysis.

The enzyme triose phosphate isomerase has molecular weight of 54 Daltons. The enzyme catalyzes the isomerization of a ketose to aldose. Three amino acid residues are important for the acid base mediated mechanism. Electrostatic interactions pull the DHAP or GAP into the active site as their negative charges of phosphates on these substrates are attracted to positive charge of Lys 12 for stabilizing the substrates. A proton is taken from carbon 1 of DHAP or carbon 2 of GAP by Glu 165. A His gives a proton to the carbon 1 or carbon 2 to help the Glu 165 abstract a proton in a many body process as by this mechanism. The His donating proton stabilize the resulting enediol(ate) intermediate. The negative charge on the intermediate is further stabilized by Lys 12 and Asn 11. In reverse the Glu 165 gives proton and the His 95 takes proton from OH of C1 to form GAP and return the enzyme to its original state.

An endiol intermediate is formed in the transition state of the mechanism from the reacting substrate dihydroxyacetone by pertinent residues and also protolysis and proton orbitals of the surrounding enzyme α helices and βpleats. The formation of this transition state of endiol involves the deprotonation of the dihydroxyacetone by 165 glutamate { $-C-CH_2-C(O)(O^-)$} as β

pleated localized unsaturated regions and α helical global unsaturated regions fiss, translate and fuse potential field about the dihydroxyacetone and Glu 165 { -C-CH_2-C(O)(O^-)} for breaking bonds of the C-OH as local α saturated regions fiss, translate and fuse potential field to couple bond formation of the resulting p^+ to Glu 165. It is important to note the role of glutamate and this is in line with ^{17}O and NH_3 in cancer as the ^{15}NH in cancer cells would make a more negative moment as the ^{15}NH pushes more electrons into the O and a ^{17}O in the glutamate { -C-CH_2-C(O)(O^-)} would be a stronger nucleophile to counter the push of electron density of the ^{15}NH into it. So that the protein backbone having ^{15}N and ^{17}O would manifest a novel magnetics as discovered here and manifest stronger α helices by proton orbitals and hydrogen bonding and β pleats by proton orbitals and hydrogen bonding. As the enzyme oscillates local β pleated unsaturated proton orbitals and global α helical orbitals in fission, translation and fusion of potential field for deprotonating a residue and deprotonating endiol with counter enzymatic oscillations of local α helices saturated and global β pleated saturated proton orbitals for taking the p^+ and protonating enolate to endiol. In this way, the enzyme catalyzes a resonating protonation and deprotonation endiol goto enolate with stabilizing protonate and deprotonate glutamate ^{17}O in glutamate and the triose sugar accelerates the protolysis for accelerating this step. A proton is given to the intermediate to form the endiol. A proton is loss from the endiol and the deprotonated endiol then takes a proton from glutamate 165 { -C-CH_2-C(O)(O^-)} for many resonating proton between the intermediary state of the substrate and the glutamate { -C-CH_2-C(O)(O^-)} as induced by the surrounding backbone of the enzyme with many β pleats locally breaking the proton bonds and nonlocal α helical ragions contributing to breaking the proton orbitals. Also, the protonations are driven by potential fields from proton orbitals in the surround enzyme locally by saturated α helices and nonlocally by many saturated β pleat regions.

The substitution of ^{17}O for the ^{16}O in the glutamate affects the energy of the resonating proton and the surrounding resonating enzyme for resulting stronger deprotonation of the dihydroxylacetone for driving the reaction forward. This thereby explains why ^{17}O in cancerous cells accelerates glycolysis as this step is accelerated by the faster resonating proton between the substrate intermediate and the glutamate { -C-CH_2-C(O)(O^-)} by the ^{15}N and ^{17}O oscillating the proton. A cure for cancer is suggested here by externally magnetically suppressing the ^{15}N and ^{17}O resonating acid and bases interactions with the carbonyls. Here it is reasoned that ^{17}O is poisonous to mammals. So also in the substrate the ^{12}C and ^{16}O can be shifted to ^{13}C and ^{17}O for added effects in the substrate and enzyme for resonating intermediary protons for accelerating the step. It could be that such simultaneous substitutions of isomers do not occur in the Kreb as the sugar may be substituted but not the enzyme so the process terminates the Kreb cycle. But the glycolysis occurs in the cytosol so now the cytosol constructs the protein in the cytosol from waste from the mitochondria and from food entering the cell. But the mitochondria is constructed within the mitochondria and if it is modified by magnetic nuclei in the enzymes then the cell may undergo apoptosis. But the sugar goes into mitochondria and jams up enzymes to cause cancer. But the cytoplasma may make enzymes of rejected magnetic nuclei and the magnetic enzymes and magnetic sugars can accelerate the glycolytic process after the Kreb cycle is terminated. So if ^{13}C and ^{17}O are in the sugar intermediate then the ^{17}O is pulled by ^{13}C of one of its electrons and the ^{17}O pulls the other electron (if the electron flips within the bond so it is pulled by ^{17}O and the other electron is pulled for symmetric pull and asymmetric orbital of the electrons about the ^{17}O as induced by the negative magnetic moment of ^{17}O nuclei, then this is totally new Ferrochemistry) from the H more so the proton ion is less easily loss to glutamate for

one isotope but more easily loss for both ^{13}C and ^{17}O at the functional group. Also, this may cause bonding goto antibonding. So, asymmetric orbitals in the glycolysis can cause acceleration of the glycolysis.

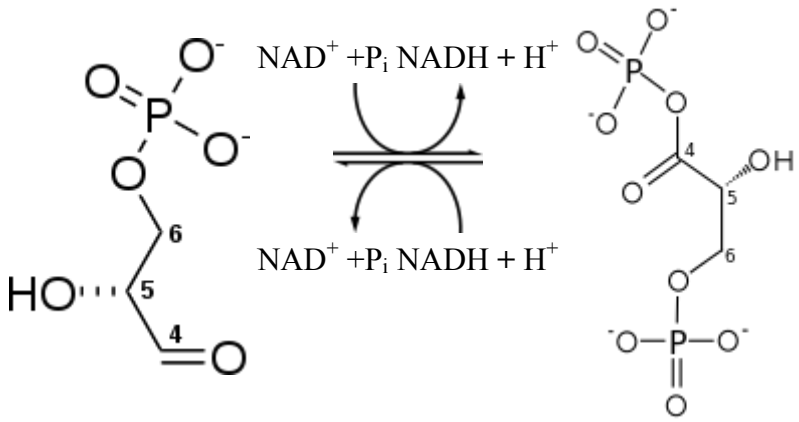
The rehybridizations about the hydroxyl carbon and the carbonyl can be assisted by the magnetic ^{13}C and ^{17}O. The enzyme may also use local saturated α helices bond global β pleated regions to catalyze sp^2 to sp^3 dynamics of hydroxyl carbon and carbonyl carbon. When these nuclei have magnetic moments then they may rotate to store internal magnetic energy and this can be another basis for the acceleration of glycolysis. This can be a basis for the killing the cancer also. Stochastic radiofrequency heat cancer cells only. Radio waves can be interconverted in frequencies and this can kill cancer if stimulation occurs as a broad continuum of RF be created. For the ^{13}C with its one excess electron has property of pushing away hydride to neighboring C and loss of hydride is important for Kreb for NAD to goto NADH but if magnetic isotopes then they prevent the heterolytic cleavage. The magnetic isotopes may cause homolytic cleavage and this causes radical nuclei and radical electrons and free radicals for cancer. So the local β pleats and nonlocal α helices produce cleavage as the hydride is lost the proton attacks the C=O double bond as induced by local α helices protolysis to transform sp^3 C and OH group to change to the double bond. At the same time the end carbon with its single electron binds with the single electron on O to form π bonds to complete the transformation as induced by local α helices and nonlocal β pleats from the enzyme.

So, that if suitable external magnetic fields are used then the bond rearrangements may be suppressed selectively in the cancer cells for this step of glycolysis. The ^{15}N of the Lys ($-NH_3^+$) and the ^{13}C and ^{17}O of the alcohol and the carbonyl can be oscillated to oppose loss of the proton from the end carbon and π bond formation between the end carbon and resulting O radical. Therefore, bond rearrangement can be suppressed selectively if suitable external magnetic fields are used on cancer cells for this step in glycolysis. The carbonyl can be oscillated to oppose loss of proton from the end carbon and π bond formation between the end carbon and resulting O radical of the ^{15}N of Lys ($-NH_3^+$) and the ^{13}C and ^{17}O of the alcohols are oscillated magnetically. The electromagnetic treatment and cure can drive the ^{13}C vincinal and its double bond to ^{17}O so as to oppose attack by proton on the ^{17}O and hydride of the neighboring end ^{13}C with suppression of glycolysis. A white light continuum may cure cancer, but why not skin cancer is this hot sunlight causes skin cancer as they think it is UV, but it could just be sunlight in general. So now if mole rats never get cancer is it because they are underground and the sun is not altering their magnetic nuclei. Does cancer come from the magnetic nuclei with sunlight so the sunlight builds up to jam up the magnetic nuclei. Non-exposure to sun cause cure for cancer with eating foods rich in ^{12}C, ^{14}N, ^{16}O and ^{32}S. Neutrons be used to drive the ^{15}N, ^{17}O and ^{13}C. The neutrons can be given suitable energies to excite only ^{15}N, ^{13}C and ^{17}O and transfer momentum into these enzymes but not affect normal cells.

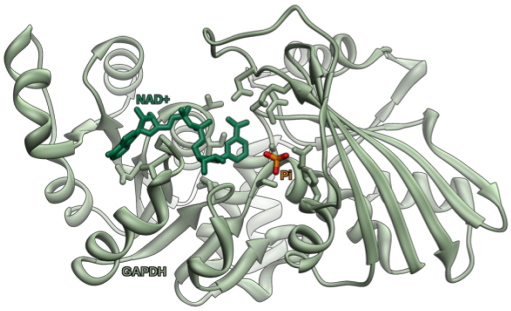
Sixth Step of Glycolysis

The 6^{th} step marks the end of the preparatory stage for glycolysis and the start of the production of energy by the transformation of glyceraldehyde 3 phosphate to D 1,3 bisphosphoglycerate by glyceraldehyde phosphate dehydrogenase. See Figure 6. [26] This 6^{th} step also produces energy by forming NADH and a second phosphate group on the substrate. Unlike the prior 5 steps where the cure involved interfering with lifting the rock for the catabolism within cancer, the cure for the subsequent five steps will involve coupling to exothermic reactions to selectively jam-up the energetic redistributions of the falling rock of the

catabolic cancer metabolism without affecting normal cells. The added phosphate group on the substrate further facilitates the bond oscillations by the phosphate for the Little Effect for catalyzing the rehybridization about carbon atoms to further oxidize the sugar pieces. The two phosphates via their 2 magnetic nuclei in phosphorus of phosphates ($^{31}PO_4^{3-}$) magnetic nuclei and fluid O electronic orbital fluidity in magnetization resonate the orbitals about the intervening C atoms of the sugar by the Little Effect for novel Ferrochemistry as introduced and further developed here. This phenomena as by the Little Effect also manifest in ATP and other molecules where a chain of phosphates have coupling oxygens of phosphorus centers where the phosphorus nuclei have positive nuclear magnetic moments and the fractional fission of such phosphorus centers oscillate the electronic rehybridizations of the many oxygen ligands so as to efficiently pull and release thermal energy, gravitational energy, electric energy, magnetic energy and quantum energy for storing and releasing chemical energy. The substitution of ^{30}P or ^{32}P for ^{31}P in the phosphates severely alter the energetics of ATP and is a means for cancer to occur. Also the change of ^{16}O for ^{17}O in the phosphates of ATP and ADP and AMP has dramatic effects on the energetic dynamics. Such resonating π bonds of phosphate P=O bonds is coupled to protonating/deprotonating and proton orbitals saturation unsaturation with coupling to the whole enzyme as the protonation of P=O is coupled to local saturated α helices and global β pleats and deprotonation of P-OH is coupled to local unsaturated β pleats and global α helices. So the whole enzyme fisses, translates and fuses and re-fisses translates refuses to couple to the phosphate with driving the substrate bond rearrangements. Such Ferrochemistry of the two end phosphates magnetically rehybridize the intervening carbon bonds from glyceraldehyde 3 phosphate to D 1,3 bisphosphoglycerate with the added potential energy given by the surrounding glyceraldehyde phosphate dehydrogenase. See Figure 6. [26]



See Reference {https://en.wikipedia.org/wiki/Glyceraldehyde_3-phosphate_dehydrogenase)



https://commons.wikimedia.org/wiki/File:GAPDH_with_labels.png

See Reference 26

Figure 6

The purpose of this 6th step is the transformation of the substrate by adding a second phosphate group. The purpose of this addition of second phosphate group is the modulation of the carbon back bone for subsequent energy releasing reactions of Step 7 involving dephosphorylation so this step 6 couples with step 7. This step 6 couples with the prior step 5 (isomerization) as it converts the product of step 5 into a form that can release energy as by catalytic of the two phosphate groups and a surrounding enzyme.

The two energy rich triose sugars from step 5 are transformed to yield 2 NADH molecules and 4 ATP molecules. It seems in traditional reaction dynamics heat and photons lift the reaction coordinate to the transition state. The transformations of the 2 sugars from step 5 produce 2 NADH and 4 ATP molecules in this step 6. But in this new discovery the enzyme by means of fractional fissing, translating and refusing fractions provide potential fields and energies to lift the substrates to the transition state by dynamical proton orbitals of local β pleats and global α helices and organize the formation of the products by dynamical proton orbitals of local α helices and global β pleats. It is important that this enzyme has been determined to play a role in transcription activities as such can couple the anabolism of nucleic acids and proteins to the catabolism as more focused in this work and the alterations of both metabolic catabolism during energy production for life as presented in details in this work as well as implications and effects and cause and/or effects for anabolism of nucleic acids and proteins which need further explorations.

The enzyme GAPDH for this step 6 is a dimer; but the monomers of the dimer are not identically the same. One side of the dimer has parallel and antiparallel β pleats, but the other monomer has both β pleats and α helices. It is important to note that the binding of S of Cys in the active site will terminate this step of glycolysis. Upon entering the active site, the nucleophilic carbon of the aldehyde is nucleophillically attacked by sulhydryl of Cys 151 to form thiohemiacetal with enzymatice induction by local α helices and global β pleats. This nucleophllic attack by the S of Cys induces loss of H^- to nearby NAD^+ as induced by β pleats and global α helices with formation of thioeaster. The same carbonyl is then attacked by a phosphate group as induced by local α helices and global β pleats. Simultaneously with the phosphate attack as induced by the enzyme but by local β pleats and global α helices bond breakage occurs as Cys breaks away and a protonated His 178 for the formation of 1,3 bisphosphoglycerate. Other residues play an indirect role, as Thr 210 and Arg 233 are involved in transporting the reactants to the direct enzyme residues. This reaction is exothermic. It is important to note the roles of ^{32}S in Cys, ^{14}N in His and ^{31}P in phosphates for this step.

In this sixth step oxidation of aldehyde triose sugars by the addition of phosphate occurs. So the reaction is combination and exothermic. But this is tricky as adding oxygen and fragmentation occur exothermically. So fragmenting appears exothermic. Be careful as fragmenting in generic is endothermic. But oxygen fragments to lower energy for exothermicity. Oxidation is like a combination reaction and it is exothermic. It is equivalent to C atoms forming graphene of diamond as this is combination and exothermic. But with oxidation due to limited valence bond number more pieces form, rather than fewer pieces. So diamond and graphene formations by bonds C-C C=C are as combusting C-O and C=O form $CO + CO_2$ formations, but entropy and release of energy help. So breaking CO_2 is as composing graphite. Huge temperature gradients can do it. So unsaturation is a better measure. The phosphate and enzyme act on the aldehydes of the triose sugars for causing the chemistry. $NADH + H^+$ form by adding H to NAD^+ on each triose sugar.

With the help of phosphate, the enzyme converts one C sp^3 to sp^2 as O adds and the other carbon transforms to alcohol from aldehyde. The angular momentum of one carbon of the triose sugar is taken and given to angular momentum in the other carbon in the triose sugar. By catalysis by enzyme is local β regions nonlocal α regions bond to release momenta into the substrate to break sp^3 carbons and local α helices with nonlocal β pleats pull in angular momenta as tranition state goto sp^2 carbon. The attached phosphate assists the changes in hybridization of the two carbons as well as the enzyme. So the substrate internally autocatalyzes as well as the enzyme catalyzing. In the next step, two phosphates in the sugar are able to rehybridize carbons in the sugars. The phosphate act to rehybridize the e^- in the sugar as by themselves coupling the bond breaking local β pleats global α helices with coupling to bond forming local α helices global β pleats. The release energies for either α helical or β pleated regions were initially considered. But now α helical and β pleated regions are more successfully correlated with decompositional and/or compositional nature of the reaction. The energetics of the combinations (for α helical regions) and decompositions (for β pleated regions) are considered next. From such considerations, the exothermic combination reactions there can be β pleated or mixed α and β to catalyze the exothermic compositional combination reaction. The β pleated regions cause exothermic decomposition and there may be α helical or mixed α and β regions for inducing the energy as to fuse decomposed species to products. {It is important to note the reversibility of

forming and bonding break as driven by strong field and L continua and their forward and backward dynamics. Such effects also explain how these elements contribute to consciousness of life. QF can be formed as released energy from the α helical regions. L continua may form and release energy from the βpleated regions. Energy may be given from surrounding superluminously by dynamics of the α helical regions Energy may be absorbed from surroundings to cause dynamics of the β pleated regions.

This reasoning explains the enzyme in this step 6 as the substrates are combination in nature but the combination reactions are exothermic whereas typically combination reactions are endothermic. In this 6th step, the reactions are combinations and typically the combinations are exothermic. But for reactions where combinations involve oxygen the combinations may be endothermic as oxides form oxygen and as loss of phosphate to ATP. As the oxygen and fluorine bind other elements more strongly than themselves. So combining O to sugar is exothermic and decompose the sugar. But combining the CO_2 and H_2O to sugar and oxygen is endothermic in contrary way. But the combination reaction for this step 6 is consistent with the model as the enzyme should be α helical regions and there are α helical regions for consistency with the combination biochemistry. But also a few β pleated as for the for the bond breaking to form the transition state of of the reactions. The β pleated also absorb the released energy of the reaction in step 6. And the β pleats drive the excess energy into its dynamics and other possible enzymatic steps.

For this step 6 the enzyme has four subunits and each subunit actively associated with the enzymatics contain cysteine residues for critical thiol groups in the subunits. Cysteine 152 (-SH) is also important for a switch to monitor oxidative stress and induce apoptosis. These thiols in the enzyme point to possible change of S isotopes to alter the enzymatics. ^{32}S can be substituted by ^{33}S with altered interactions and reactivities within the subunits. ^{33}S is a weaker base than ^{32}S due to the positive nuclear magnetic moment of the ^{33}S and zero nuclear magnetic moment of the ^{32}S so ^{33}S would be a better electrophile and it would attack the double bond of the carbonyl in this step more to accelerate this step of glycolysis explaining why this nonprimordial isotope causes normal cells to take on characteristics of cancerous cells. But now this is a means of curing cancer as many external dynamical and static magnetic fields can drive the ^{33}S selectively in cancer cells to inhibit the electrophilicity to selectively terminate the 6th step in cancer cells in the host without affecting the ^{32}S in normal cells for curing cancer. Phosphorylation and dehydrogenation are catalyzed by this enzyme so both α helical and β pleated regions are needed to induce and drive the phosphorylation and the decomposition involved with the dehydrogenation. First oxidation is induced and catalyzed by the enzyme as aldehyde is converted to carboxylic acid as local α helices and global β pleats drive the oxidation as by forming hydrogen bonds. Then reduction of NAD^+ to NADH is catalyzed. As the aldehyde is oxidized to carboxylic acid the C of the carbonyl is polarized in positive manner for nucleophilic attack by O of water molecule. Then a S of Cys (-SH) attacks the C to displace the water to form a thioester from the carboxylic acid with catalytic induction of attack by local α helices and global β pleats and consequent displacement of water by local β pleats and global α helices. Energy released by this oxidation of the aldehyde to thioester is used to cause the reduction. The reduction is involving covalent catalysis and base catalysis with the lowering of the activation energy along the pathway.

The change of the carbonyl from ^{12}C to ^{13}C may accelerate the oxidation as the ^{13}C is more acidic as the one electron is pulled closer to ^{13}C nucleus. The ^{13}C assist the conversion of the sp^2 to sp^3 C during the transition state as the S attacks the carbon center. This explains why changing ^{12}C to ^{13}C causes the acceleration of this step in glycolysis as the ^{13}C is easier to attack by S of Cys and forming the intermediate to the product. This role of ^{13}C in cancer cells give a basis for coupling selectively to cancer cells to hinder the attack by the S of the Cys to terminate the step and stop glycolysis in cancer cells selectively to kill cancer cells selectively and cure cancer. A change from ^{32}S to ^{33}S may make the S a stronger electrophile for accelerating glycolysis and perhaps causing cancer. On the basis of these various reactions in this mechanism changing the isotopes of C, N, O and S can change the dynamics. If ^{17}O is substituted for ^{16}O then the C=O bond is more polarized electrically and also an internal magnetic dipole is created as the ^{17}O pushes one electron spin into the C and pulls the other electron spin to it. If the ^{12}C is also substituted for ^{13}C then the internal electric and magnetic dipoles are larger as the positive magnetic moment of ^{13}C assist the negative magnetic moment of ^{17}O for pulling the bosons apart. This further gives a basis for selectively tuning into the glycolysis of the cancer cell without affecting the normal cell as cancer cells containing sugars with $^{13}C=^{17}O$ can be excited by dynamical magnetic fields to inhibit the oxidations of these sugars. Also the ^{32}S of cysteine can be replaced by ^{33}S so as to make the ^{33}S a stronger electrophile so the S attacks the intermediate double bond of the carboxylic acid more strongly to for the thioester. Also hydride is removed from GAP and bound to NAD^+ to form NADH.

Thermodynamically, the thioester has higher energy than the carboxylic acid from which it forms so the energy to transform the thioester in next step is less. The enzyme thereby lowers the activation barrier for the next step by forming the thioester. The S - ^{12}C has a higher energy relative to ^{16}O-^{12}C as the S cannot pull the electrons from C as ^{16}O does. If the O is replaced by ^{17}O then the ^{17}O-^{12}C has a higher energy relative to ^{16}O-^{12}C. And if the ^{32}S is substituted for ^{33}S then the ^{33}S-^{12}C has a lower energy relative to ^{32}S-^{12}C as the ^{33}S can better pull electrons from ^{12}C. So ^{17}O can bypass the need for cysteine attacking the carbonyl and if ^{33}S is in Cys (-SH) then the resulting thioester has lower energy and larger activation barrier. So it can be that this bypassing Cys (-SH) thioester formation accelerates the glycolysis. But the ^{33}S may be a stronger electrophile than the ^{32}S for substitution. The acceleration can occur as the ^{33}S is stronger electrophile for substitution so attacks the aldehyde and eliminates hydride. The magnetic moment of the center affects the electrophilic attack.

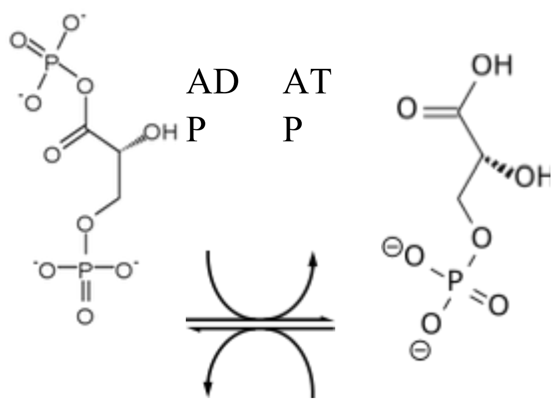
The hemithioacetal loses hydride as His (-cyclo-pentyl $(NH)NH^+$) the local β pleats and global αhelices increase induce deprotonation loss of H^- and thiol loss from the substrate is deprotonated. The carbonyl reforms as the His (-cyclo-pentyl $(NH)NH^+$) deprotonates and thio is loss and the hydride is ejected. Isotopic changes such as ^{15}N for ^{14}N causes more basicity of His (-cyclo-pentyl $(NH)NH^+$) for slower loss of proton but faster H^- loss for accelerating the step. The ^{13}C would less readily lose H^- to NAD^+ relative to ^{12}C during enzymatics of local β pleats and global α helices. The NADH replace NAD^+ in the active site. The negatively charged carbonyl of O is stabilized by the NAD^+ along the reaction pathway for lower the activation energy as the thioester is attacked by a phosphate to form a tetrahedral intermediate with coupling of substrate to NAD^+ local α and global β pleats induce binding between carboxyl and $NAD^{+\cdot}$ The phosphate attacks the carbocation by coupling to local α helices and global β pleats.

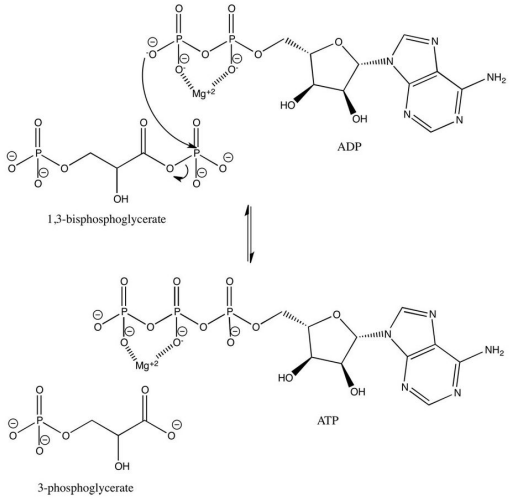
The carbon is prepared for this attack of the phosphate by first oxidizing with oxygen then attack by water, then attack by sulfide then the sulfide allows phosphate attack on the

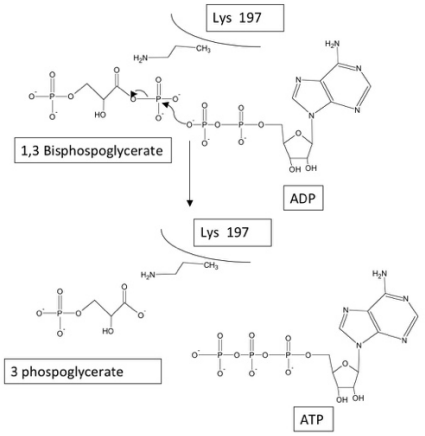
carbon by oscillations of bond forming and bond breaking protolysis as by global β pleats and local α helices to construct bonds and local β pleats and global α helices to decompose bonds; during such bond oscillations C is prepared to bind PO_4^{3-}. The tetrahedral intermediate transforms to 1,3 bisphosphoglycerate and a thiol on the cysteine (-SH) residue. ^{13}C assist the formation of tetrahedral intermediate. The oxidation by O causes the C to be positively polarized to cause stronger attack by the sulfide and then attack by phosphate nucleophile. 1,3 bisphosphoglycerate forms from the tetrahedral intermediate. But if ^{33}S attacks then an elimination can occur without the tetrahedral intermediate for a lower barrier and perhaps faster conversion of the sixth step by ^{33}S relative to ^{32}S. So it seems that nonprimordial ^{13}C, ^{15}N and ^{17}O with ^{33}S accelerates the sixth step.

Seventh Step of Glycolysis

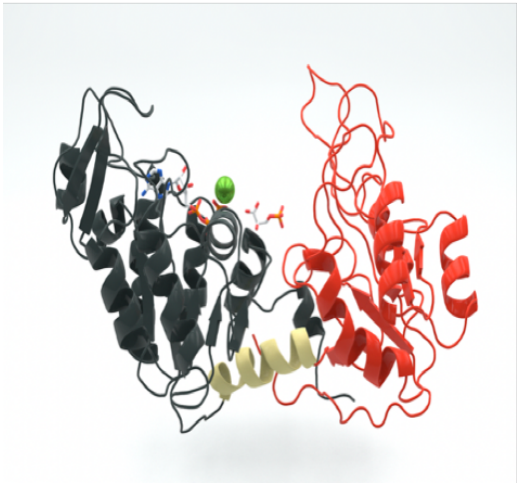
During step 7, phosphoglycerate kinase catalyzes the transformation of 1,3 bisphosphoglycerate to 3 phosphoglycerate by replacing a PO_4^{3-} by a hydroxyl group OH^-. The step seven is modulated by relative ATP and ADP amounts. The enzymatic structure of phosphoglycerate kinase is consistent with the α helices catalyzing compositional reactions and the β pleated regions catalyzing decompositional reactions. See Figure 7. [27] The reaction path involves both decompositions and compositions so both β pleated and α helical regions are important. The decompositions involve loss of PO_4^{3-} from the substrate and its rearrangement and the compositions involve addition of OH^- as by OH^- formation. Typically, during chemical dynamics as here the reactant 1,3 bisphosphoglyerate is broken up to form the transition state and such is induced by β pleated regions. The transition state in this case then rearranges and adds OH^- by means of catalyzing α helical regions.







See Figure Reference: { http://proteopedia.org/wiki/index.php/Image:Pgk001.jpg}



By Thomas Splettstoesser - Own work, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=27500408

See reference 27

Figure 7

The purpose of this 7th step is the dephosphorylation of the sugar containing two PO_4^{3-} after the two PO_4^{3-} have achieved the job in prior step of phosphorylation and protonation. The dephosphorylation is need for the later step of shifting the OH^- relative to a single PO_4^{3-} along the backbone to focus in on modifying bonds to form the final pyruvate product of the glycolysis. This step of dephosphorylation of bisphosphate is in sync with prior step of phosphorylation and protonation and later steps of isomerization of OH^- and PO_4^{3-}.

Phosphoglycerate kinase catalyzes this crucial step in the glycolysis as it transforms 1,3 bis phosphoglycerate into 3 phosphoglycerate and ATP. This method is crucial as it stores energy in ATP without use of oxygen, NADH or ATPase for a sublevel phosphorylation. This reaction is exergonic with coupling to the enzyme of the 6th step GADPH for simultaneity of the steps. This enzyme has 400 amino acids and a molecular weight of 45,000 Daltons. Lobes in the enzyme are connected by two locations; residues 189-202 of β pleats and residues of 404-408 of α helices. The enzyme has roughly equal numbers of α helices and β pleats so based in the Ferrochemical theory in this model for enzyme both decompositional and compositional chemical dynamics are equally important and on the basis of the chemical purpose of the step 7.

This is so as PO_4^{3-} has to break from 1,3 BPG and bind to ADP while OH^- has to break and bind to form 3PG. The enzyme has open and closed conformations. The open conformation forms with PGA and ATP and induces their release. The entrance of ADP and 1,3 bisphosphoglycerate into N terminal and ADP into C terminal causes the open conformation to convert to the closed conformation. The N terminal and C terminal are two separate parts composing the active site; which opens to release the ATP and PGA and allows entrance of 1,3 bisphosphoglycertate and ADP with induced closure. The closure pulls the C and N terminals closer. It is important to note that this new model gives a basis for this opening and closing of large regions of the enzyme as induced by the reacting substrates and opening induced by the products as the key enzymatics innovatively given in this paper is the fission of the substrates and products to couple to and change the enzyme and the fission, translation and refusion of pieces of whole enzymes about the substrates within its interior to alter the interior substrates. So this fissing, translating, and fusing of enzyme and substrates can easily explain the opening and closing of this enzyme by the substrates and products and the pulling in of substrates and pushing out of products by the open and closed conformations of the enzyme.

The phosphoglycerate kinase begins its enzymatics with closing the domains as induced by Arg 62 {--$C(NH\text{-}C(NH_2)NH_2^+$} and Asp 200 {-- COO^-}. Recently (2010) it has been demonstrated that the open to close conformational dynamics is induced by hydrogen bonding dynamics between the reacting substrates and these residues and other residues to close the domains but as products form the hydrogen bonding dynamics change so that the closed conformation converts to open conformation {41}. This is identical to local and global changes in proton orbitals and Ferrochemistry in proteins as predicted by the author in 2007 [1]. It is important to note the closed conformation is highly unstable and this has contributed to difficulty probing the mechanism experimentally. But here it is noted that such instability is as by 2 Law of Ferrochemistry a basis for ease of coupling to this step of the glycolysis so as to hinder it in cancer cells without detriment to normal cells. It is thought that this enzyme behaves similar to hexokinase enzyme of 1st step. As both involve hinge between domains of active site. Hexokinase binds ATP and removes phosphate group and binds to glucose. The PKG enzyme in this 7th step has similar role but in reverse of catalyzing release of PO_4^{3-} and transferring to ADP to form ATP. The PGK pulls PO_4^{3-} from C1 group of 1,3 biphosphosphoglycerate and binds the PO_4^{3-} to ADP to form ATP. A single displacement nucleophilic substitution reaction takes place wherein the oxygen of the ADP β phosphate nucleophilically attacks the 1 PO_4^{3-} group on the 1,3 biphosphoglycerate as driven locally by α helices and globally by β pleats of the enzyme. It is thought by conventional chemistry that the transfer occurs directly by charged transition state. The negative charge of the O of the 3 PO_4^{3-} of ATP favors the transfer as the enzyme provides supporting hydrogen bonding. 3 hydrogen bonds in ATP are favored over 2 hydrogen bonds in ADP. During such enzymatics 2 residues are very directly involved. Lys 197 ($-NH_3^+$) binds the 1,3 bisphosphoglycerate and it transfers the PO_4^{3-} to form the transition state. The ^{14}N in Lys is a stronger acid and the ^{15}N in Lys is a stronger base, so that if the primordial $^{14}NH_3$ in Lys is replaced by nonprimordial $^{15}NH_3$ the Lys ($-^{15}NH_3^+$) is stronger base and more readily releases electrons nonlocally to the phosphorus atoms of PO_4^{3-} of the 1,3 biphosphoglycerate for more strongly binding the substrate and for strongly holding and guiding the PO_4^{3-} to the ADP to accelerate the glycolysis and give a basis for cancer. The ^{15}N in Lys nonlocally magnetically binds phosphorus atoms in ADP and PO_4^{3-} to pull them together in bonding as the internal p^+ of the $^{15}NH^{3+}$ fuses its electron pair which transfer to the nonlocal PO_4^{3-} and ADP with wave nature to entangle the ADP and PO_4^{3-} into bonding. But moreover, the Ferrochemistry in this work

identifies a cure for cancer by again coupling to ^{15}N in Lys 197 and use of external dynamics magnetic fields to disrupt its binding of substrate and PO_4^{3-} to terminate this step and selectively kill cancer cells!

After the Lys 197 transfers PO_4^{3-} to the ADP, the P-O of ADP attacks the 1 PO_4^{3-} of the 1,3 biphosphoglycerate to remove the PO_4^{3-} to form ATP. A second important residue Arg 36 {--C(NH-C(NH_2)NH_2^+} has been shown of direct importance for hydrogen bond the resulting ATP product. Such interaction via proton orbitals between Arg and the PO_4^{3-} of ATP change as ^{14}N in Arg are replaced by ^{15}N in Arg as the ^{15}N causes stronger bacisity and the ^{15}N in Arg would cause stronger hydrogen bonding than the ^{14}N in primordial Arg for accelerating this step and causing cancer. But again, this difference of ^{15}N and ^{14}N of stronger hydrogen bonds of ^{15}N with weaker conjugate bases of PO_4^{3-} is a basis for selectively exciting ^{15}N in Arg for magnetically suppressing this step for curing cancer by using external dynamic fields to rotate the Arg for suppressing the step to kill cancer but not affect normal cells having ^{14}N.

Recently it has been shown that this enzyme plays a role in transforming the enzyme of zymogen plasmin which is involved in an active form in for forming blood vessels in tumors. But the PGK cleaves S-S bonds in zymogen so that the active form forms blood vessels in tumors. It may be important to consider the ability of cancer cells to use PGK to cleave S-S bonds may involve residues with altered isotopes that allow such cleavage. But in normal cells the primordial isotopes in their PGK will not allow S-S cleavage in zymogen for altering blood vessels for tumor growth and habitat. The PGK is involved in binding PO_4^{3-} to PO_3^{3-} for forming and breaking P-O-P and C-O-P bonds so such may also break S-S bonds in zymogen. The change of ^{14}N to ^{15}N in PGK causes greater basicity of Lys and Arg and such greater basicity may allow nonlocal breaking of S-S bonds to cleave S-S bonds for activating zymogen in tumors. But this gives a basis for magnetically attacking the tumor as using suitably electromagnetic waves the Lys and/or Arg cannot interact with the S-S bonds in zymogen to form active cleaving of S-S bonds for blood vessel dynamics.

This seventh step is a reversible transfer of PO_4^{3-} to ADP from 1,3 bisphosphoglycerate with products of ATP and 3 phosphoglycerate. Gluconeogenesis involves the reverse formation of ADP and 1,3 bisphosphoglycerate. This phosphoglycerate kinase is very important for producing ATP. The enzyme in this 7^{th} step can couple via its fractional fission to the enzyme in the 6^{th} and 5^{th} step to drive the 5^{th} and 6^{th} steps. In the cytoplasm, the conditions are such to favor the glycolysis rather than the gluconeogenesis. The phosphoglycerate kinase has also been determined to catalyzed this reductase for angiostatin formation from plasmin for suppressing tumor growth. Here the work considers how this enzyme can suppress tumor growth. By inhibiting glycolysis, the enzyme can suppress tumor growth and diminish ATP production as determined in this mechanism. The phosphoglycerate kinase also is involved in DNA replication. Nucleic acids have PO_4^{3-} groups. So PO_4^{3-} catalyzes bond rearrangements in energy store and energy release. Also in patterning PO_4^{3-} are present as the pattern is information.

So which occurs 1^{st} the malfunction of pattern or energy production? The pattern is there so fuel is in error causes the PO_4^{3-} handles but Kreb jams and goes to lactate or pyruvate goto lactic and the fat eventually goto sugar phosphate of DNA then protein amino acids meets nonprimordial ^{15}N, ^{13}C, ^{17}O, ^{33}S, ^{30}P and ^{32}P and incorporates such nonprimordial isotopes into DNA. Lysine and Glutamine are the basis of how the nonprimordial isotoptes get into protein.

Once in protein, the nonprimodial isotopes scramble in DNA and cause DNA to malfunction and to then alter formation of other proteins. Then proteins alter Kreb cycle and alter glycolysis. So it is the proteins that 1st incorporate nonprimordial isotopes and transfers these to nucleic acids. Fats have long sections of ketones and carboxylic acids; these polar and hydrogen bonds allow ^{17}O and ^{15}N and ^{13}C to get into proteins and or nucleic acids. Meats can have large concentrations of ^{25}Mg, ^{13}C, ^{15}N ^{31}S, ^{17}O. Cysteine and Lys can cause DNA to mutate to start cancer. Fats cause a resonance that alter enzymes. So by its role in DNA replication, the phosphoglycerate kinase may alter DNA to produce isotopic shift in DNA and in RNA and in the proteins of Kreb cycle and glycolysis.

There are 415 residues in phosphoglycerate kinase and it has two domains of N and C termini that bind Mg^{2+} ATP (at C terminal) and 3 phosphoglycerate at N terminal. α helices link the two terminals and the bond forming catalysis of these α helices linking the terminals couple decomposition products in each terminal for forming bonds from breaking PO_4^{3-} in one terminal to ADP in the other terminal. Within the terminals, decompositions of the phosphoglycerate and the ADP are catalyzed by 6 internal β pleated strands. Also surrounding global α helices via nonlocal, unsaturated proton orbitals assist the bond breakages. The two domains have some independence in some conformations. The internal binding of the substrates in the terminals alters the independence as by local regions binding and nonlocally decomposing in other domains. Conformational changes activate substrate binding as the conformational changes induce fractional fission, translation and fusion of activating binding QF for substrates. The domains close as substrates fill the two domains so that the enzymatics of PO_4^{3-} transfer are induced. In the open conformation, the domains are more independent for retrieving substrates for more rapid diffusion of substrate inside and after capture the domains rapidly close and catalysis occurs for product formation and exit and transformation of reactant to product across the reaction trajectory. So the substrates' fissions activate conformational closure and enzymatic fission, translation and fusion to catalyze the substrate. The closed conformation is more unstable due to exposure of hydrophobic regions on the outside of the enzyme. These hydrophobic regions outside feel pressure from hydrophilic regions to pressure the inside of the domains. The fractional fission and the external fission of other domains induce such interactions between domains.

Mg^{2+} is mandatory for the catalysis as it binds the phosphate group. The α helices in the enzyme fractional fiss, translate and fuse to provide E_{act} for binding Mg^{2+} to phosphate groups. Lightning striking earth transmute ^{24}Mg to ^{25}Mg by neutron capture and weak interaction so ^{25}Mg appears in ground water and soil. This role of $^{24}Mg^{2+}$ makes $^{25}Mg^{2+}$ a possible isotopic substitution that can alter the enzymatics of the phosphoglycerate kinase as the activation from isotropic altered enzyme or $^{25}Mg^{2+}$ or phosphate may cause inadequate binding for enzymatic activities. The $^{25}Mg^{2+}$ nucleus has a negative nuclear magnetic moment of -0.85546 and nuclear spin of 5/2 relative to zero spin of other important $^{24}Mg^{2+}$ nuclei so such substitution of $^{25}Mg^{2+}$ for other $^{24}Mg^{2+}$ nuclei can dramatically alter Mg^{2+} role in the enzymatics. $^{25}Mg^{2+}$ may not as well shield the negative charge of the PO_4^{3-} due to the inability of local α helices and global β pleats to provide binding fields on the $^{25}Mg^{2+}$ to PO_4^{3-} relative to binding field on $^{24}Mg^{2+}$ to PO_4^{3-} for slowing nucleophilic attack on the PO_4^{3-}. Therefore, $^{25}Mg^{2+}$ accumulation in the cytosol can disrupt the shielding of PO_4^{3-} and cause inability of nucleophilic attack on PO_4^{3-} to stop glycolysis. Such activity may also stop DNA replication.

$^{25}Mg^{2+}$ may be a poisonous for killing normal cells and cancer cells. The negative nuclear magnetic moment causes it to push surrounding electrons away and to induce electron wave rather than electron particle due to interior proton fissing and such push of electron waves away and $^{25}Mg^{2+}$ pushes one spin more than the other spin to cause internal magnetic moment in the valence and covalence of ligands and complexed species. Therefore, $^{25}Mg^{2+}$ also slows to stop glycolysis but ^{25}Mg and ^{17}O accelerates glycolysis. One can give ^{17}O on PO_4^{3-} of cancer but ^{16}O in normal cells will not be altered; only affect and kill the cancer cells. Less shielding of phosphate by positive charge of $^{24}Mg^{2+}$ causes oxygen to be more negatively charged by convention so that nucleophiles (negative charged entering of positive seeking entering groups) are not able to penetrate the PO_4^{3-} to attack phosphorus center. But the $^{25}Mg^{2+}$ has interior protons and the fission of the proton induces electron spin to fission to electron wave orbital for a new basis of spin and angular momenta transmutations as by RBL. The surrounding local α helices and global β pleats may not be able to push nucleophile into $^{25}Mg^{2+}$ for binding nucleophile to PO_4^{3-} center. $^{25}Mg^{2+}$ on ^{16}O may assist the nucleophilic attack on the PO_4^{3-}. But if ^{16}O is changed to ^{17}O then the glycolysis may be accelerated as the $^{25}Mg^{2+}$ pushed electrons on the ^{17}O of PO_4^{3-} and the ^{17}O pushes electrons onto the $^{25}Mg^{2+}$ so maybe the electron is pushed into d orbital of P center for magnetic separation of spin up and spin down with magnetic nucleophile attaching the P center to accelerate the phosphorylation. B_{ext} can act between Mg^{2+} and PO_4^{3-} via the nonlocal electron waves to hinder the shielding and phosphorylation. The accumulation of both ^{17}O and $^{25}Mg^{2+}$ thereby accelerates the phosphorus transfer to accelerate glycolysis in cancer cells. So by using electromagnetic waves to couple to ^{17}O and $^{25}Mg^{2+}$ then the cancer cells can be selective stimulated to kill the cancer cells.

It is important to compare this work with Buchachenko's work. Buchachenko's work [17] involved radical radical interactions of spin of nucleus 5/2 Mg^{2+} with electron spins of radicals during chemical change. Such nuclear spin interacting with electron spin of Buchanchenko is very different from the phenomena of this discovery by RBL as the presented discovery here of RBL introduces for first time the importance of the direction and sense of the nuclear magnetic moment for determining different chemical dynamics of the electrons and the many body interactions of many spins and relativistic superluminous spin fragments of Little rather than only pair of luminous spins of Buchachenko. Furthermore, in Buchachenko's prior work the spin pairs of like spin slow the rebonding. But beyond this radical pair effect RBL introduces many spins altering orbitals for alteration of chemical dynamics during the biochemistry here. Such many spin interactions for example can accelerate and chemical dynamics as here by $^{25}Mg^{2+}$ and ^{17}O spins accelerating the 7^{th} step by many spin interacting. The slowing of Buchachenko prior work by radical pair effect cannot account for the here discovered acceleration of glycolysis by Little Effect for causing cancer.

The enzyme exists in the open form in absence of the substrate. The two domains are brought closer together as substrates diffuse inside and bind with more interdependence of the domains and the substrates induce a hinge bending process for closing the two domains and the driving of the enzymatics in both domains for transformations of the enclosed triose and nucleotide. The β pleats in the two domains breaks bonds in the phosphoglycerates and the nucleotide to form a transitions state where by the broken β PO_4^{3-} of ADP in one domain via the intervening α helicies across the two domains attacks the 1,3 bisphosphoglycerate in the other domain. During the nucleophilic attack the PO_4^{3-} is guided to the phosphoglycerate by a Lys 219

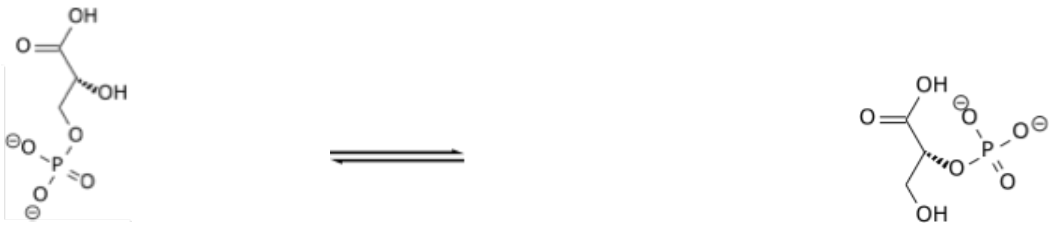
($-NH_3^+$) of the intervening α helices on the basis of the theory here for composing α helical regions.

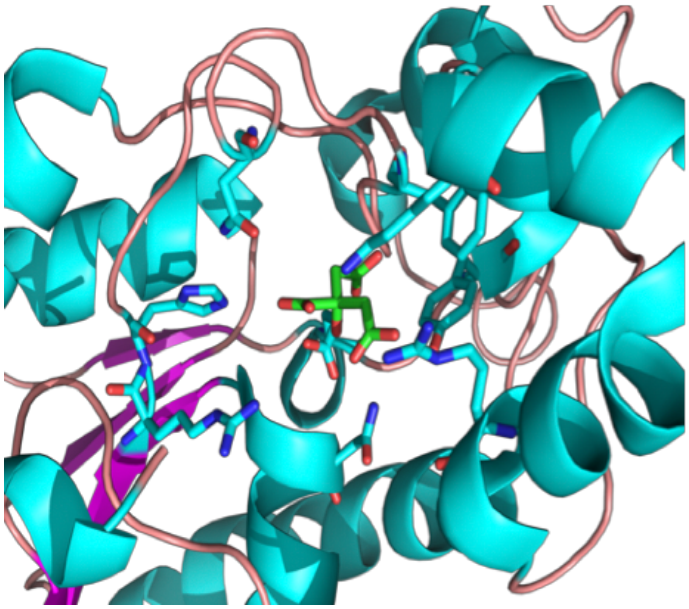
The isotopic effect of changing ^{14}N to ^{15}N causes the Lys($-NH_3^+$) to be more basic and to be more strongly interacting with the nucleophilic PO_4^{3-} as by spin separated nonlocal electron waves of the nucleotide for pulling the nucleotide to the 1,3 bisphosphoglycerate to accelerate the glycolysis. Such effect of the ^{15}N in Lys ($-NH_3^+$) can be a basis for stopping glycolysis in cancer cells as the magnetic field can alter the ^{15}N to interfere with its guiding the PO_4^{3-} nucleotide to the sugar. The ^{14}N in normal cells would be unaffected as they have different magnetism. In this work the Kreb cycle is analyzed to ensure that such coupling to ^{15}N in Lys ($-NH_3^+$) in this step does not alter ^{15}N in some process in Kreb or another step of glycolysis in harmful way to normal cells.

The phosphate may be hindered by changing ^{16}O to ^{17}O. The P becomes a stronger nucleophile as ^{16}O is changed to ^{17}O due to the negative nuclear moment of ^{17}O. The P becomes a stronger nucleophile as the ^{17}O pushes electron density onto it due to the negative nuclear magnetic moment of the ^{17}O. The transition state has the oxygens of all three PO_4^{3-} stabilized by the enzyme, but only two PO_4^{3-} are stabilized prior to the transition state in the initially bound state of the substrate. As the ^{16}O are replaced by ^{17}O, the O becomes less acidic and more electron density is given to the stabilizers in the enzyme. A high phosphoryl transfer energy is within the initial bisphosphoglycerate substrate. The prior steps of the glycolysis can couple to the transferring PO_4^{3-} to ADP. Cancer has been correlated with high expression of the phosphoglycerate kinase. The invasiveness of cancer cells in vitro has been observed to result from excretion of this enzyme. This secretion of phosphoglycerate kinase may be spreading ^{15}N, ^{17}O, ^{13}C and ^{33}S during spread of cancer.

Eighth Step of Glycolysis

The 8th step of glycolysis involves the transformation of 3 phosphoglycerate to 2 phosphoglycerate by the enzyme phosphoglycerate mutase. OH^- group and phosphate group shift and exchange for this isomerization. The isomerization is driven by the PO_4^{3-} ability to resonate the second carbon's double bonds. The enzyme participates with the PO_4^{3-} resonating the bonds so as to transfer PO_4^{3-} in the reactant from C3 to C2. The enzyme of step 7 may relate to step 8 as they both break PO_4^{3-} bonds and form PO_4^{3-} bonds so that through the enzyme the step 7 and 8 communicate The phosphoglycerate mutase belongs to a class of enzymes known as alkaline phosphatase. See Figure 8. [28] The model given in this discovery explains the structure of the phosphoglycerate mutase and its ability to catalyze the isomerization in this step. The exchange of functional groups between C2 and C3 involves some bond breakage and some bond formation. The local β pleated regions in the enzyme catalyzed the bond breakage. The local α helical regions in the enzyme catalyze the bond formations.





By Nsae - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=38842423

See reference 28

Figure 8

The purpose of this 8th step is to shift the phosphate relative to a OH^- group along the sugar chain. The 8th step couples to the prior step 7 of dephosphorylating the substrate from 2 PO_4^{3-} to one PO_4^{3-} group. Such shift in the 8th step allows further chemistry in the 9th step of dehydration and elimination to the needed reactant for step 10.

Phosphoglycerate mutase (PGM) is composed of a mix of $\alpha\ \beta\ \alpha$ layers. A prominent character of the PGM is a mixed β sheet of 6 strands, with the 5th strand having antiparallel arrangement relative to the other 5 pleats. The enzyme has two subunits for a homodimer. The molecular mass is 56,000-60,000Kilo Daltons. This mutase catalyzes the transfer of a functional group from one position to another position for isomerization. The free energy of the isomerization is 0.1 kJ/mol. Overall this reaction is energetically neutral but essential for producing molecules for subsequent formation of pyruvate by other enzymes. During the

mechanism, the phosphate placed on C2 is not the same phosphate removed from C3. The important residues during this enzymatics include His 8 and His 181 (-cyclo-pentyl (NH)NH^+) as these have imidazole groups near C2 and C3 in the substrate. The N of the His allow proton orbitals for phosphorylation of His 8. The other His 179 is involved with protolysis with the substrate. The His 8 transfers its PO_4^{3-} (by induction of local β pleats and global α helices) to C2 to form an intermediate 2,3 bisphosphoglycerate –enzyme complex (by induction of local α helices and global β pleats). The PO_4^{3-} of C3 is transferred back to His 8 to regenerate the enzyme. It seems that many amino acids along the active site are important for the enzymatics. Many of these are positively charged. Arg {--C(NH-C(NH_2)NH_2^+} in particular is important for efficient enzymatics. The import of the positive charged residues is due to the negative charge of the substrate. Glutamate 15 and 86 { -C-CH_2-C(O)(O^-)} contribute proton withdrawing groups in interacting with the substrate with induction by local β pleats and global α helices. In considering these important residues of the His and the Arg, the His and its ^{14}N is important for protonating and stabilizing the PO_4^{3-} so as the ^{14}N is replaced by the ^{15}N the His is better able to nonlocally protonate the PO_4^{3-} as the ^{15}N in imidazole is more basic but the surrounding PO_4^{3-} crystal fragments the proton embedded near ^{15}N for protonating the whole PO_4^{3-} of ATP and the ^{15}N causes cancer by accelerating this step by such strong nonlocal protonation of PO_4^{3-} of ATP and ADP. The Arg are involved in also positive charge and stabilizing negative charge in the substrate during the catalysis so the substitution of ^{15}N for ^{14}N in Arg causes the nuclei of Nitrogen to be more positive magnetic moment so the electrons are pushed farther away and proton are embedded toward the nucleus of ^{15}N relative to ^{14}N; so the ^{15}N should better stabilize the negative charges in the substrates as it fragments nonlocal proton waves. The glutamate contribute proton strong nonlocal interactions with the substrate. As ^{16}O is substituted for ^{17}O in the glutamate the ^{17}O pushes electrons away from the O nucleus so as to better present electrons for interacting with protons about the substrate for accelerating the glycolysis by the substitution of primordial isotopes by these nonprimordial isotopes of ^{15}N and ^{17}O. This difference of ^{15}N in His and Arg and ^{17}O in Glu relative to ^{14}N and ^{16}O in healthy cells gives a basis for selectively coupling with the enzyme in the cancer cell to disrupt glycolysis in the cancer cell. The tumor can be oscillated by dynamic magnetic fields of the ^{15}N and ^{17}O to disrupt the accelerated interactions for suppressing this step in cancer without affecting normal cells.

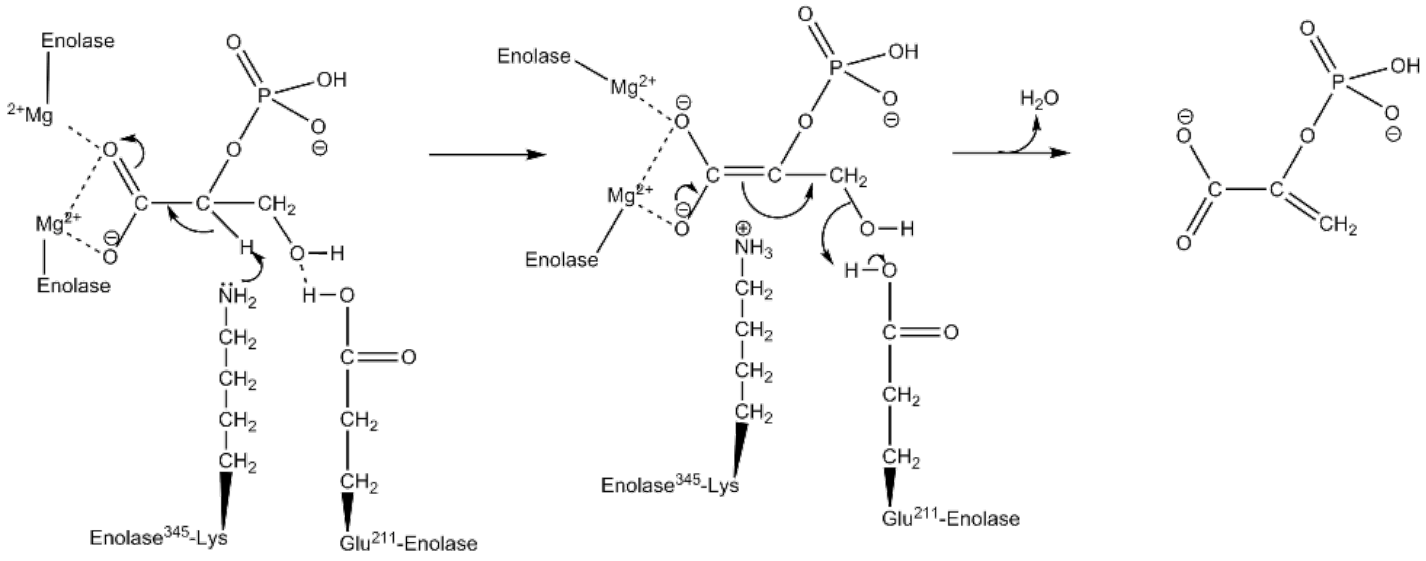
The enzymatics involve transfer of PO_4^{3-} from C3 to C2. A change in isotopes of C from ^{12}C to ^{13}C in the substrate affects the ability of the PO_4^{3-} to move from C3 to C2. The ^{13}C has positive magnetic nucleus and the ^{13}C has positive magnetic nucleus so that both P and ^{13}C pull electrons from intervening O to make the oxygen less basic so the P and C become more nucleophilic. The PO_4^{3-} that is transferred to C2 is not the same PO_4^{3-} loss from C3. The active site containing a phosphorylated His (-cyclo-pentyl (NH)NH^+) catalyzes the process. Allosteric change in enzyme result as the dephosphorylation of the His (-cyclo-pentyl (NH)NH^+) occurs. These allosteric changes are here determined in new ways to involve fractional fission of local β pleats regions and global α helical regions for their fractional fission and fusion with translation to PO_4^{3-} on His to dephosphatorylate the His.

Sequential agitation of local α helices and global β pleats induce fission and fusion with translation to the substrate of PO_4^{3-} and C3 to activate the phosphorylation of C3. A conformational change aligns the C3 to His (-cyclo-pentyl (NH)NH^+) for transfer of $PO_4^{3-}$from His to C3. A change of isotopes in this His from ^{14}N to ^{15}N can make the His (-cyclo-pentyl (NH)NH^+) less basic with weaker binding the PO_4^{3-} to disrupt the transfer of PO_4^{3-} to C2. Such

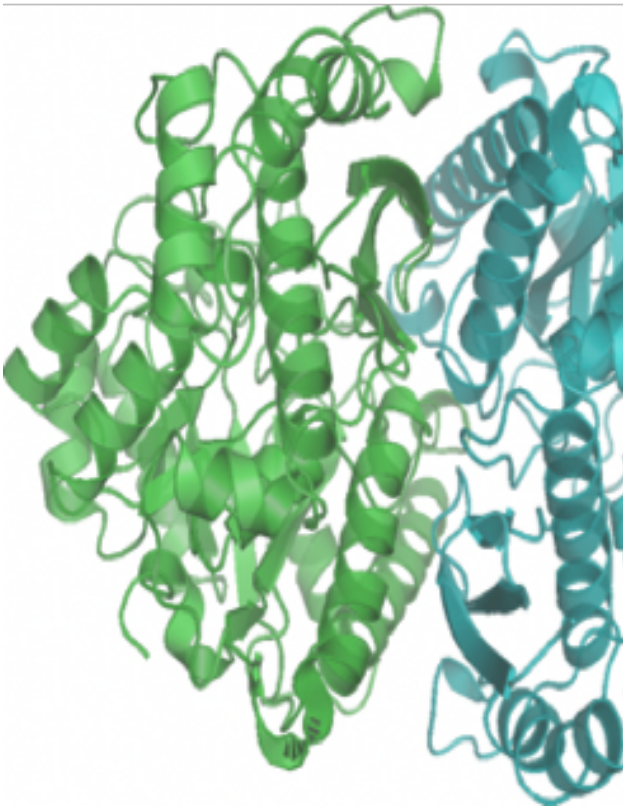
alteration to ^{15}N would alter the ability of local α helices global β pleats to bind PO_4^{3-} to His with ^{15}N. Also such alteration would alter the ability of local β pleats global α helices to disphosphorylate the His. transfer the PO_4^{3-} from C3 to C2 more easily. A treatment can involve electromagnetic radiation exciting ^{15}N in the His (-cyclo-pentyl $(NH)NH^+$) of the cancer cell to disrupt the binding of the PO_4^{3-} to disrupt the transfer of the phosphate to C3. Some chemicals throw off the balance of ^{14}N and ^{15}N in protein and nucleic acids. As the more acidic or basic environment may mutate the DNA with ^{15}N and the mutated DNA may favor protein with ^{15}N and they accumulate in certain cells and if the cells do not have ^{15}N they die and give their ^{15}N to surrounding cells so the surrounding cells develop cancer. Cancer spread by cancer cells dying and releasing their unusual isotopes. This why cancer kills the host.

Nineth Step of Glycolysis

In the 9th step the 2 phosphoglycerate is converted to phosphoenolpyruvate by enolase enzyme. During the 9th step, the 2 phosphoglycerate is converted to phosphoenolpyruvate by enolase enzyme. p^+ and OH^- on vincinal carbons are eliminated. Phosphopyruvate hydratase catalyzes the reaction. See Figure 9. [29] A double bond is formed across the carbons eliminating the OH^- and p^+. This reaction is a fragmentation and the model well accounts for the reaction in terms of the β pleated regions acting to break bonds in the substrate for overall eliminating pieces of the reactant as products. But on the basis of the model α helices are involved in the formation of new bonds in the products.



See Reference
{https://en.wikipedia.org/wiki/Enolase#/media/File:Enolase_mechanism2.png}



By Richard Wheeler (Zephyris) 2006. For the metabolic pathways wikiproject.

See Reference 29

Figure 9

The purpose of this 9th step (dehydration and elimination) is the phosphoenolpyruvate for its conversion to pyruvate in the 10th step (dephosphorylation). The pyruvate cannot form from the product of the eighth step (phosphate shift) 2 phosphoglycerate so this step has to convert the 2 phosphoglycerate to what can be converted to phosphoglycerate. Such relations of the substrate in space can also couple to the enzymes of steps 8, 9 and 10 in time and space.

Asn is involved in this step and Asn accelerates glycolysis in breast cancer cells. The N and O base can interfere with backbone hydrogen bonding and local α global β and local β global α forming and breaking bonds. Or the Asn can replace some other amino acid in the formation of nucleic acids or formation of proteins. It seems that the proximity of the C(O) (N) to the backbone may interfere strongly with the back bone or weaken some of the proton orbital rearrangements of the back bone.

The enzyme is a metalloenzyme that converts 2 phosphoglycerate to phosphoenolpyruvate and water. Under the enzymatic conditions of pH = 6.5 the reaction is reversible. But glycolysis is favored with the formation of phosphoenolpyruvate. The enolase in

humans have three subunits α, β and γ. The Glu {-CH_2-CH_2-C(O)(NH_2)} and Arg {--C(NH-C(NH_2)NH_2^+} are oriented in two subunits within the α unit. Substituting ^{12}C, ^{14}N and ^{16}O in Glu and Arg with ^{13}C, ^{15}N and ^{17}O causes alterations of the functioning of these residues on the substrate. N terminal and C terminal exist in each subunit. Three α helices and four β pleat sheets are in the N terminal. Two β pleated and two α helices with barrel structures and surrounding α helices are in the C terminal. The compact globular structures lead to the two domains interacting by hydrophobic means. Five important residues are within the active site of enolase: Glu 168{-C-CH_2-C(O)(O^-)}, Glu 211{ -C-CH_2-C(O)(O^-)}, Lys 345 (-NH_3^+), Lys 396 (-NH_3^+), and His 159 (-cyclo-pentyl (NH)NH^+). Substituting ^{13}C, ^{15}N and ^{17}O in these residues may affect the activities in this 9th step. Two Mg^{2+} act as cofactors by stabilizing the negative charges on substrates. There is possibility that substituting $^{25}Mg^{2+}$ with its negative magnetic moment can alter the stabilizing influence of the Mg^{2+} cofactor.

The enolase works best with co factors of divalent metals like Mg^{2+}, Mn^{2+} or Zn^{2+} or Co^{2+}. These ions induce conformational changes by binding the enzymes in the active site. Such conformational change allows the 2PGA to bind in the active site. The catalysis is initiated after the the substrate binding and the binding of a second Mg^{2+} in the active site. The enolase has 36 α helices and 22 β pleats so it is predicted by this theory to induce more bond forming than bond breaking. It may seem that the greater number of α helices may be inconsistent with the theory as more elimination occurs but the more α helices are associated with the binding of cofactors Mg^{2+} to the enzyme. The active site of the enolase has Lys 345, Lys 396, Glu 168, Glu 211 and His 159. The 2PG substrate is bound by Mg^{2+} and the Glu 211 and Lys 345 as induced by local α helices and global β pleats. The Mg^{2+} binds 2PG at the deprotonated carboxylated C1. A hydrogen bond is formed between the OH on 3C of 2PG and Glu 211 as induced by local α helices and global β pleats. The Lys 345 deprotonates the 2C as induced by local β pleats and global α helices. The 2C forms an alkene with 1Cwith charge flow onto the oxygen giving a negative charge. The other O electronically rearranges to form a ketone with 1C. internally the electrons forming double bond between 1C and 2C then rearrange to form double bound between 2C and 3C. The surrounding enzymes drive the internal electron rearrangement of double bond shift from 1C and 2C to 2C and 3C as the Glu 211 protonates the 3C with shifting of internal electrons in the carbons and the formation of H_2O from the protonation of 3C and the formation of PEP.

As ^{17}O is substituted in the Glu 211 then the delocalized protonation of the OH on 3C is accelerated for accelerating the mechanism relative to ^{16}O in Glu. As ^{15}N is substituted for ^{14}N in Lys 345 the ^{15}N is more as basic than ^{14}N but the electrons are more assessable to the proton and a magnetic interaction may pull protons more from the 2C and thermal agitation fragment the pulled protons tautermically into various proton orbitals and hydrogen bonding. And the ^{17}O in Glu 211 magnetically better protonates the 3C relative to ^{16}O as the dynamics are shifted from electrical to magnetics so the ^{17}O and its negative nuclear magnetic moment pulls one electron more than the other in the valence so the embedded proton is magnetically fragmented for nonlocally binding the electron less pulled into the ^{17}O and also the electron pushed toward 3C for loss of p^+ from 3C (sp^3) but later after the 3C is rehybridized to sp^2 the protonated Glu with ^{17}O-H is not able to hold the proton from the sp^2 3C as electrons shifted more into 3C due to the double bonding and the electrons crystallize the proton into the ^{17}O. So on the basis of such, a cure for cancer can involve the external dynamic magnetic fields rotating ^{15}N of Lys and ^{17}O of Glu so as to disrupt the protonation of 3C and the deprotonation of Lys 345.

Isotopic labeling has pointed to E1cb elimination mechanism to convert the 2PG to PEP via a carbanion intermediate. Two Mg^{2+} coordinate the 2 phosphoglycreate at the carboxylic acid groups in the active site of the enolase. Local α helices and global β pleats fiss, translate and fuse to activate the binding of Mg^{2+} to 2 phosphoglycerate. The acidity of the α hydrogen increases due to the stabilization of the negative charges by the 2 Mg^{2+}. The Mg^{2+} may stabilize ^{17}O differently from ^{16}O for change in dynamics for isotopic substitution and alter the activation by local α helices global β pleats. Lys 345 ($-NH_3^+$) takes a proton at the α carbon with induction by local β pleats and global α helices. The change in N from ^{14}N to ^{15}N can change the ability of the Lys to take the α hydrogen and the ability of local β pleats global α helices to catalyze the deprotonation. Resonance with the carboxylate oxygen and the Mg^{2+} cations stabilize the negative charge of the deprotonated C or carbanion. The effects of ^{13}C and ^{17}O on both carboxylic acid group and the carbanion can alter the resonance stabilization to affect this step.

Next OH^- on the C3 is eliminated as water by interacting with Glu211 ($-COO^-$) with the formation of phosphoenolpyruvate. As activated by local α helices and global β pleats binding p^+ to OH^- and locally β pleats global α helices breaking loose H_2O as local α helices global β pleats induce C-C to C=C. Conformational changes of the enzyme enolase assist these steps of the catalysis. The deprotonated C and carbanion are stabilized by resonance of the carboxylated oxygen and the Mg^{2+} cation. A change in O from ^{16}O to ^{17}O and or $^{24}Mg^{2+}$ to $^{25}Mg^{2+}$ would alter such resonance of the resulting carboxylate group for changing its formation and stability. Gln 167 {$-CH_2-CH_2-C(O)(NH_2)$} and Lys 396 ($-NH_3^+$) are agitated by two Mg^{2+} and binding local α helices and global β pleats for inducing rotation of the substrate into position.

It is important to consider that such agitation of $^{24}Mg^{2+}$ to rotate the substrate is a magnetic interaction and $^{25}Mg^{2+}$ would alter the dynamics of such rotation. And alter the ability of local α helices and global β pleats to induce rotations. Furthermore, if the N and O in the Gln {$-CH_2-CH_2-C(O)(NH_2)$} and the Lsy ($-NH_3^+$) are changed from ^{14}N to ^{15}N and ^{16}O to ^{17}O then the effect of the Mg^{2+} to alter and rotate the substrate is changed for better rotation. The replacements of ^{14}N and ^{16}O for ^{15}N and ^{17}O with the negative magnetic moments of the ^{15}N and ^{17}O causes nonlocal protonations as the fragmentation of the protons in the proton orbitals near ^{15}N and ^{17}O. The α hydrogen is more acidic if ^{16}O goes to ^{17}O and the nonlocally protonation of the phosphoryl group by His (-cyclo-pentyl $(NH)NH^+$) and His will better nonlocally protonate as well if the ^{14}N is changed to ^{15}N. The corresponding activation by the enzyme regions would also be altered. The nearby Arg {$--C(NH-C(NH_2)NH_2^+$} also increases the acidity of the α Hydrogen. The Arg is subject to altered dynamics by both ^{13}C, ^{15}N. Arg 374 {$--C(NH-C(NH_2)NH_2^+$} takes a proton from Lys 345 ($-NH_3^+$). With catalysis by local β pleats and global α helices Such deprotonation of Lys is increased as the ^{14}N is replaced by ^{15}N.

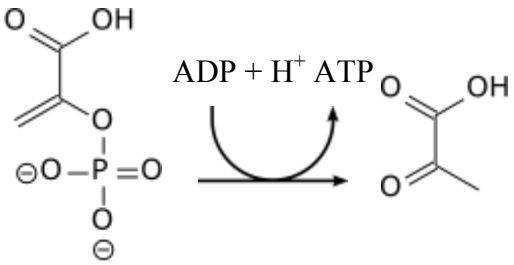
This mechanism of eliminating α p^+ and β OH^- is driven by Lys ($-NH_3^+$) and supported by other residues like His, Arg {$--C(NH-C(NH_2)NH_2^+$}, His (-cyclo-pentyl $(NH)NH^+$) , Asn {$-CH_2-C(O)(NH_2)$}, Gln {$-CH_2-CH_2-C(O)(NH_2)$} . ^{14}N and ^{16}O is in Glu { $-C-CH_2-C(O)(O^-)$} so changing to ^{15}N and ^{17}O alters the effect of the Glu. The Asn really helps holding the substrates or delivers Mg and Mn to the enzyme or allow high concentrations of Mg and Mn? ^{14}N is in Arg, His, Asn and Gln so changing the nuclide to ^{15}N alters the effects of these residues so that glycolysis is accelerated. It is important to note that some isotopic substitution has already been employed to study the mechanism and the fact that the substitutions did not terminate the mechanism is support of the view here that the step was accelerated by the change in isotopic

nuclides. Also the change in isotopic nuclides could have altered the dynamics in ways not discerned or reasoned by prior investigators. Or the needed amounts of substitution and the substitution of different elements C, N, O, S, and P was not previously done to see new effects. So the substitution of unusual nuclides and isotopes seems to cause the cancer.

Tenth Step of Glycolysis

During the 10^{th} step, the phosphoenolpyruvate is converted to pyruvate by pyruvate kinase. ATP is produced by this 10^{th} step. This step is an elimination. Phosphate appears to assist in all these steps of the glycolysis. Phosphate may play a more direct role in glycolysis (as in this step assisting the rehybridization for elimination reaction) relative to Kreb cycle. The enzymatics of the phosphate may be accelerated by substituting ^{17}O on the P as the ^{17}O pulls one electron away from the magnetic P center so as to induce magnetism within the molecule for handle for thermal energy to oscillate the phosphate and the phosphate in turn oscillate the C centers of the substrate. The α helical and β pleated regions of the enzymes can also assist in the rehybridization of the carbon centers. See Figure 10. [30] This step is consistent with the model as in this elimination the mechanism predicts β pleated regions and indeed the enzyme has β pleated regions near the active site for organizing the fragmentation for the elimination.

The purpose of this tenth step is to form pyruvate by eliminating phosphate as phosphate has done its job and phosphate is not used in Kreb cycle. The Kreb cycle has more sp^2 and C=O double bonds and acidic groups so this is the last step of the glycolysis for which the sugar with its C-OH are converted to acetates, carboxylic acids.



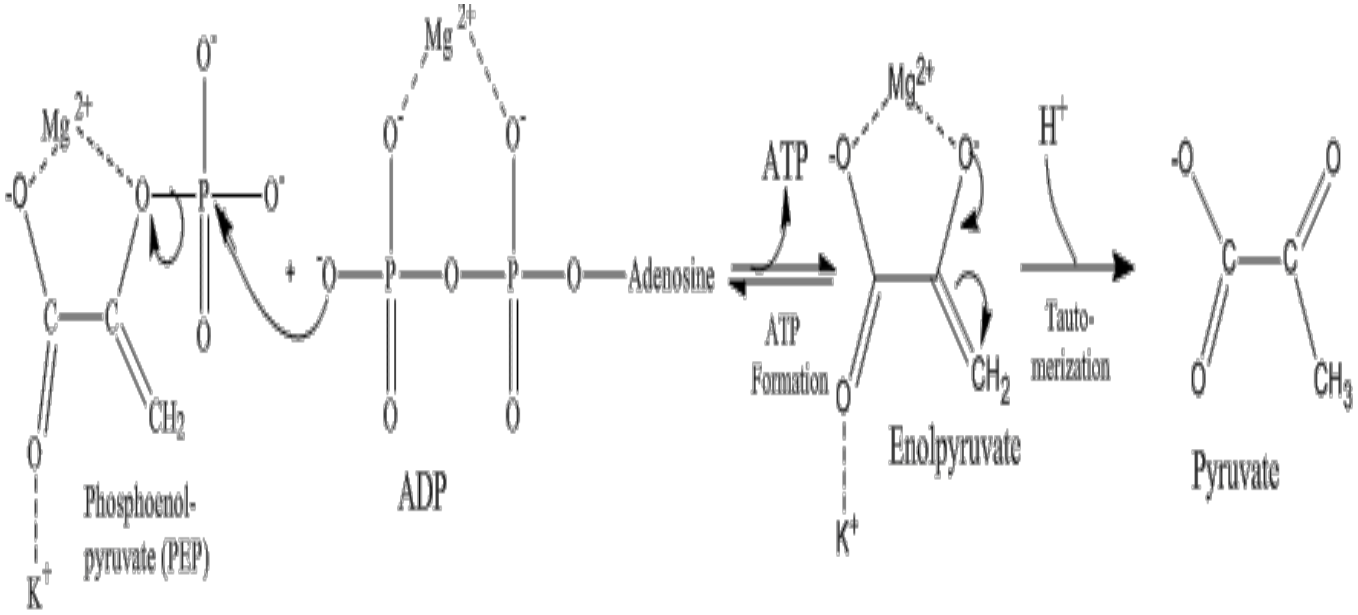
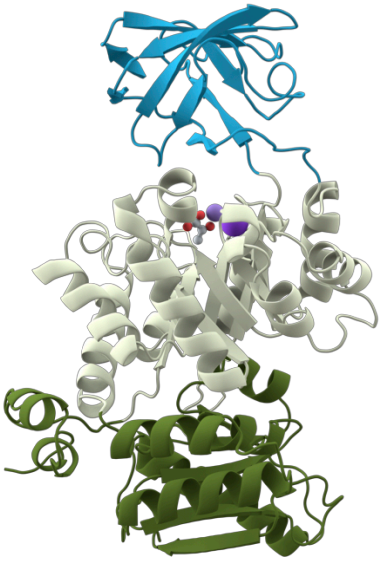


Figure 1: The mechanism of the reaction catalyzed by pyruvate kinase.

First the nucleophilic attack of an ADP atom on the phosphorous atom of PEP to form ATP and enolpyruvate and the tautomerization of enolpyruvate to pyruvate.

See Reference { http://proteopedia.org/wiki/images/1/17/Pyruvatekinasemechanism.gif}



Thomas Splettstoesser (www.scistyle.com)

See Reference 30

Figure 10

The pyruvate kinase (PK) is an all β protein, belonging to the β class of proteins. And within this theory β pleats are associated with more decompositional type chemistry. The PK has both α helices and β pleats. But the β pleats are consistent with the eliminating nature of this step. The PK involves many α helices in binding K^+ and Mg^{2+} cofactors. The energy of the PEP cleavage is coupled into ATP generation as pyruvate is formed. The PEP nucleophilic attacks the P atom of β phosphoryl oxygen of ADP as induced by local α helices and global β pleats. The nucleophilic attack induces local β pleats and global α helices to fragment enolpyruvate from the intermediate complex to also form ATP. The protonation of the C=C bond involves a tautomerism that shifts the double bond to the neighboring O with protonation of the C as induced by local α helices and global β pleats. It is important to note the role of K^+ in this reaction as the K^+ is a positive nuclear magnetic moment and high concentrations of K^+ in the enzyme are essential for affinity for the PEP and ADP by the enzyme for binding. This role of K^+ is unusual as alkali cations are typically spectator ions (2005) [19]. But the author pointed out in 2012 the involvement of K^+ and Na^+ ions in the catalytics of oxidation of graphene [14]. Just as the nuclear spin of K^+ in this PK enzyme is essential for enzymatic activity due to its nuclear spin, the alteration of the nuclei of other elements in these various enzymes causes altered enzymatics and reactivities of the substrates.

This is the final step of glycolysis and it is catalyzed by pyruvate kinase. The pyruvate kinase involves two steps of enzymatics: phosphate transfer to ADP and transformation of phosphoenolpyruvate to phosphoenolatepyruvate. Replacing ^{12}C and ^{16}O with ^{13}C and ^{17}O can alter the enzyme conversion of the enol to enolate. It may also be possible to externally drive the ^{13}C and ^{17}O so as to suppress the transformation of enol to enolate by loss of p^+ as catalyzed locally by β pleats and globally by α helices. The phosphoenolatepyruvate in the second step accepts a proton to produce pyruvate as catalyzed locally by α helices and globally by β pleats in the enzyme. ^{13}C and ^{17}O in the enolate can alter the ability of the pyruvate to accept a proton. The ^{13}C and ^{17}O can also prevent the pyruvate from forming. If the pyruvate does not form, then how can the Kreb cycle be initiated the hindrance of this last step of glycolysis whereas the other steps are promoted can hinder ATP production by the last step so as to accelerate the prior steps; but prevent the Kreb cycle.

Mg^{2+} and or Mn^{2+} are need to assist the transformation as cofactors. The Mg^{2+} binds the pyruvate kinase by local α helices and global β pleats at the active site for accelerate the rate. The alteration of $^{24}Mg^{2+}$ to $^{25}Mg^{2+}$ can alter the rate and dynamics of this step as it may not bind to the enzyme as well or better and the negative magnetic moment can accelerate the attack on ^{16}O and ^{12}C, but the ^{17}O may over express and over phosphorylate for cancer. The Mg^{2+} interacts with ^{17}O of phosphate with blockage of the action of ^{25}Mg. This last step is one of the key 3 rate determining steps of glycolysis. The cure for cancer will involve these three steps of rate determination. Although the slowest rate determining step is more important the other two nest slowest steps are also important.

The cure for cancer as presented here involves stimulating these 3 rate determining steps so as to accelerate in excess to kill cancer and/or to suppress to starve the cancer cell. The external resonance of ^{13}C in its many enzymes in step 10 may be a means to selectively kill

cancer cells as normal cells lack the ^{13}C having ^{12}C. This 10th step is irreversible as the pyruvate product is used in other cycles. Lactic acid can be formed from the pyruvate or the pyruvate can be used in the Kreb cycle to produce more ATP. The fructose 1,6 bisphosphate is an important regulator for activating the enzyme and such moderator and this fructose 1,6 bisphosphate is a product of an earlier step of glycolysis. So the last step can be directly slowed by the product of an earlier step so as to prevent unhealthy buildup of intervening products and reactants as such may alter the other steps. This fructose 1,6 bisphosphate interacts with the C domain of the enzyme for causing conformational change in the enzyme to affect its activity.

The Kreb Cycle and Its Suppression by ^{13}C, ^{15}N and ^{17}O

Next the Kreb (citric acid) cycle is considered; as the Kreb cycle in normal cells takes pyruvate from glycolysis and converts it to CO_2 and provides more energy. The pyruvate product from the glycolysis process is the reactant for the Kreb (citric acid) cycle. The glycolysis process is the dominant catabolic process in cancer cells for generating ATP and energy from sugars as the Kreb cycle is suppressed in cancer cells for what is called the Warburg Effect. In this work after considering the glycolysis process by new mechanism of RBL and Ferrochemistry and novel dynamics of enzymatics thereby with Ferrochemistry between enzymes and substrates and alterations of such Ferrochemistry by substituting magnetic isotopes of ^{13}C, ^{15}N, ^{17}O ^{33}S for ^{12}C, ^{14}N, ^{16}O and ^{32}S, next the Kreb cycle is analyzes by the Little Effect and Ferrochemistry with comparison to glycolysis process and effects of changing magnetic isotopes of C, N, O, Mg, P and S for determining a new atomic mechanism of the Warburg Effect on the basis of Ferrochemistry and the Little Effect. In the Kreb cycle (unlike the glycolysis occurring in cytoplasm of cells), acidic substrates are modified, oxidized and combusted to CO_2 in the mytochondria within the cells.

The Kreb cycle differs from the glycolysis process as the glycolysis operated on C-OH in glucose and fructose and fragmented the 6 carbon, polyalcohol. But the Kreb cycle operates on poly-carboxylic acids along the carbon chain. How does polarity, pH, density of mitochondria compare to cytoplasm? The mitochondria has dense fields and this contributes to quantum phenomena in mitochondria. The cytoplasma has less dense fields for more classical physics. High fields inside mitochondria couple many enzymes QM. The reactants and intermediates of these two processes differ as the glycolysis process transformed C-OH in glucose and fructose and decomposed a six carbon polyalcohol to 3 carbon pyruvate (alcohol, aldehyde carboxylic acid?) whereas the Kreb cycle transforms 3 carbon to 6 carbon carboxylic acids for transforming them to carbon dioxide.

Quite interesting in a new view as by RBL, the enzymes differ for the different substrates of glycolysis process and Kreb cycle and the fractional fission and fractional fusion of the enzymes from RBL mechanism provides a means for the enzymes to interact with each other in space as they interact with substrates within them as the substrates interact within different enzymes in time! {It possible that the enzymes of the glycolysis process have parts of Kreb enzymes, but the Kreb lacks the whole of the glycolytic enzymes.} This indeed may be a basis for consciousness and life of living verses nonliving. (Consciousness seems quantum phenomena but how does one take consciousness from submicroscopic to macroscopic by the fractional fission and fusion of the author.)

The different compositions and structures of polyalcohol substrates of the glycolytic substrates relative to the aldehyde and carboxylic acids of the substrates in Kreb cycle manifest

more difficult bond rearrangements of the carbon substrates during the glycolytic process relative to the carbon substrates of the Kreb cycle due to the fewer carbon oxygen double and single bonds with added phosphorus oxygen carbon bonds in the glycolytic process relative to more carbon oxygen bonds in substrate of the Kreb cycle. In glycolysis, the oxygens are indirectly coupled to carbon bonds via the phosphorus. But in the Kreb cycle the oxygens are more directly coupled to the carbon bonds of the substrate. These differences lead to different enzymatics and different effects on spins on the enzymatics. In general, the magnetic ^{31}P center in phosphates and their direct role in glycolysis process leads to magnetic nuclear moments accelerating the glycolysis process. But the ^{12}C nonmagnetic bosonic nucleus is frustrated by the magnetic nuclear moments to suppress the Kreb cycle by nonprimordial isotopes. The normal cells have Kreb cycles catalyzed by protons and proton orbitals in the mitochondria. As magnetic nuclei are substituted for the primordial C, N, O, Na, Mg, P, and S the proton in its delocalized dynamics is not able to buffer the effects of the introduced spins and magnetic moments as does the ^{31}P center in phosphates of glycolysis. It is on this basis that the nonprimordial nuclear isotopes suppress the Kreb cycle.

So that in general the phosphorus of the glycolysis process helps the external oxygens (with proton modulation and proton orbitals) couple to the sugar alcohols to rearrange carbon --- carbon bonds Ferrochemically during glycolysis. But during the Kreb cycle more oxygens couple directly to the carbon --- carbon bonds of the substrates for more direct role of oxygen (with proton modulation and proton orbitals) in altering bonds of the carbon substrates of the Kreb cycle. The phosphorus nuclei catalytically affect in the glycolysis as a large positive magnetic moment and available d orbitals of ^{31}P for accommodating effects of varying nuclear spins of C, N, O and S between the substrates and enzymes in glycolysis process. But the oxygen nucleus and carbon nucleus of the aldehyde, ketones and carboxylic groups on substrates of the Kreb cycle lack nuclear magnetic moments to accommodate changes in the magnetic moments of C, N, O and S during Kreb cycle to suppress the Kreb cycle for cancer as induced by nonprimordial isotopes. It would be interesting to compare the enzyme compositions of glycolysis process and Kreb cycle.

So cancer is internally magnetic as by ^{31}P during glycolysis. So by driving the cancer with magnetism then can kill cancer cells. But how can the cancer cells be driven magnetically without harming normal cells and the iron in blood? Will driving magnetics in glycolysis harm the magnetics of the Kreb in normal cells? The Kreb is more sensitive negatively to magnetics than the glycolysis process. Some normal cells may die as cancer are killed by driving their glycolysis. The magnetism may alter perhaps reversibly the diamagnetic ^{16}O and proton catalysis of substrates in Kreb cycle. But magnetic dynamics of oxygen and proton of Kreb differ from dynamics of phosphorus in glycolysis. The ^{31}P in glycolysis is over driven or totally suppressed without driving the O and H of enzymes in Kreb cycle. It may be that ^{31}P goto ^{30}P or ^{32}P for cancer by accelerating glycolysis n cancer cells so can selectively drive ^{30}P-O or ^{32}P-O. I then kill cancer without harming normal cells. The Kreb cycle has the electrons of oxygen and coupling protons more directly driving altering C-C bonds so unusual nuclear moments of ^{13}C, ^{15}N, ^{17}O and ^{33}S can frustrate such dynamics of O in Kreb cycle. Asp + magnetic moments interacts with ^{17}O, ^{15}N, ^{33}S, ^{30}P, ^{32}P via O-P, S-O or S-H, P-O-C, P-O-P. so now P-O-H less sensitive to change in isotopes than N-O ; N-H; H-O, S-H as P has d orbitals + magnetic nuclei so can use d orbitals to take in electron spins from ligands and nonprimordial isotopes. ^{33}S may use d orbitals to alter its chemistry but SH would be active and not S-O except in thioester like

R-O-C=O, R-S-C=O thioester; but even here the S is not S-O as in P-O. So in R-S-C is S is not unsaturated or electrophilic as P in O-P=O is electrophilic and takes electron into d orbital of P.

But in glycolysis the magnetic moments of P and its empty d orbitals drive O and drive carbon --- carbon bond rearrangements to sustain cancer cells and the ^{13}C, ^{15}N, ^{17}O, ^{25}Mg, ^{30}P, ^{32}P and ^{33}S less adversely affect the glycolysis as the magnetic phosphate nuclei accommodate these and the magnetic phosphate nuclei can segregate ^{15}N from cytoplasma in cancer cells. Does the cancer digest parts of the mitochondria to produce ammonia by digesting glutamine? Is glycolysis older than Kreb cycle? In this mechanism, such suppression is explained on a molecular, atomic and nuclear basis for how cancer originates in normal cells and how cancer can be cured for the first time in human history. The cancer cells are a malfunction of a normal cells as the normal cells sustain a longer life and allow for reproduction and parenting. But cancer cells are not as capable and they eventually kill the organism of their origin and the cells that malfunction to form them and even eventually the cancer cell kill themselves suicidally.

First and Second Steps of Kreb Cycle

In 1st Step of the Kreb cycle involves the isomerization of citric acid to cis-aconitric acid and cis aconitate occurs by uptake of H_2O to form isocitrate in 2nd Step. Aconitates is the enzyme that provides the α helical regions for compositional and β pleated regions for decompositional in fractional fusion of global to fractional fission of these pieces to catalyze the isomerization of step 1 and the hydration by step 2.

The purposes of these 1st and 2nd steps are the formation of isocitrate for the 4th step from the product of the 10th step (citric acid). The chemical bond rearrangements involve dynamics of isomerization and then hydration. Such isomerization reaction and hydration dynamics couple with prior aldol condensation dynamics from step 10 and the dynamics of oxidative decarboxylation for subsequent steps 3 and 4.

The aconitase consist of a lot of alternating α helices and β pleats. There are four domains three of these domains are rigid and the other is more flexible. An 4Fe4S cluster exist in the aconitates with no redox activities but binding the OH^- of the citrate and catalyzing its elimination and this cluster is the site where catalysis occurs. The active site has many important residues: Gln72, Asp100, His101, Asp165, Ser166, His167, His147, Glu262, Asn258, Cys358, Cys421, Cys424, Cys358, Cys421, Asn446, Arg447, Arg452, Asp568, Ser642, Ser643, Arg644, Arg580. Is it important to not the large number of Cys residues. And this may lead to inactivity as ^{32}S is replaced in the protein by ^{33}S. These Cys of 385, 448 and 451 are binding and holding the iron atoms of the FeS fluster. Activation causes a 4th Fe to be included in binding with an attached water. Free aconitase has the FeS cluster binding OH but with binding citrate the FeS cluster is protonated for water binding of the cluster. Water from either His 101 or His 167 transfers proton to the cluster upon the binding of citrate. Asp 100 and Glu 262 are paired in proton orbitals with His 101 and His 167 so as to modulate the protonation of the cluster as the substrate becomes bound. The binding of the citrate also reorients the cluster by conformational changes. A Ser 642 deprotonates the citrate or isocitrate as induced by local β pleats and global α helices to form the aconitase intermediate. The double bond is rehydrated to form isocitrate from the prior cis-aconitate. As ^{14}N is changed to ^{15}N in His, the electron pair is pulled inward and proton is pushed outward so the His better pushes proton wave on water and for transferring a proton to citrate. The nearby Asp 100 and Glu 262 may have their ^{16}O replaced by ^{17}O for

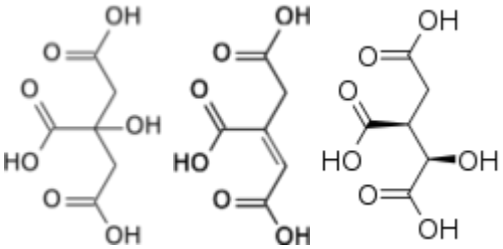
negative nuclear magnetic moments and pushing protons outward from these nuclei for causing proton orbitals between the water and His 101 or 167. Ser deprotonates the citrate, but as ^{17}O replaces ^{16}O on the Ser the deprotonation of citrate is hindered. This may be a basis for suppressing the Kreb cycle. It may be possible for the different amino acids to switch ^{16}O for ^{17}O via water acid base reactions. This can be a basis for replacing ^{15}N and ^{17}O in malfunctioning enzymes by surrounding $H_2{}^{16}O$ and $^{14}NH_3$. If the Ser is not able to deprotonate the citrate then the intermediary double bond cannot be hydrated to form the cis-aconitate.

It is important to note from this mechanism that the FeS cluster in binding OH and protonating the OH for bond H_2O and interacting with the C-OH of the citrate for the dehydration and sp^3 to sp^2 and rehydration for sp^2 to sp^3. The FeS cluster via protonation and deprotonating gives spin induced angular momenta in the proton orbital dynamics between the residues and the substrate for accelerating sp^3 to sp^2 in the C-C bonds to C=C and sp^2 to sp^3 in the C=C goto C-C. It is on this basis that replacing ^{32}S in the FeS cluster with ^{33}S alters its accelerating decelerating orbital angular momenta to rehybridize the carbon atoms and this can be a basis for cancer. The ^{32}S has a positive magnetic moment and ^{32}S has a magnetic moment of zero. As ^{33}S replaces ^{32}S, the valence electron pairs are pulled toward nucleus due to the positive magnetic moment and the p^+ of proton orbital is pushed further away from the nucleus. The electrons pulled inward are fissioned to electron waves as given by wavefunctions and the proton is pushed outward for proton fission for wave nature of proton. The ^{33}S and its outer proton wave is not as able to coordinate the FeS cluster as ^{32}S as the ^{32}S has electron pair to ligate the FeS cluster. The ^{33}S has the positive nuclear magnetic moment pulling electron pair inward to destabilize the interaction of the pair with Fe.

In the 2nd step of the Kreb cycle, the cis-aconitate undergoes a hydration reaction by the aconitase enzyme to form isocitrate. The aconitase enzyme uses its residues of β pleated (exothermic) regions to decompose the substrate along reaction trajectory of cis-aconitric acid substrate and H_2O to break bonds to form activated state with fragment double bond and fragmented water for p^+ and OH^- addition by α helical (endothermic) regions across double bond to form isocitrate. The aconitase can reverse its conformational configurational, transformational changes and so as to fractionally fuse the α helical regions (exothermically) for pieces to rupture isocitrate by fragmenting OH^- and p^+ from the vincinal carbons and fissioning its β pleated regions (endothermically) to fuse the double radical to double bond and fuse proton to water to reform the cis aconitric acid. See Figure 12. [32] The change of ^{12}C to ^{13}C in the enzyme and or substrate can have dramatic alteration of the enzymatics and hydration/dehydration as the FeS cluster interact differently with ^{13}C to form unusual intermediates that cannot support the primordial Kreb cycle as the ^{13}C rotates along the Kreb cycle in different ways than ^{12}C. (Is life based on certain nuclear isotopes? Life is based on certain isotopes. If the slightest change occurs, then what happens to life? Cancer momentarily and then death! The loss of OH^- for dehydration is slowed for ^{13}C relative to ^{12}C to hinder the cis-aconitates formation to suppress the Kreb cycle. Furthermore, if ^{17}O so happens to also substitute ^{16}O, then the ^{13}C and ^{17}O cause very different Ferrochemistry of ^{13}C-^{17}OH heterolytic cleavage dynamics and alterations of the residues of the aconitase by ^{13}C, ^{15}N, ^{17}O and/or ^{33}S lead to further altered dynamics relative to the primordial aconitase and cis aconitate with suppression of the 1st and 2nd steps of Kreb cycle. This is a common example along the Kreb cycle with suppression (and the glycolysis process with reinforcement) wherein the change of interacting ^{12}C for ^{13}C and/or change of interacting

^{14}N for ^{15}N and/or change of interacting ^{16}O for ^{17}O and/or change of interacting ^{32}S for ^{33}S hinders the interaction induced rehybridization of carbon from sp^3 to sp^2 and/or sp^2 to sp^3. The Kreb cycle involves a lot of carboxylic acid and CO_2 formations whereby sp^3 goes to sp^2 and to sp hybridizations of C. The glycolysis mostly involves sp^3 to sp^2. The larger changes in orbital momentum during the Kreb cycle involve larger effects of changes in isotopic nuclear magnetic moments for the cause of the Warburg Effect by Ferrochemistry and the Little Effect.

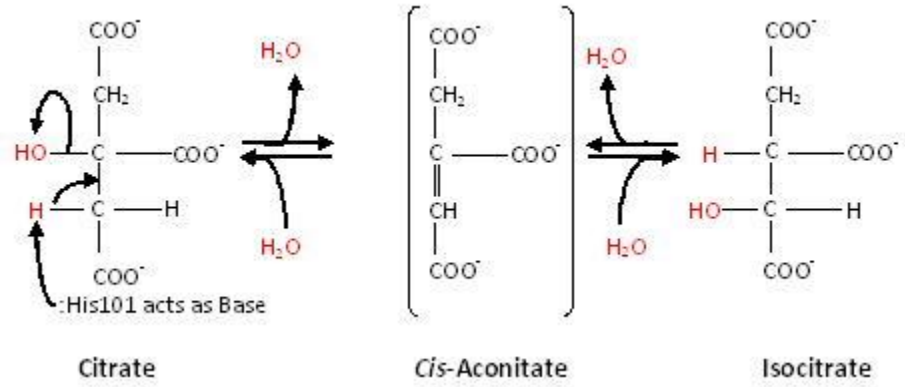
On the basis of this mechanism, the bond breakage and bond formations associated with the chemical dynamics on the substrates for isomerization of citrate to cis aconitric acid to isocitrate along a reaction coordinate whereby the aconitase (with appropriate composition and shape) has β pleated regions to fission (translate and fuse fields) for decomposing bonds of the citrate to form activated state for proton and hydroxide with formation of transport of the intermediates (via conformational changes of aconitase) to regions of α helical structures which fuse (fission) for relaxing the proton, hydroxide and fragmented substrate to the isomeric product of cis aconitric acid with the rebonding of the enzyme and reformation of enzyme to its native state. See Figure 11. [31] The aconitase enzyme has the necessary composition and constitution of residues for regions of β pleats and regions of α helices for such enzymatic dynamics supporting this new theory and model of the author.



→→

By Nmorrison89, using F. Takusagawa as a reference. - Own work, using information from http://web.ku.edu/~crystal/taksnotes/Biol_638/notes/chp_16.pdf, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=15224703

By Jawahar Swaminathan and MSD staff at the European Bioinformatics Institute - http://www.ebi.ac.uk/pdbe-srv/view/images/entry/1aco600.png, displayed on http://www.ebi.ac.uk/pdbe- srv/view/entry/1aco/summary, Public Domain, https://commons.wikimedia.org/w/index.php?curid=6164417



http://proteopedia.org/wiki/images/9/98/Aconitase.JPG

See Reference 31

Figure 11

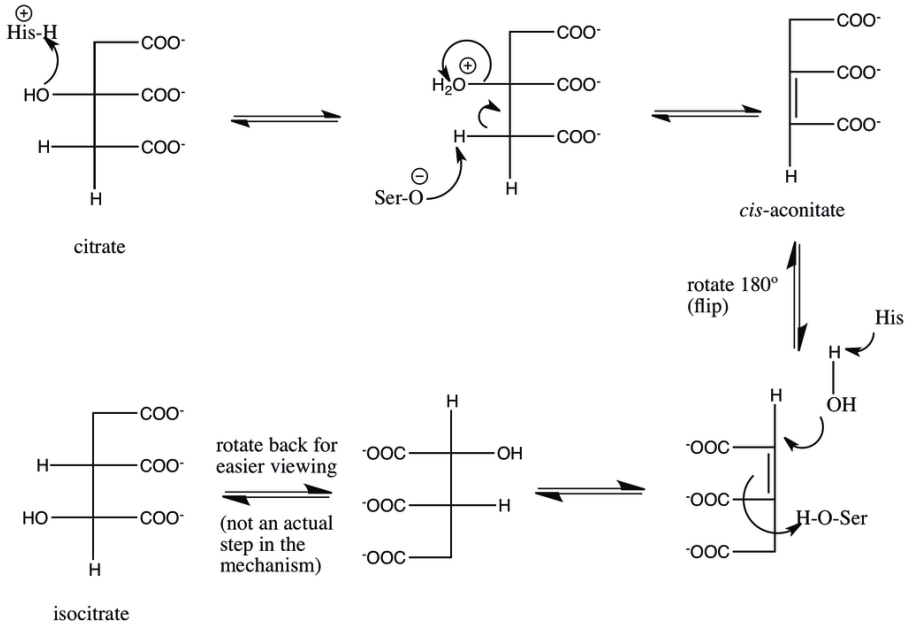
It is extremely important for understanding how the altered nonprimordial isomers of ^{13}C, ^{15}N, ^{17}O, ^{30}P and ^{32}P and ^{33}S suppress the Kreb cycle by noting that the aconitase enzyme functions by use of $[Fe_4S_4]^{2+}$ cluster within the enzyme aconitase. The discovery in this work is magnificent as it determines that such $[Fe_4S_4]^{2+}$ cluster within aconitase has important magnetic properties which allows it to catalyze the bond rearrangement for isomerization of the C-OH for primordial ^{12}C-^{16}OH. But as the ^{32}S of $[Fe_4S_4]^{2+}$ cluster is substituted for ^{33}S and ^{13}C and ^{17}O are substituted for ^{12}C and ^{16}O in C-O-H the $[Fe_4S_4]^{2+}$ cluster cannot as well catalyze the hydration and dehydration for steps 1 and 2 of the citric acid cycle. The FeS cluster manifest the needed help for N groups and O groups (of nearby amino acids) to alter orbital momenta about C centers during these steps of the Kreb cycle. Moreover, the alterations of the ^{32}S in the FeS cluster by the Little Effect alters its catalytic mechanism for assisting the N groups and O groups rehybridization of the C centers. The $[Fe_4S_4]^{2+}$ clusters are bound directly to the enzymes by three cysteine (-SH) amino acid residues in the aconitase. During the step the activity of the cluster involves its detachment from cysteine (-SH) and coordinating to local H_2O s by enzymatic dynamics of local β pleats and global α helices. During the step the substrate incorporations into the active site causes the $[Fe_4S_4]^{2+}$ cluster to detach from the three cysteine residues and bind to local H_2O by local α helices and global β pleats for setting the stage for the dehydration and hydration dynamics as modulated by α helices and β pleats of the whole enzyme. See Figure 12.

In addition to Cys (-SH), the aconitase has important His 101 {--cyclo pentyl (NH) $(NH)^+$} and Ser 642 {--OH)} that are directly involved in the enzymatics of hydration and dehydration dynamics. The whole aconitase via its α helices and β pleats indirectly drive, organize and synchronize the hydration and dehydration with further effects on indirect enzymatics of the whole aconitase. The enzymatics are dramatically altered by the substitution

of ^{15}N and ^{17}O for ^{14}N and ^{16}O on these residues of the in aconitase. The replacement of ^{32}S by ^{33}S also alters the activity of the Cis (-SH) residue. The His 101 {--cyclo pentyl (NH) $(NH)^+$} of the aconitase protonates the C3 of citrate with subsequent loss of water from the resulting intermediate as catalyzed by local β pleats and global α helices deprotonating His 101 and local α helices and global β pleats protonating C3. The protonation of the citrate is decelerated if ^{14}N is changed to ^{15}N as the less basic ^{15}N by its negative nuclear magnetic moment causes it to be more releasing electrons than ^{14}N. Simultaneously the C2 of the citrate is prepared for the elimination as Ser 642 {--OH} of the aconitase deprotonates the C2 as aconitase local β pleats and global α helices catalyze loss of p^+ from C2 and local α helices and global β pleats induce p^+ binding to Ser 642 so the loss of OH^- from C3 and deprotonation of C2 causes vincinal C – C carbocation and carbanion for double bond formation as induced by the aconitase local α helices and global β pleats. Such chemical dynamics are dramatically changed by the Ferrochemistry if ^{16}O of Ser {--OH)} is changed to ^{17}O so the OH of Ser is more basic and can deprotonate the C2 for suppressing this step of the Kreb cycle.

Therefore the isotopic shifts of primordial ^{12}C, ^{14}N, ^{16}O and ^{32}S to nonprimordial ^{13}C, ^{15}N, ^{17}O and ^{33}S within the aconitase enzyme; the substrate citrate causes alterations catalysis of the FeS cluster and alterations of the catalysis of the OH of Ser {--OH)} and N of His {--cyclo pentyl (NH) $(NH)^+$} and alterations of the whole enzyme α helices and β pleats for catalyzing for providing a reaction trajectory for deprotonating C2 of citrate and pulling OH^- from C3 for catalyzing the elimination for double bond formation to cis aconitric acid. The change of magnetic moment from 0 to positive for ^{12}C to ^{13}C and ^{32}S to ^{33}S and the change in negative magnetic moment for ^{14}N to ^{15}N and ^{16}O to ^{17}O even more exponentiated the Ferrochemistry and altered dynamics for the dehydration. These effects as by this discovery demonstrate how the Little Effect and Ferrochemistry give a subatomic basis for Warburg Effect.

The 2nd step involves the hydration of the cis aconitate to form isocitrate. The hydration involves a flip in structure as the aconitate intermediate is rotated by 180°. See Figure 12 {K3}.



See Reference 32

Figure 12

Here is an example of a base from enzyme protonating; the His protonates a strong base; ^{14}N better protonates or gives proton; ^{15}N is a weak base and it would not easily lose p^+ as it is less acidic; H-^{15}N vs H-^{14}N. deprotonate $^{17}OH_2$ cannot protonate His. HO-Ser cannot protonate the double bond. H-N internal motion in covalence for revorbital faster than light causing negative nuclear magnetic moments to alter chemistry. Note the H-^{15}N of positive and negative magnetic moments. So the positive p^+ magnetic moment and ^{15}N negative magnetic moment pull the electron up and electron down spins apart so that p^+e^- spin up spin up bind tighter for lower acidity relative to p-$^{14}NH_3{}^+$ the positive moment of p^+ and positive moment of ^{14}N pull opposite of electron up down so the e^- pair is not as internally polarized. RBL discovers internal magnetism inside a covalent bond. GN Lewis discovered the covalent bond. So now RBL discovers a way to internally magnetize the covalent bond.

So now what would be the acidity of H-$^{14}NH_3$ verses H-$^{15}NH_3$ as temperature increase as external magnetic field varies? What kind of measurement can I do at the magnet lab would nanosize matter? So the His ^{15}N is not able to protonate the citrate so it cannot be able to isomerize to cis aconitate; then His deprotonates water but $^{17}OH^2$ then the ^{17}O would not as easily protonate His. Therefore Ser with ^{17}O cannot protonate; H_2O with ^{17}O cannot protonate His; His with ^{15}N cannot protonate.

The isotopic change from ^{14}N to ^{15}N in His {--cyclo pentyl (NH) $(NH)^+$} and ^{16}O to ^{17}O in Ser {--OH) } of aconatase causes difficulty of the rehybridization of C3 for loss of OH^- and C2 for loss of p^+ for the sp^3 C2 and sp^3 C3 carbons to rehybridize to sp^2 for double bond formation as catalyzed by the 1st and 2nd steps of Kreb cycle. There by this isotopic change is discovered here to suppress the Kreb cycle causing cancer. The dehydrations and hydration occur on opposite sides of the intermediate due to the flip of the intermediary transition species. An important innovation of this step is the discovered dynamics of the enzyme as its fissioned fuse β pleated regions that provide potential energy for space time to relax the product of the 1st step and fused fissioned α helical regions that gave potential energy to break bonds of the reactants of the first step then flips the substrate in the distorted state of the enzyme and the enzyme renatures so as the fission fuse the altered β pleated regions of the enzyme for bond breaking to activate the 2nd step and the distorted fused fissioned α helical regions re-nature to pull in the bond formation energy of the 2nd step.

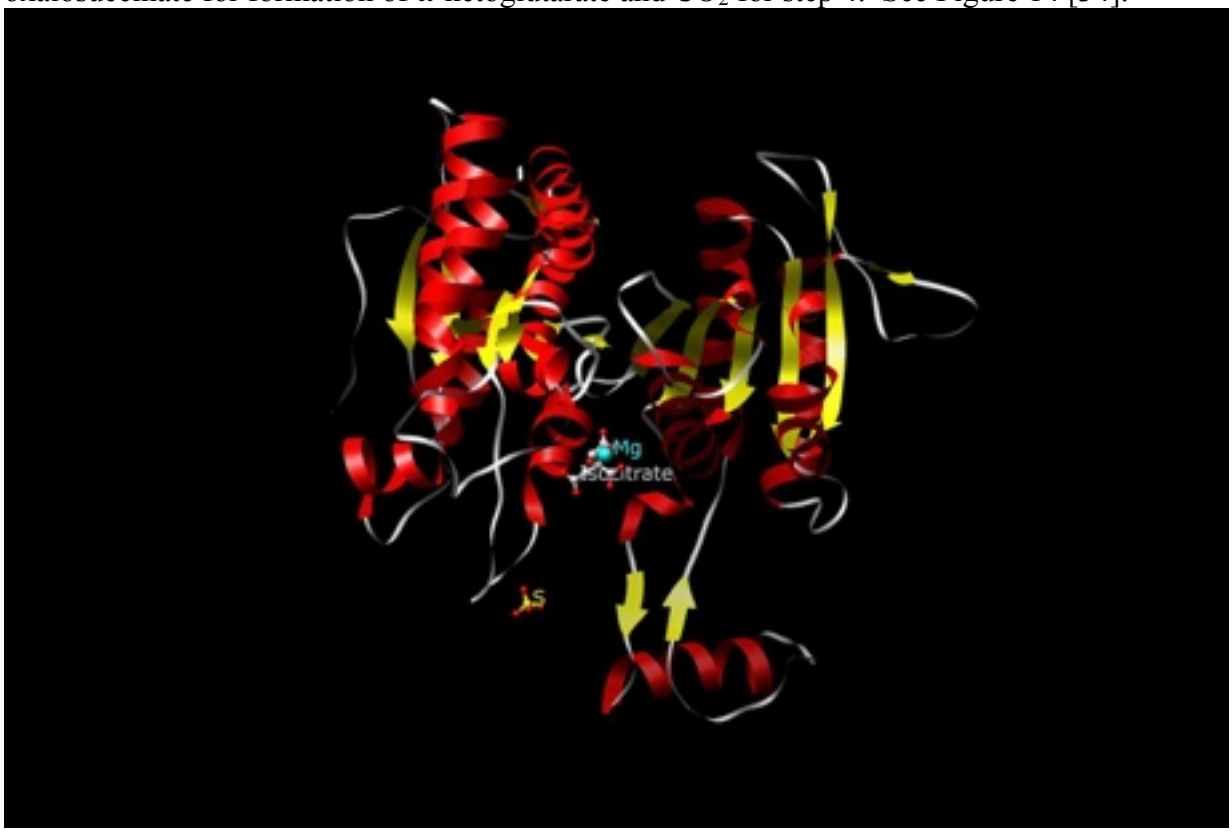
After the flipping of the substrate from the 1st step, the reverse process of protonation and deprotonation occurs as the Ser <u>{--OH) }</u> loses its proton as catalyzed by local β pleats and global α helices of aconitase that it previously gained to the C2=C3 double bond and the His <u>{--cyclo pentyl (NH) $(NH)^+$}</u> gains its proton from H_2O with catalysis by local α helices and global β pleats and the OH^- from the fragmented water binds the C3 as the proton binds the C2 by local α helices and global β pleats for rehybridizing the C2 and C3 from sp^2 to sp^3 by the protolysis as organized by the ^{14}N and ^{16}O of His <u>{--cyclo pentyl (NH) $(NH)^+$}</u> and Ser <u>{--OH) }</u>. But if the His acquires a ^{15}N and Ser a ^{17}O then such momentum exchange between the ^{15}N of His via proton on C3 and ^{17}O on Ser via proton on C2 cannot occur and the enzymatic induction is

diminished so the 3rd Step is suppressed by changing primordial ^{14}N to ^{15}N and primordial ^{16}O to ^{17}O so the isomerization is suppressed by the 2nd and 3rd steps of Kreb cycle.

The suppression of the Kreb cycle is therefore demonstrated by these different substitutions of ^{15}N for ^{14}N, ^{13}C for ^{12}C and ^{17}O for ^{16}O and ^{33}S for ^{32}S as due to changes in the isotopes of carbohydrates, nucleic acids, fats and protein in the diets of plants animals and humans from the bottom of the food chain to the top as the isotopic distribution in the terrestrial geosphere, plant sphere, animal and human sphere are altered with earth's population increase, man's technology and environmental changes. The protonation deprotonations of C with loss of OH^- are directly catalyzed by S, O and N of amino residues in this Kreb cycle rather than directly by P as in glycolysis so that the shift in these isotopes on Kreb cycle is stronger and different than on glycolysis as the shift to magnetic isotopes hinders the protolysis and magnetic rehybridizations of C, N, and O of Kreb but drives and reinforces the rehybridizations of P for accelerating glycolysis.

Third and Fourth Steps of Kreb Cycle

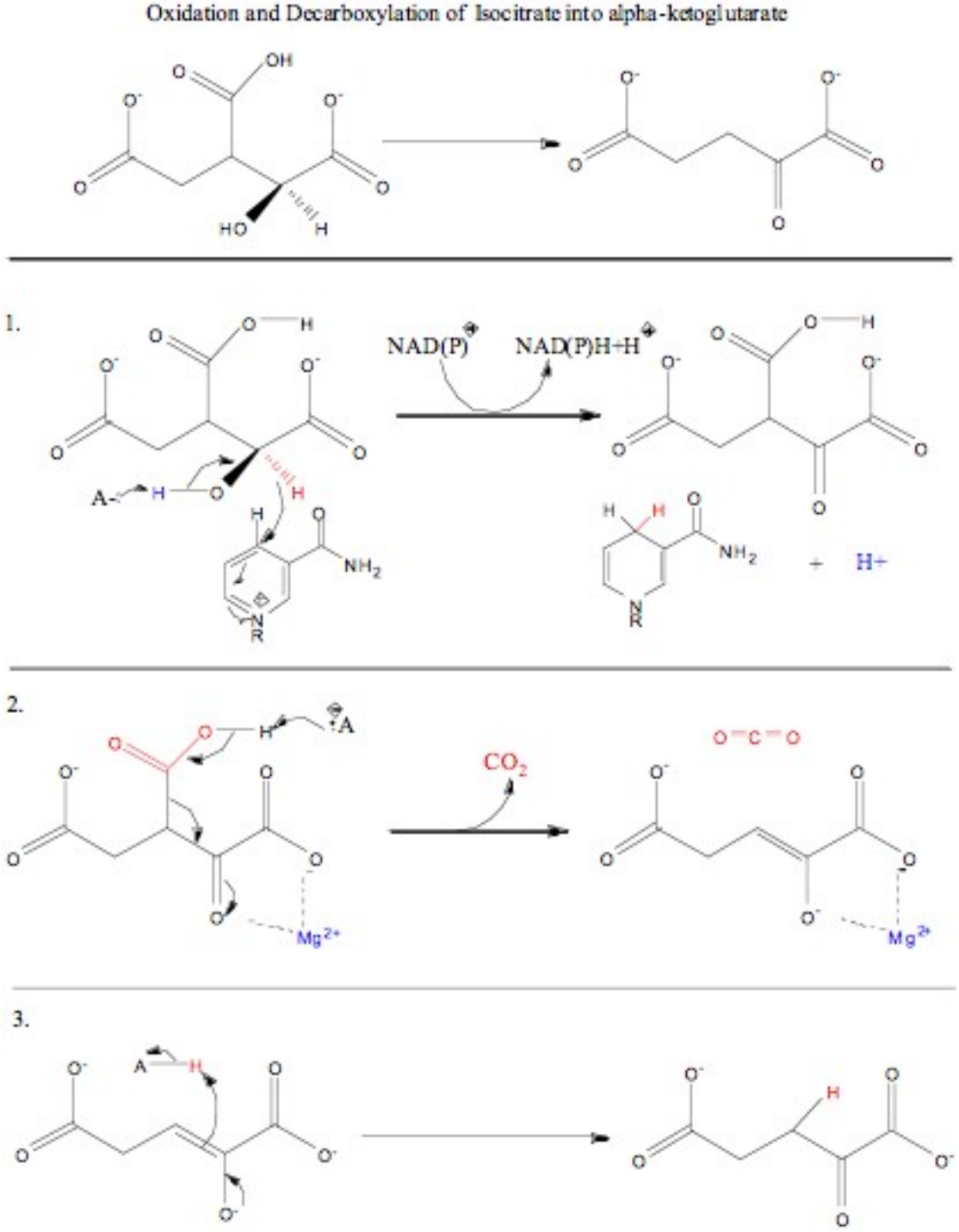
The 3rd step of the Kreb cycle involves the oxidative decarboxylation of isocitrate to form oxalosuccinate + NADH plus proton as catalyzed by the enzyme isocitrate dehydrogenase. See Figure 13 [33]. The isocitrate dehydrogenase catalyzes this irreversible decarboxylation of oxalosuccinate for formation of α ketoglutarate and CO_2 for step 4. See Figure 14 [34].



By Haynathart - Own work, Public Domain, https://commons.wikimedia.org/w/index.php?curid=3196178

Figure 13

See Reference 33



By Haynathart - Own work, Public Domain, https://commons.wikimedia.org/w/index.php?curid=3190879.

See Reference 34

Figure 14

The purpose of this third and fourth steps is to form the reacting substrate for step 5 (ketoglutarate) by chemically altering the product from step 2. Such chemical conversion involves oxidation for step 3 and decarboxylation for step 4. Such dynamics of oxidation in step 3 and decarboxylation couple with prior dynamics of hydration from step 2 and subsequent dynamics of oxidative decarboxylation in step 5.

Isocitrate dehydrogenase is an $\alpha\ \beta$ structure. The secondary composition of isocitrate dehydrogenase is composed of sandwich structures of $\alpha\ \beta\ \alpha$. The global structure of the enzyme is like two adjacent sandwich structures with opposite faces. The two active sites (A and B subunits) face in opposite directions. NAD^+ and Mg^{2+} or Ca^{2+} are bound in the active site by induction by local α helical and global β pleats. The substrate is decarboxylated and by this theory the β pleats should be more populating the enzyme. The binding of these Mg^{2+} and Ca^{2+} ions play a strong role and need for binding β helices. It has been determined in consistency with the model in this paper that binding of NADP and Ca^{2+} to the active site induces 3 different conformations. A loop conformation develops in the inactive enzyme. In the partially open conformation the active site has an unraveled α helix (by the model such should manifest decompositional perhaps to unbind products and to pull in new substrate nonlocally). The active form has an α helix and such as by the model locally bind Mg^{2+}, NADP and the citrate. Proton orbitals manifest between Asp 279 and Ser 94 as induced by local α helices and global β pleats. Tyr, Ser, Asn, Arg, Arg, Arg, Tyr and Lys are heavily involved in binding the isocitrate to the active site. The Ser 94 undergoes reversibly phosphorylation which can change structure of the active site to hinder the enzymatics.

Tyr {--Phenyl-OH} deprotonate the alcohol group off the α carbon. Such deprotonation induces electron accumulation near the oxygen to cause double bond formation. The hydrogen bond to the α carbon is removed as induced by local β pleats and global α helices as nearby $NAD^+/NADP^+$ as electron acceptor. A carboxyl group pushes electrons toward oxygen so as to increase its basicity so it pulls proton off Lys ($-NH_3^+$). If ^{14}N in Lys is replaced by ^{15}N then the Lys will not release proton to the O of the carbonyl to terminate this step and cause cancer. It is important to consider that just as convention notes such pushing and pulling of electrons by electronic lattice, in this model the nuclei by their fractional fission and fusions push and pull electrons in the lattice between atoms. The deprotonation of the carboxylic acid by Tyr as induced by local α helices and global β pleats leads to the pushing of electrons internally to eject the CO_2 as further induced locally by β pleats and globally by α helices. But if Tyr ^{16}O is replaced by ^{17}O then the Tyr with ^{17}O is not able to remove the proton to push electrons internally to eject CO_2 for terminating this step and inducing cancer. Mn^{2+} stabilize the oxides on opposite side of the substrate. The forming double bond between α and β carbon pulls a proton from Tyr. The oxygen returns to ketone with α ketoglutarate formation.

It is important to note that mutation of Arg 132 have been discovered to cause a number of types of cancers. So this is consistent with the theory of this paper. But the prior mutations involved is thought to involve hypermethylating the DNA sites which code the proteins for cell differentiation and repress genes. A mutant IDH produces 2 hydroxyglutarate which competes

with inhibiting TET2 hydroxylating protein of methylated cytosine for demethylation. With inactive cell differentiating inducing genes the undifferentiated cancer cells form. This is different from this new theory but less embracing than the new as it demonstrates that altering the residues can cause cancer.

The reactions of step 4 are decompositional and exothermic as the isocitrate dehydrogenase fragments and pulls in the energy from the substrate in step 3 and the regions of the isocitrate dehydrogenase causing such exothermic fragmentation are more so α helical regions due to the exothermic nature with some β pleated regions due to the needed initial decompositional. As chemical dynamics involve bond breaking to transition state then some β pleated regions are always involved and the dynamics involve bond forming to product some α helical regions are always involved but the α helical regions and/or β pleated regions may be transient along the reaction trajectory. Depending on the particular chemistry, β pleated regions may play stronger roles or α helical regions may place stronger roles. In the case here, the β pleated regions play a strong role as the overall reaction is decompositional, fragmenting catabolic and exothermic such that bond breaking is more the net change than bond forming. It seems that for increase entropy, the β pleated place stronger role. For decrease entropy in substrate, the α helical regions play stronger roles.

In Figure 13, the many yellow regions demonstrate the prevalence of β pleated regions in the isocitrate for catalyzing the fragmenting catabolic exothermic substrate transformations of isocitrate dehydrogenase with consistency of the Ferrochemistry presented here and this mechanism and model. Figure 13 presents fewer red zones of α helices for substantial rebonding fragments for compositional anabolism. The nature of the initial substrate and product must also be taken into consideration as the role of β pleated and α helical regions vary if the reactants have higher energy than product with larger or smaller activation energies verses if the reactants have lower energy than products with larger or smaller activation energies and if the reaction is classical or quantum mechanical on the basis of the Little Rule 2 and Little Rule 3.

The following mechanism occurs during the 3rd step of the Kreb cycle. Oxidation and decarboxylation of the isocitrate is organized by the isocitrate dehydrogenase as global α helical regions fragment bonds in the isocitrate to form transition state in substrate and form intermediary global β pleated regions. The oxidized species produced from step 3 is decarboxylated in step 4. By its local α helical and global β pleats regions, the isocitrate dehydrogenase assist the residues of Arginine {--C(NH-C(NH_2)NH_2^+} , Tyrosine {--Phenyl-OH}, Asparagine {--C ($_{NH2}$)O }, Serine {--C-OH}, Threonine {--C(H)(OH)(CH_3)} and Aspartic acid { --C(O)O^-} in holding the isocitrate during the transformations. Isocitrate, NAD^+/$NADP^+$, Mn^{2+} or Mg^{2+} are also involved in the ferrochemical dynamics. These residues of the isocitrate dehydrogenase hold the substrate by the favorable interactions of primordial ^{12}C, ^{14}N, ^{16}O, and ^{32}S with the citrate substrate so that changing these nuclides to nonprimordial ^{13}C, ^{15}N, ^{17}O, and ^{33}S would modify the favorability of the interactions with the isocitrate for instability of the housing of the substrate by this enzyme and for enzymatic global activity for reinforcing the binding of the substrate. The magnetic nature of Mn^{2+} by its electrons are consistent with it substituting for ^{25}Mg as the $^{25}Mg^{2+}$ has negative nuclear magnetic moments for the nucleus manifest the similar magnetic in electronic as the electronics of Mn^{2+}. The surrounding water deprotonate the oxygens of the isocitrate with local β pleats and global α helices catalyzing so that if ^{17}O is substituted on the isocitrate then the deprotonation may be decelerated.

Oxidation of the α (C2) is induced by deprotonation of the alcohol group of C2 {with local β pleats and global α helices inducing} with electron flow from O to C2 so that an electrophile ($NAD^+/NADP^+$) is driven into C2 as catalyzed by local α helices and global β pleats. The oxidation of the α carbon pulls electrons from the carboxyl group with flow of electrons onto oxygen of the carboxyl group so that some electron density of nearby Lysine $\{-NH_2\}^+$ is removed by the more positive carboxyl group. Complexed water on Mg^{2+} and/or Mn^{2+} causes the removal of proton from the α carbon with catalysis by local β pleats and global α helices. The substitution of ^{13}C for ^{12}C at the α carbon would hinder these dynamics associated with the α carbon and the catalytic ability to deprotonate by local β pleats and global α helices. The ^{13}C at the α carbon would hinder the ketone group formation as the formation involves electron flow and rehybridization which would different for ^{12}C relative to substituting ^{13}C for suppression of Kreb cycle in this step. The substitution of ^{16}O for ^{17}O in the carbonyl may allow ^{13}C to oxidize as the ^{17}O pushes electrons onto ^{13}C unlike the ^{16}O to allow oxidation and loss of electrons to $NAD^+/NADP^+$. The ^{13}C would be less nucleophilic and pushes one electron onto ^{17}O as ^{17}O pulls one spin of a pair. So it appears that opposite nuclear spins internally magnetize electron pairs for violating antisymmetry. The ^{13}C is less able to pull diamagnetic e---e pair from carbonyl group to diamagnetically push electrons back into it, as the O is ^{17}O. ^{17}O pushes electrons so it would less remove electrons from Lys ($-NH_3^+$) relative to ^{16}O.

If the Kreb cycle is suppressed then what happens to its materials, the ^{15}N is converted to ammonia but ^{13}C appears to get trapped. ^{15}N will more easily form ammonia than ^{14}N due to the negative nuclear moment of ^{15}N allowing it to push electrons onto H to form its elimination from the body product $^{15}NH_3$. But if ^{12}C is replaced by ^{13}C then it is difficult to form $^{13}CO_2$ due to the positive nuclear magnetic moment of ^{13}C and it pulling electrons from O and its positive nuclear magnetic moment favoring sp^3 hybridization so sp C in CO_2 is hindered by its nucleus. ^{15}N has negative nuclear moment and it will better pull in protons for ammonia formation and removal. But the ^{13}C is positive magnetic moment and difficult to form CH bond and CO_2 due to the positive nuclear moment of ^{13}C and neutral magnetic moment of ^{16}O. The substitution of ^{15}N on Lys ($-NH_3^+$) further complicates the interactions with O of the carbonyl for altering Kreb cycle.

Decarboxylation of oxalosuccinate is initiated for step 4 as tyrosine {--Phenyl-OH} is brought near the carbonyl group for deprotonation of its oxygen with consequent electron flow to C2 as further induced locally by β pleats and globally by α helices. The deprotonation depends on the nature of the O as change from ^{16}O to ^{17}O in Tyr increases basicity to enhance the deprotonation of the O of the substrate. This substep of step 4 is accelerated by ^{17}O in Tyr but prior substeps are decelerated where Tyr has to deprotonate $-^{17}O-H$ as the ^{17}O resist loss of H^+. So the prior suppressed substeps by ^{17}O in Tyr hinder this step 4 for causing cancer. Also if the carbonyl O is ^{17}O then an acceleration in deprotonation occurs. ^{17}O for ^{16}O then the ^{17}O accelerates the Tyr from deprotonating the oxygen of the carbonyl as ^{17}O is more basic relative to ^{16}O so as environmental isotopic pollution replaces. Negative charge on the oxygen of the α carbon accumulates as electrons flow to the ketone oxygen of the α carbon due to the deprotonation such negative flow induce α β unsaturated double bond between C2 and C3 as driven globally by β pleats and locally by α helices for loss of CO_2 from isocitrate's β carbon as induced locally by β pleats and globally by α helice. The electron charge flow after deprotonation and the development of α β unsaturated double bond is altered of the ^{16}O is substituted by ^{17}O and ^{12}C is switched to ^{13}C as it is less likely that ^{17}O can pull in electrons as

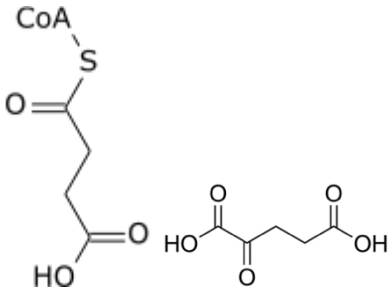
well as ^{16}O. As a result, negative charge is less pulled by α C=O for the decarboxylation of the β carbon. The change in the C and O isotopes by ferrochemistry therefore alters the decarboxylation dynamics and kinetics for this 4th step of Kreb cycle.

There is a change in hybridization during the decarboxylation from sp^2 to sp about the carboxylic group so that the dynamics would be different for ^{12}C relative to ^{13}C. Also if two ^{17}O bind the β carbon, then the ^{17}O more so push electrons onto ^{13}C for causing more difficult rehybridiation of sp^2 carbon to sp carbon as denser electrons stabilize higher order hybrids of sp^2 and sp^3 so that ^{13}C and its magnetism would also favor higher hybrid order (sp^3) relative to ^{12}C and its (sp). The sp^3 to sp^2 rehybridization about β carbon as the α carbon transforms from intermediate sp^3 would be induced by $^{25}Mg^{2+}$. Again such dynamics may differ for ^{13} C relative to ^{12}C. The deprotonation of oxygen of α carbon by Lys ($-NH_3^+$) as catalyzed by local β pleats and globally by α helices induces lone electron flow to reform the ketone double bond as by the saturation of the α β double bond by the Lys with forcing the electron pair into the α β carbon double bond. A proton is given to β carbon by Tyr as catalyzed by global α helices inducing deprotonation of Tyr and local α helices inducing protonation of β carbon. The alteration of the enzyme so ^{15}N replaces ^{14}N in Lys and ^{17}O replaces ^{16}O in Tyr would hinder the deprotonation of the α carbon and the catalytic action of the enzyme and the loss of electron flow on the α β carbon double bond for promoting the double bond to form the ketone group. The greater basicity of the α ^{16}O of Tyr {--Phenyl-OH} cause less ability of α ^{17}O of Tyr to protonate β carbon. Rehybridization of the α carbon induces the transformation of the ketone on the α carbon via a transient intermediate with the rehybridization of β carbon from sp^2 to sp^3. The replacement of ^{12}C to ^{13}C in the enzyme and in the substrate will hinder the enzyme catalyzing rehybridization of the C for the ketone formation in this 4th step of Kreb cycle.

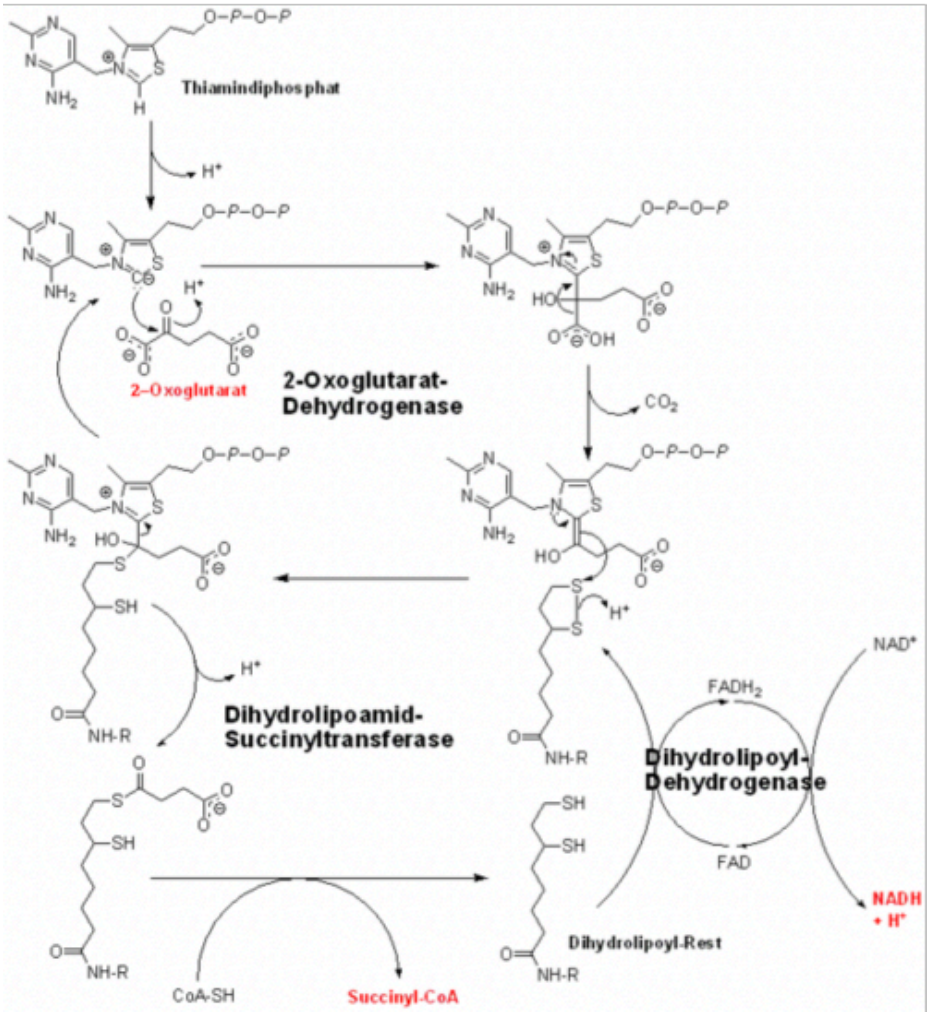
Fifth Step of Kreb Cycle

During the 5th step of the Kreb cycle, the ketoglutarate and NAD are transformed to succinyl CoA and CO_2 and NADH. First, the α ketoglutarate is decarboxylated; second, the NAD^+ is reduced to NADH; and third, the carbon is transferred to CoA as succinyl CoA. During this step, oxidative decarboxylation occurs with irreversible generation of NADH and the reformation of a 4 carbon chain occurs without CoA. Energy is stored in the thioester bond of the succinyl CoA product from this endothermic reaction. See Figure 15. [35]

The purpose of this step is the formation of the reactant for the 6th step (succinyl CoA) from the product of the 4th step (keto-glutarate). The decarboxylation in the step 5 couples with the oxidative decarboxylation from the previous step and the substitution in the next step.



+ NAD+ + CoA → + CO_2 + NADH



See Reference 35

Figure 15

This 5th step is a regulatory step with production of CoA and NADH slowing the step and lower Ca^{2+} activation of enzyme and large change in energy also slowing the step. Oxidative phosphorylation and ATP production are regulated by this step. Electrons are supplied for reduction for running electrons through the transport chain for oxidative phosphorylation by the transformation of NAD^+ to NADH. The increase NADH relative to NAD^+ is caused by high oxoglutarate dehydrogenase. As the step progresses more ATP is produced and more free radicals can increase oxidative stress. It is important that the increase in nuclear magnetic moments creates a reductive stress in conjunction with the oxidative stress. Oxidative reduction is sensed in the mitochondria by the enzyme for this step so that the enzyme provides an ability to alter operations in the mitochondria to prevent oxidative stress. Free radicals can also induce the enzyme to reversibly inhibit processes for forming such free radicals. Such effects of the free radicals and the enzymes ability to counter the free radicals also lead to similar effects of ^{13}C, ^{15}N, ^{17}O, ^{25}Mg, ^{30}P, ^{32}P and ^{33}S nuclei with differing magnetic moment relative to ^{12}C, ^{14}N, ^{16}O, ^{24}Mg, ^{31}P and ^{32}S with analogous magnetic effects as electron free radicals such that the enzyme also responds to these magnetic nuclei as it responds to the electron free radicals.

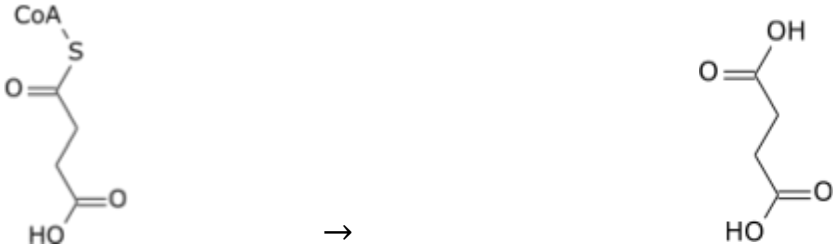
If the C of the substrate is changed from ^{12}C to ^{13}C then the change in momentum as the rehybridization occurs to form CO_2 would be hindered as ^{13}C has to alter its hybridization from sp^2 to sp^3, then to sp^3 to sp^2 and then sp^2 back to sp^3 and then sp^3 back to sp^2. The stronger acidity of the ^{13}C relative to the ^{12}C would cause its difficulty in transforming from sp^3 to sp^2 to sp. In addition to the C the O may also have ^{17}O rather than ^{16}O so that both ^{13}C and ^{17}O alter the rehybridization about the C such that ^{17}O pushes electrons onto ^{13}C to increase its inability to lower hybridization for less CO_2 formation. The needed internal change in momenta about the ^{13}C for lower hybrid bonding from sp^3 to sp^2 to sp for forming CO_2 would be suppressed by nonprimordial isotopic ^{13}C (relative to primordial ^{12}C) due to its positive nuclear magnetic moment and the greater angular momentum of its electrons relative to ^{12}C. In addition to this effect of ^{13}C for hindering CO_2 formation, if ^{17}O is involved with its higher basicity due to its negative nuclear magnetic moment then it would push even more unbalanced spin electron density on the ^{13}C with further inability and suppression of sp hybridization about the ^{13}C. The ^{13}C pulls on e^- of the bond more than the other e^- due to its positive nuclear magnetic moment; the ^{17}O would push the other e^- less from it to increase the up down spin separation within the covalent bond for an internal exchange within the covalent bond. These contributions of ^{13}C and ^{17}O in the enzyme for this 5th step of Kreb cycle can occur due to the diet of the host as the cells of the host would replace ^{12}C and ^{16}O for ^{13}C and ^{17}O for suppressing this 5th step of the Kreb cycle. The enzyme Carbon has to remain sp^2 and this can cause difficulty if the ^{12}C is replaced by ^{13}C as sp^3 is more preferred for ^{13}C.

Radicals and toxins can damage this enzyme so as to cause disease. It is further important to note that the nonprimordial magnetic ^{13}C, ^{15}N and ^{17}O, ^{25}Mg, ^{30}P, ^{32}P and ^{33}S are like such toxins and radicals as they are magnetic so that the nuclei just as the electrons have magnetic moments so as to damage the enzyme and enzymatic activities. The damage of the enzyme by magnetic electron radicals and magnetic nuclear moments can cause suppression of the 5th step and the overall Kreb cycle for causing cancer.

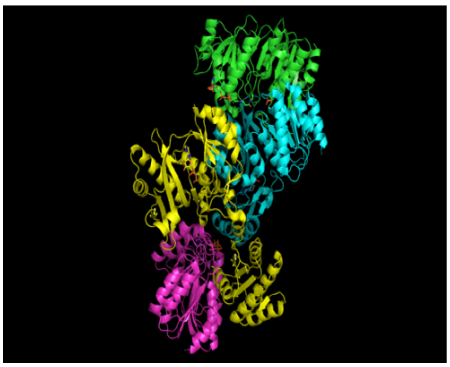
Sulfur also place an important role in this 5th step of Kreb cycle. The S does not play as large a role in glycolysis process as P was important in glycolysis. The stronger role of S in this Kreb cycle is a result of the S not being ligated with O whereas the P is ligated with O (but with H) so that the P resist effects of magnetic nuclei (due to its oxygens) if its O are ^{16}O so the glycolysis is not as affected by these magnetic nuclei. The S is not ligated as the P by oxygens so these magnetic nuclei can interfere with S chemistry and also ^{32}S is nonmagnetic and possible substitution by nonprimordial ^{33}S with its positive nuclear magnetic moment causes more issues by nonprimordial S isotopes upon Kreb cycle. The S (in this amino acid residue) is not decorated with O (as PO_4^{3-}) so the S (in this amino residue) has difficulty overpowering the nonprimordial ^{13}C, ^{15}N, ^{17}O, ^{25}Mg, ^{30}P, and ^{32}P that may be in the enzyme and digesting sugar molecule for catalyzing the digestion of this step. The P by its O and its available d orbital in phosphate can overpowers the effects of nonprimordial ^{13}C, ^{17}O, ^{25}Mg, ^{30}P, ^{32}P and ^{15}N. The S may or may not involve FeS cluster but may be as S on amino acid residue so that the S cannot by itself over power the nonprimoridal ^{13}C, ^{15}N ^{17}O, ^{25}Mg, ^{30}P, and ^{32}P for inducing needed rehybridizations. Unlike in the glycolysis process, in the Kreb cycle there are S and N. The N cannot act as O and force C to sp^2 and sp^3. N itself has issues rehybridizing and the S is of third row and it may sp^3 but it cannot force ^{13}C to sp^2 hybridization. Also the P is more π bonding than S and the O ligands on P resonate rehybridization about P center for inducing such rehybridization on the substrate carbons for the catalysis during the glycolysis and the change from primordial ^{12}C, ^{14}N, ^{16}O and ^{32}S to nonprimordial ^{13}C, ^{15}N ^{17}O, ^{25}Mg, ^{30}P, and ^{32}P with greater magnetism may assist the resonating hybridization about P center and reinforce carbon fixation during the glycolysis process. So where as the nonprimordial ^{13}C, ^{15}N ^{17}O, ^{25}Mg, ^{30}P,^{32}P and ^{33}S may put out the fire of Kreb cycle, these nonpriordial magnetic nuclei may redirect into cytoplasma during cancer genesis to accelerate the blaze of the glycolysis process for cancer.

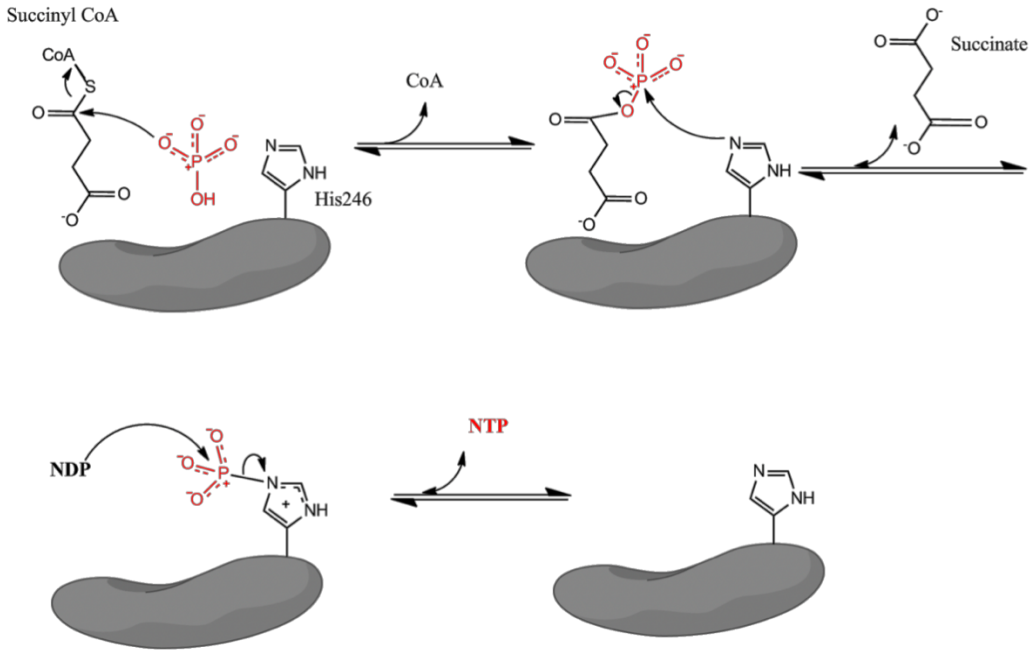
Sixth Step of Kreb Cycle

During the 6th step of the Kreb cycle, the succinyl CoA is converted to succinate by the enzyme Succinyl-CoA synthetase. ATP is generated by this phosphorylation of the succinyl CoA. This step is reversible. The succinate thiokinase has regions of many α helicies and a few β pleated regions for consistency of the mechanism and theory for shapes and structures of protein causing certain chemical dynamics as in this case the substrate undergoes decomposition and exothermic changes. The succinate thiokinase enzyme is observed in Figure 16 {reference} to have in agreement with the theory mostly α helical regions. The purpose of this step is the formation of succinate for step 7 from succinyl CoS from step 5 with the storage of energy in ATP. The interactions of the enzymes are the substrate interact in time; so spatial interactions goto time interactions. And the interactions within the substrate are as interact in space.



By Blowry88 - Own work, CC0,
https://commons.wikimedia.org/w/index.php?curid=15234158





See Reference 36

Figure 16

Succinyl CoA synthetase is a tetramer. A His 246 is involved in phosphorylating and dephosphorylating ATP. It is speculated that Glu 208 interacts with His 246 in the phosphorylated and dephosphorylated states of His 246. Glu 197 is thought to play a similar role as Glu 208. The His phosphorylates ADP and dephosphorylates ATP by cooperative mechanics. The cooperative mechanics involve binding of ATP at a site with Mg^{2+} to form 2 ATPs and 2 phosphoric residues. This complex transforms to 4 phosphoric residues. The complex reacts with succinate and CoA with formation of succinyl CoA complex with release of phosphoric residues. Transfer of phosphates between site 1 and site 2 are cooperative. During this cooperative binding of ATP and phosphoric and Mg^{2+} residues of the His 246 interact with lone π group of the phosphoric residues. Such interactions of His with the π involves proton orbitals and the replacement of ^{14}N by ^{15}N will not allow such protonation of π electrons as the ^{15}N would be more basic and less releasing proton to the π electrons as the ^{15}N magnetically polarizes the electrons of its lone pair and the proton interacts strongly with one electron and less strongly with the other spin. The lone spin would repels the πelectrons of the phosphate but the lone electron of the $^{15}NH_3^+$ may interact with the positive magnetic moment of the P center on PO_4^{3-}. Such interaction lowers the ability of the proton of ^{15}N to interact with the π electrons of P=O of the ATP. This reduced interaction of His 246 after replacing its ^{14}N with ^{15}N causes a suppression of this step and a basis for cancer.

During this step, S is eliminated from the carbon chain by phosphate activity. The carbonyl center binding the CoA = S is nucleophilically attacked by O of phosphate for leaving of the CoA=S group. The substitution of nonprimordial ^{13}C, ^{15}N, ^{17}O, ^{25}Mg, ^{30}P, ^{32}P, and ^{33}S for primordial ^{12}C, ^{14}N, ^{16}O, ^{24}Mg, ^{31}P and ^{32}S on the substrate and/or protein amino acids can alter this enzymatic transformation by the nucleophilic substitution. The His (-cyclo-pentyl $(NH)NH^+$) residue within the enzyme moves nearby and interacts with co enzyme A (Co A) (as catalyzed globally by β pleats pushing the His to Co A and enzymatics of local α helices inducing interactions). The His becomes phosphorylated as the succinate forms (as catalyzed by local α helices). Replacing ^{14}N by ^{15}N in the His can alter the nucleophilicity of the N in His as the ^{15}N with its negative nuclear magnetic moment is a stronger base and weaker nucleophile for substitution due to its slight separation of electron pair as the spin would attack the P center magnetically for spinophilicity and attacking the P center in phosphate to displace O; so the active residue and the local α helices and nonlocal β pleats may not as well coordinate and drive the substitution as local β pleats and global α helices start the bond cleavages. The resulting His – phosphate complex would have greater magnetic moment which would not act as favorably with the carbonyl bosons for suppressing this step of Kreb cycle. The His is brought near the the nucleoside to form the nucleotide triphosphate by large conformational changes in the enzyme. The changes in C, N, O, Mg, P and S isotopes in the enzyme alter the ability for it to undergo large conformational changes for causing proximity and orientation of the histadine with phosphate to nucleotide triphosphate to further frustrate this 5^{th} step and the Kreb cycle.

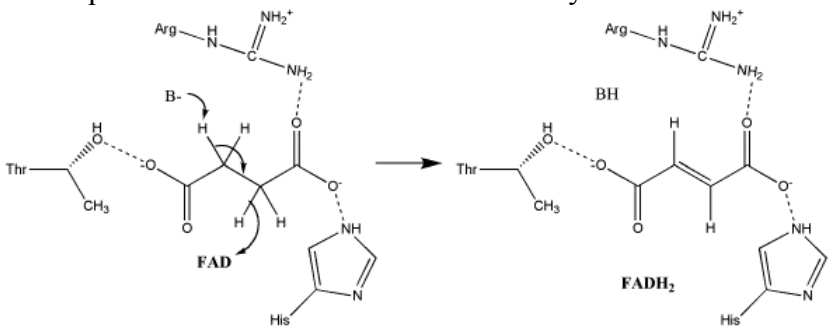
Two glutamines{-C $(NH_2)(O)$} are important in the phosphorylation and dephosphorylation of histadine (-cyclo-pentyl $(NH)NH^+$) . The glutamines induce the phosphorylation of the His by deprotonating the His {as catalyzed by enzymatics of local β pleats and global α helices} for making the His (-cyclo-pentyl $(NH)NH^+$) a stronger nucleophile

for attacking the P center in the phosphate of the nucleotide triphosphate {as catalyzed by enzymatics of local α helices and global β pleats} as the ^{14}N and ^{16}O of glutamines act as strong bases to pull protons off the His. But if ^{15}N and ^{17}O are involved rather than the ^{14}N and ^{16}O in glutamine then the basicity is more for ^{15}N and ^{17}O and these nonprimordial isotopes would be less able to deprotonate the His (and the surrounding enzyme would be less able to assist) with suppression of this step of Kreb cycle.

Although role of glutamines on histadine in this step is still being researched, it is important to note on the basis of this discovery that substituting ^{14}N and ^{16}O in the glutamines {-C $(NH_2)(O)$} with the negative nuclear magnetic moments of these isotopes of ^{17}O and ^{15}N relative to the zero and positive nuclear magnetic moments of ^{16}O and ^{14}N will cause the glutamines to be less basic and less pulling proton from histadine. The negative nuclear magnetic moments of ^{15}N and ^{17}O are less able to pull proton from the His (-cyclo-pentyl $(NH)NH^+$) as the ^{15}N and ^{17}O are more basic and push electrons away for lower electron density about their nuclei so they more pull in p^+. Thereby the glutamine with ^{15}N and ^{17}O is more able to deprotonate the His with the consequent stronger nucleophilicity of the His with weakening the nucleophilicity as the electron pair is separated due to ^{15}N in the His and its weaker capacity to nucleophilically attack the phosphate of the nucleotide triphosphate for removing the phosphate from the sugar moiety. Such nonprimordial ^{15}N and ^{17}O would also weaken the enzymatics induction and reinforcement of deprotonation of His, protonation Glu and combination of phosphate of sugar to nucleophilile phosphate. The nonprimordial isotopes would thereby inhibit this step causing cancer. The CoA is eliminated from the carbonyl as the phosphate is bound to the carbonyl of the His with catalytic reinforcement by local β pleats. The change of ^{16}O to ^{17}O in the carbonyl causes less ability of O to assist rehybridizing C in the carbonyl as the phosphate enters and the CoA=S leaves. Such differences in ^{13}C and ^{12}C, ^{16}O and ^{17}O, and ^{14}N and ^{15}N may contribute further to suppressing the Kreb cycle for causing cancer.

Seventh Step of Kreb Cycle

During the 7th step of the Kreb cycle succinate is oxidized to fumarate and ubiquinone to ubiquinol. During this oxidation reaction FAD is transformed to $FADH_2$ with production of 1.5 ATP. See Figure 17a. {reference} The enzyme for this 7th step is bound in the inner membrane of the mitochondria and it catalyzes Kreb cycle and electron transport chain simultaneously. Figure 17b {reference} illustrates the consistency of the shapes and regions of this enzyme with the theory and model of this discovery of correlating enzymatic dynamics to protein conformation and configuration as the α helical regions tend to catalyze more compositional anabolic and endothermic biochemical reactions and the β pleated regions tend to catalyze more decompositional catabolic and exothermic dynamics.



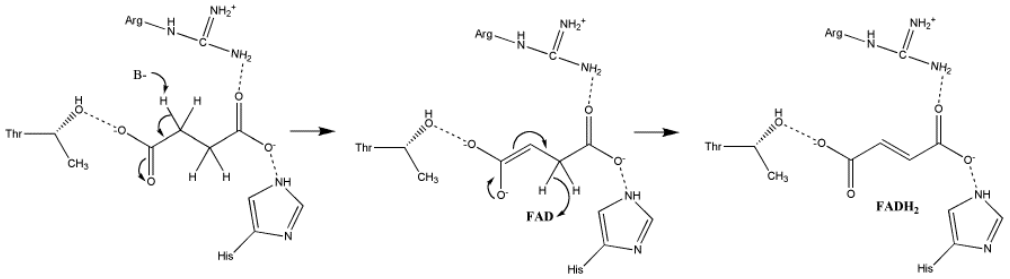
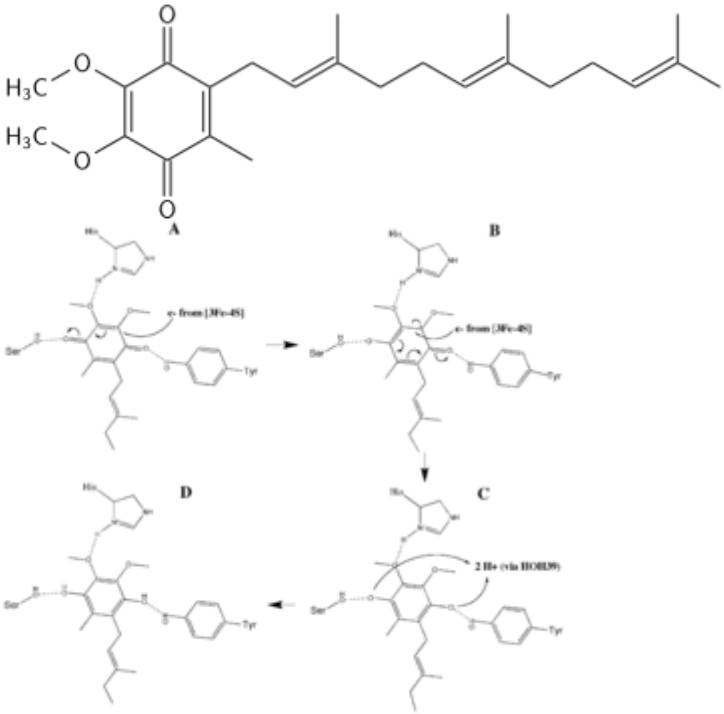
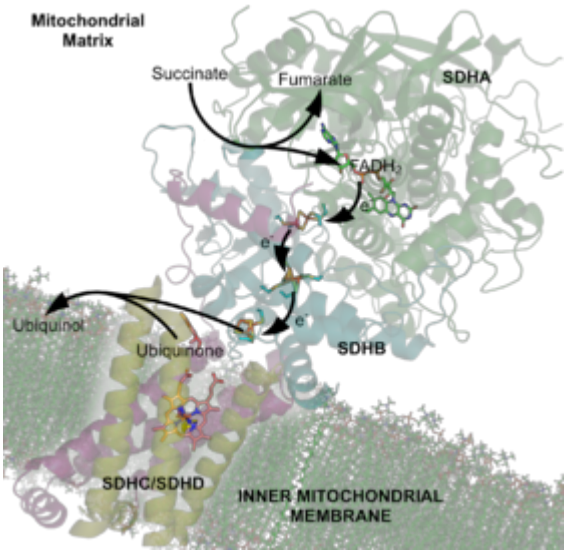


Figure 17a



Ubiquinone reduction mechanism.



Reference

Figure 17bB

The purpose of this 7th step is the oxidation of succinate to fumarate and ubiqunone to ubiquinol. This step integrates with the prior step by using the succinate from step 6 to convert to fumarate and to produce energy and store energy in ATP.

The succinate dehydrogenase is a tetrameric enzyme attached to the cell membrane. This enzyme is of the $\alpha + \beta$ classification, containing segregated α helices and antiparallel β pleats. The enzyme has two hydrophilic and two hydrophobic subunits. The hydrophilic subunits are called SdhA and SdhB. The SdhA has binding site for FAD and succinate. The SdhB is a FeS protein having three clusters 2Fe2S, 3Fe4S and 4Fe4S. The hydrophobic regions of SdhC and SdhD are bound within the mitochondrial membrane and has cytochrome b. The cytochrome has 6 transmembrane α helices, a heme b group and a binding site for ubiquinone. SdhA binds the succinate by residues Thr 254{--C(H)(OH)(CH_3)}, His 354 (-cyclo-pentyl (NH)NH^+) and Arg 399 {--C(NH-C(NH_2)NH_2^+} via hydrogen bonds. The bound substrate is oxidized by FAD and electrons are carried to iron sulfur cluster 2Fe2S of AdhB with reduction of FAD to FADH2. The change in isotopes from ^{16}O and ^{14}N to ^{17}O and ^{15}N diminishes the binding of the substrate via hydrogen bonding. The protons come from the residues and the substrate is negatively charged. This substrate binding is via proton orbitals of the residues rather than Mg^{2+} as in the glycolysis. So the replacement of the ions diminishes the ability of the enzyme to bind the substrates due to the negative nuclear magnetic moments if ^{15}N and ^{17}O. This causes cancer. Although the exact mechanism is unknown for oxidation of succinate to fumarate, it is thought that FAD, Glu255, Arg 286 or His 242 initiate a loss of proton from α carbon with resulting

induced loss of hydride from β carbon via E2 mechanism. An E1cb is also thought to occur as the loss of the proton forms an anolate intermediate with the removal of hydride from the intermediate. The reduction of ubiquinone is thought to involve the O1 carbonyl orienting with Tyr 83{--Phenyl-OH} of SdhD for hydrogen bonding. Electrons are removed for oxidation through iron sulfur clusters to 3Fe4S. As electrons are channeled in the cluster the second hydrogen bond is induced between O4 carbonyl and Ser 27 {--OH)} of SdhC. Electrons are transferred sequentially. It is important to consider that the replacement of ^{16}O with ^{17}O will reduce the hydrogen bonding of the Tyr 83 to O1 and the Ser 27 to O4 carbonyl. The Tyr 83 has OH and the ^{17}OH would be less acidic for less protonating the and hydrogen bonding the carbonyl of the ubiquinone. This will suppress this step and diminish Kreb cycle to cause cancer. It is also important to not that ^{32}S in the iron sulfur protein will alter its ability to transfer individual electrons and cause can.

For both the transformation of ubiquinone to ubiqinol, the α helices and β pleats make up the active site for the transformation of the ubiquinol to ubiquinone as the transformation does not alter the size and backbone of the reactant but only changes two C=O double bonds to C-OH with aromatization of the intervening hexyl ring. Furthermore, the succinate is transformed to fumarate in a region of the enzyme involving more β pleated structures as the succinate to fumarate transformation involves decompositional loss of p^+ and H^- by elimination from the succinate substrate to form double bond and fumarate. The theory here proposes β pleated structures undergo fission, translation and fusion of quantum fields to give reaction coordinates to break bonds in the substrate to reach the transition state and during the conversion of succinate to fumarate, the p^+ and OH^- bonds to vincinal carbons are broken to release H_2O and the vincinal carbons form double bond with β pleated catalyzing the bond cleavage and decomposition. As predicted in this model. The succinate is oxidized to fumarate in regions having more β pleated structures.

Global β pleats and some local α helices induce are involved in regions of enzyme having the subunits of SdhB, SdhC and SdhD to position ubiquinone for interactions with stability with His 207 {--cyclopentyl –(NH)(NH^+)} of subunit B, Ser 27 {-C-OH} and Arg 31 {--C-NH-C(NH_2)(NH_2^+) of subunit C and Tyr 83 {-C-phenyl-OH} of subunit D. Within these subunits amino acids have primordial ^{12}C, ^{14}N, ^{16}O, and ^{32}S isotopes so change in isotopes to nonprimordial ^{13}C, ^{15}N, ^{17}O and ^{33}S can alter the holding of the ubiquinone by an enzymatic global activity for altering the Kreb cycle. Ile 28 of subunit C holds the ubiquinone ring, Pro 160 {-CH_2-CH_2-CH_3} of subunit B by local α helices and global β pleat regions and also interacts with the ring. Ile 209 {-CH(CH_3)-CH_2-CH_3}, Trp 163 {- -CH_2-cyclophenyl (NH)-phenyl} and Trp 164 {- -CH_2-cyclophenyl (NH)-phenyl} of subunit B and Ser 27 {- CH_2-OH} of subunit C thereby providing a hydrophobic environment for the quinone pocket. SdhA (with reinforcement by local α helices and global β pleats) binds succinate during its oxidation. Within subunit A Thr 254 {-CH(OH)(CH_3)}, His 354 {--cyclopentyl –(NH)(NH^+)} and Arg 399 {- CH_2-NH-C(NH_2)(NH_2^+)} all contribute to binding succinate (with reinforcement by local α helices) as it is oxidized by FAD with electron transfer to iron sulfur cluster. As these amino acid residues in subunit A contain C, N and O, if the nonprimordial ^{13}C, ^{15}N and ^{17}O replace these primordial ^{12}C, ^{14}N, ^{16}O, ^{24}Mg, ^{31}P, and ^{32}S then the binding becomes looser (and the enzyme is less able to reinforce binding) and the ability of FAD to oxidize the succinate is diminished. Furthermore, as

^{32}S is substituted by ^{33}S in iron sulfur cluster, then the cluster less modulates and transfers electrons from the oxidation down the chain. See Figure 17a.

The binding regions of the succinate and ubiquinone contain a chain of redox centers with extension over 40A (Nano-size). FAD, Glu 255 { -C-CH_2-C(O)(O-), Arg 286 {- CH_2-NH-$C(NH_2)(NH_2^+)$} and His 242 {--cyclopentyl –(NH)(NH^+) }_ of subunit A cause the initial protonation step with catalysis by local α helices and global effects of binding by β pleats. Isotopic substitutions by nonprimordial ^{15}N and ^{17}O for primordial ^{14}N and ^{16}O in the Glu, Arg and His in subunit A leads to lower dense electrons on valence of ^{17}O and ^{15}N for resulting stronger basicity for weaker catalyzing this protonation step for suppressing this 7th step of Kreb cycle. The mechanism involves two possible eliminations. A concerted mechanism by E2 as simultaneously α carbon is deprotonated (with catalysis by local β pleats and global α helices) and β carbon transfers hydride to NAD (by local β pleats and local α helices) for forming fumarate via this oxidation. This E2 is modified if ^{13}C replaces ^{12}C at the β position as the ^{13}C at β hinders the loss of hydride (and the catalytic acceleration by local β pleats) to suppress the elimination and oxidation relative to ^{12}C. For E1cb, the formation of enolate intermediate occurs first then hydride transfers to FAD occurs (as catalyzed by local β pleat bond breaking and local α helices for binding H^- to NAD) for forming the resulting fumarate with loose interactions for leaving the enzyme.

A second possible mechanism is the E1cb case whereby enolate intermediate forms first by deprotonation (as catalyzed by local β pleats) and then hydride subsequently transfers to FAD (with catalysis by bond breaking β pleats and bond forming α helices) with forming fumarate under looser interactions for leaving the enzyme. Changes in hybridizations about α and β carbons occur for such elimination reactions so that replacing ^{12}C to ^{13}C would alter the rates of the eliminations to suppress this 7th step of Kreb cycle. The replacement of ^{16}O by ^{17}O also hinders the rehybridization dynamics about these α and β carbon atoms to prevent enolate intermediate formation and loss of hydride for forming fumarate. The electrons produced by the oxidation of succinate tunnel along FeS toward FeS clusters where ubiquinone accepts the tunneling electrons. The substitution of ^{32}S with ^{33}S will alter the magnetism of S so as to hinder the electron tunneling alone the FeS and transfer of electrons from FeS cluster to ubiquinone with suppressing the Kreb cycle by this step. Ubiquinone is shown below: See Figure 17b.

The ubiquinone is held in subunit B via a hydrogen bonding interaction with Tyr 83 {--Phenyl-OH} by the carbonyl group in ubiquinone (as reinforced enzymatically by local α helices and global β pleats). The replacement of ^{16}O by ^{17}O alters and weakens the ability of Tyr to hold the ubiquinone (and the reinforcement by the whole enzyme). Electronic changes in the [3Fe-4S] cluster cause the ubiquinone to reorient. Such reorienting is likely magnetic phenomena induced by the [3Fe-4S] cluster so that if ^{33}S replaces ^{32}S in the [3Fe-4S] cluster the altered magnetism can alter the ability of the cluster to orient the ubiquinone. The reorientation by the cluster causes a second hydrogen bond between the O4 carbonyl of ubiquinone and Ser 27 {--OH)} of the subunit C with reinforcement enzymatically by local α helices. The alterations of isotopes either in the cluster or the ubiquinone severely alters such interactions and hydrogen bonding. For instance, replacing ^{16}O by ^{17}O changes weakens hydrogen bonding between the carbonyl and Ser 27 and changing ^{32}S to ^{33}S changes the reorienting of the ubiquinone for suppressing this 7^h step of the Kreb cycle.

As the cluster releases electrons into the ubiquinone it is reduced one electron at a time and this single electron reduction is a magnetic phenomenon afforded by the magnetic cluster and such would be altered by the alteration of nonmagnetic ^{32}S to magnetic ^{33}S in the cluster. One electron release to the ubiquinone forms semiquinone radical species and a second electron from the cluster causes a full reduction of the ubiquinone. The intermediate radical semiquinone is magnetic by its electron and alterations in surrounding nuclear magnetisms would alter the formation and behavior of this intermediate radical semiquinone for suppressing the Kreb cycle. The first electron transferred to ubiquinone from 3Fe-4S involves tunneling back and forth between heme and the ubiquinone. The heme acts as an electron sink. This semiquinone plays a huge role in magnetics of this 7th step as after the first electron transfer to ubiquinone from the cluster the single electron tunnels back and forth between heme and ubiquinone and such tunneling back and forth manifest a local magnetic field of the tunneling electron such that this magnetic resonance prevents molecular oxygen from pulling the electron before the second electron can fully reduce the ubiquinone to quinone. Molecular oxygen is magnetic and the magnetic interactions of the oxygen and single electron would disrupt the process. But the replacement of nonmagnetic primordial ^{12}C, ^{16}O and ^{32}S by magnetic nonprimordial ^{13}C, ^{33}S and ^{17}O and /or positive magnetic ^{14}N by negative magnetic moment ^{15}N would influence the resonating electron fermion just as molecular oxygen would influence the resonating electron. So this is another basis why the change in nonmagnetic primordial ^{12}C, ^{16}O and ^{32}S to magnetic nonprimordial ^{13}C, ^{17}O (negative) and ^{33}S and also change from positive magnetic moment ^{14}N to negative magnetic moment ^{15}N would suppress this 8th step of the Kreb cycle. The heme also has Fe ion. The heme prevents interactions of the ubiquinone intermediate with molecular oxygen (a magnetic spin). It is important to take into consideration these magnetics of the 7th step of Kreb when considering suppressive magnetic resonance on the glycolysis process so as to make sure the suppressive magnetics on glycolysis does not suppress normal healthy magnetics of this 7th step of Kreb and other steps of Kreb cycle. It is important to note that the presence of magnetic nuclei of nonprimordial ^{13}C, ^{15}N and ^{17}O would have similar effects as magnetic molecular oxygen for suppressing the Kreb cycle.

The quinone is then reduced to semiquinone for completing the reduction of ubiquinone to ubiquinol. The reduction of the intermediate quinone to ubiquinol involves protolysis from two water molecules as catalyzed by local β pleats and global α helices fragmenting H_2O and local α helices and global β pleats binding p^+ and OH^- to quinone. The involved waters are coordinated by the enzyme amino acid residues of by His 207 {--cyclopentyl –(NH)(NH$^+$)}_of subunit B, Arg 31 {- CH2-NH-C(NH2)(NH2+)} of subunit C and Asp82 {-CH2-C(O-)(O)} of subunit D with reinforcement by local α helices. The coordinated water molecules transfer protons to semiquinone to form the final ubiquinol product as catalyzed by local α helices and global β pleats. A change in isotopes of primordial ^{14}N and ^{16}O to nonprimordial isotopes causes less electron density about valence shells of nonprimordial ^{15}N and ^{17}O isotopes as the nuclear magnetic moment shifts from 0 to negative from ^{16}O to ^{17}O and from positive to negative from ^{14}N to ^{15}N so that the enzyme residues containing ^{15}N and ^{17}O isotopes would not be able to coordinate water as well as ^{14}N and ^{16}O and the proton would not be as well transferred from the coordinated water to the semiquinone (with weakening ability of the α helices to induce the transfer). Also the formation of semiqinone and quinone involved ^{12}C; but if ^{13}C replaces ^{12}C then the single electron transfer would be suppressed for the reduction of ubiquinone to semiqunione. On the basis of these many roles of primordial ^{12}C, ^{14}N and ^{16}O in the direct

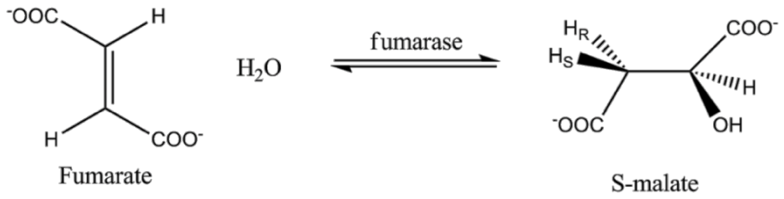
enzymatics of catalyzing the bond rearrangements during this step, the substitutions of ^{15}N for ^{14}N, ^{13}C for ^{12}C, ^{17}O for ^{16}O and ^{33}S for ^{32}S suppresses this step of the Kreb cycle for causing cancer.

It is important to note that it is already known that mutation of the enzyme (succinate dehydrogenase) of this 7th step causes cancer. But the idea introduced here of magnetic nuclei of ^{13}C, ^{15}N, ^{17}O and ^{33}S can also alter the enzyme and thereby cause cancer. Prior research has shown that mutation of SdhB causes cancer paraganglioma and pheochromocytoma as from succinate dehydrogenase defiency. SdhD mutation also leads to paraganglioma and pheochromocytoma although benign.

[0150] Eighth Step of Kreb Cycle

During 8th step, fumarate is dehydrogenated to S malate by fumarate hydratase. The fumarate hydratase has both cytosolic and mitochondrial forms. The Kreb cycle forms the mitochondrial enzyme as an isoenzyme. The metabolism of the amino acids and fumarate leads to cytosolic form of isoenzyme. Cytosolic fumarase is signal in absence of mitochondrial signaling as the mitochondrial signaling is caused by sequencing by amino terminus. The fumarase also induces reductive carboxylation cycle (CO_2 fixation) and renal cell carcinoma.

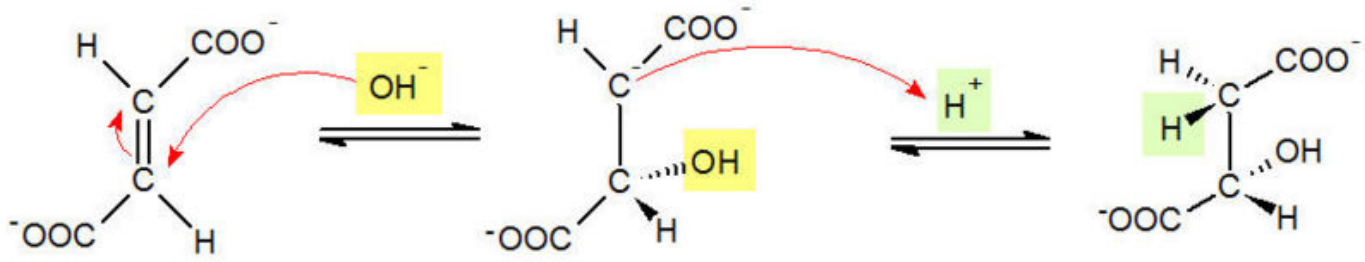
In Figure 18 [38], the image of the fumarate hydratase provides shape and structures that are consistent with the model given here for explaining and predicting enzyme shape verses its chemical dynamics. The substrate is hydrogenated across a double bond to involve a combinative, anabolic exothermic reaction so on basis of the theory given here the enzyme should have many α helical regions to catalyze such compositional chemical dynamics. The image in Figure 18 reveals α helical regions consistent with the model. As the dominant nature of the biochemistry is compositional anabolic only a few β pleated regions are observed and few are predicted by the model for consistency of model and data.



By The original uploader was Bradleyriley 2010 at English Wikipedia - Image self made using ChemDraw Standard Edition., Public Domain, https://commons.wikimedia.org/w/index.php?curid=16394762

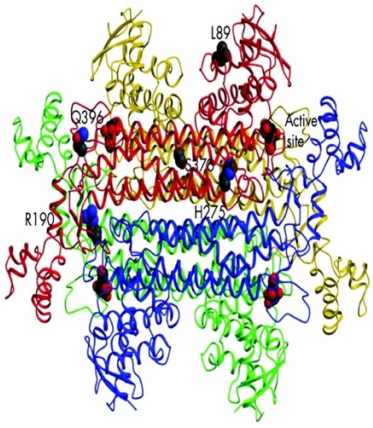
Pithukpakorn and others, '*Fumarate hydratase enzyme activity in lymphoblastoid cells and fibroblasts of individuals in families with hereditary leiomyomatosis and renal cell cancer' ;* http://dx.doi.org/10.1136/jmg.2006.041087 / ; http://jmg.bmj.com/content/43/9/755

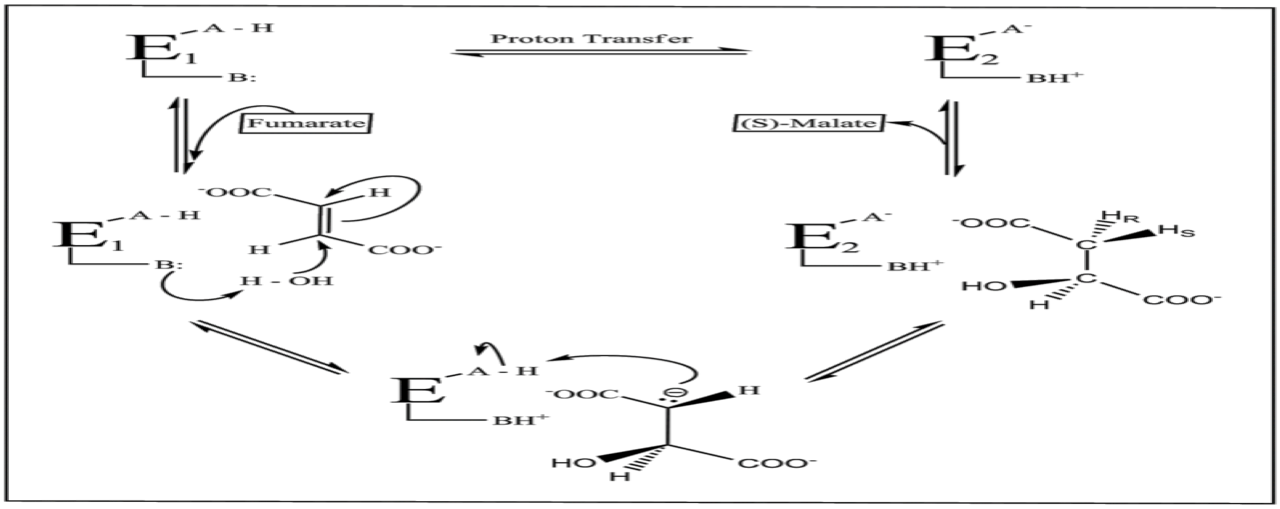
http://proteopedia.org/wiki/index.php/Image:Fumarase_2.jpg



Fumarate

L-Malate





Bradleyriley 2010 at English Wikipedia

See Reference 38

Figure 18

The purpose of this step is the addition of H_2O across the double. Such purpose transforms the reactant (fumarate) of this 8th step to the reactant (malate) of step 9 for integrity of the steps into a cycle. Fumarase is of two possible classes of I and II. Class I is sensitive to Fe^{2+} and superoxides and inactivated by heat and radiation. Class II are iron independent and thermally stable. Fumarase catalyzes the conversion of fumarate to L malate. The reaction is unusual as OH^- is added across a double bond. The intermediate negative charge carbanion adds a proton on the opposite side of the hydroxyl group to form the L malate.

Fumarate is converted to malate by transfer of protons by two acid base groups as catalyzed by two different conformations of the enzyme E1 and E2 by ionization states and changing proton orbitals of global α helices and local β pleats to break bonds to liberate the protons and local α helices and global β pleats to form bonds of the protons to the substrate to form the malate. A neutral internal A-H/B: state involve E1 type groups. But an A-/BH+ state of zwitterionic forms is involve E2 type groups. The E1 conformation of the enzyme binds fumarate to form malate with enzymatic activity of local α helical regions and global β pleats to bind and local β pleats and global α helices to dehydrogenate. The E2 conformation of the enzyme binds malate to form fumarate by enzymatic activities of local α helices and global β pleats to bind and local α helices to add 2H across a double bond. The E1 and E2 conformations undergo isomerizations with turnover of the catalytic mechanism of the enzyme. The enzymatics of malate to fumarate is less understood.

The transformation of the fumarate to malate by the enzyme is more understood. It seems the mechanism is not totally reversible but may have different paths in the forward and reverse directions. The fumarate is transformed to malate by first hydration of fumarate to form S malate by enzymatics of local α helices and global β pleats; the hydration occurs by trans addition of ionized water p^+ OH^- across double bond for 1,4 trans-addition of hydroxyl group as local α helices fission, translate and fuse about the p^+ and OH^- formed by global α helices

fragmenting, translating and fusing to H_2O. One mechanism of the reverse malate to fumarate was thought the dehydration of malate to carbocationic intermediate by loss of α proton to form the fumarate. During such the carbocations were thought protonated to form fumarate as by subsequent hydroxyl addition from water for malate formation from fumarate. {Carbohydrates as is case for aldehydes, ketones and carboxylic acids react with water as catalyzed by N, O, S, and P species. But why would these species catalyze the water + carbohydrate reactions?} But recent studies are consistent with acid base catalyzed elimination to form carbanionic intermediate by E1CB elimination.

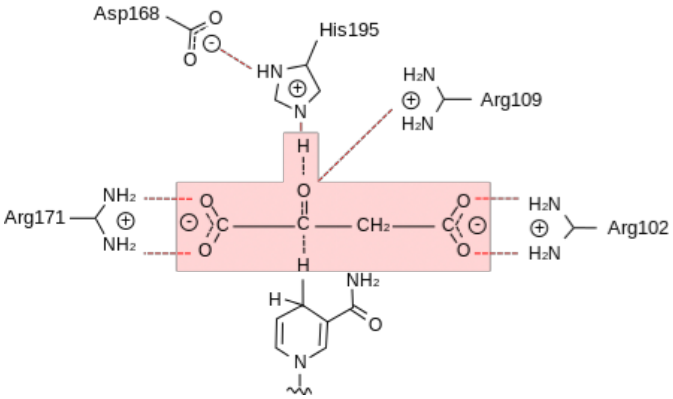
By both processes, the transformations from fumarate to malate and vice versa involve addition across double bond for sp^2 to sp^3 and elimination to form double bond for sp^3 to sp^2. On the basis of this biochemistry with primordial ^{12}C, ^{14}N, ^{16}O, ^{24}Mg, ^{31}P and ^{32}S, it is reasoned that replacing these with nonprimordial ^{13}C, ^{15}N, ^{17}O, ^{25}Mg, ^{30}P, ^{32}P, and ^{33}S will alter the biochemical dynamics and kinetics as catalyzed by the enzyme. The transformations of the fumarate to malate and vice versa involve addition across double bond for sp^2 to sp^3 and elimination to form double bond for sp^3 to sp^2 rehybridization to reform the double bond. The change of ^{12}C to ^{13}C will hinder the sp^3 to sp^2 rehybridization and the ^{13}C may hinder the global α helices and global β pleats involving combination across the double bond. The hindered Kreb by ^{13}C leads to build up of ^{13}C in cancer cells. But there is no buildup of ^{15}N. As ^{17}O replaces ^{16}O the higher electron density about the ^{17}O relative to ^{16}O due to negative nuclear magnetic moment causes ^{17}O on the water causes larger nucleophilicity of ^{17}O relative to ^{16}O nucleophilicity. ^{13}C would further pull one electron density from the ^{17}O to reduce its nucleophilicity with internal magnetic moment of C-O bond to reduce the tendency of the C-O bond cleavage. It is important to note that the nuclear spins partially separate the electron pair of the valence and covalence for inducing spinophilicity. In some cases, the spinophilicity can induce faster attack and form formation and substitution and/or elimination. In this case, the ^{17}O increases the nucleophilicity to attack the C=C double bond. But the elimination and or rehybridization is suppressed as by ^{13}C relative to ^{12}C as the magnetic moment of ^{13}C prefers higher hybrid order of sp^3 rather than sp^2. Thereby with both ^{13}C and ^{17}O on the substrate, the O is bound more loosely and there is difficulty rehybridizing electrons about C as driven by ^{16}O.

Energetic transformation within the NADH battery are allowed by fumarase. Fumarate in the cytosol is metabolized by fumarase; the urea cycle and catabolism of amino acids produce fumarase. The active site within fumarase involves four subunits inside the tetrameric enzyme. There are four subunits within fumarase that cause active sites. The active sites also coincide with strong binding sites. His 188{--cyclopentyl –(NH)(NH^+) } and Lys 324 $\{NH_3\}^+$are likely important residues of the active site and corresponding binding sites with modulation of binding by local α helices and global β pleats. The role of these N and O of His and Lys for binding the substrate and catalyzing the water alkene and or alcohol dehydration may involve the protolysis and/or OH^- interactions with the water, alkene and/or alcohol to induce water addition across the alkene and/or deprotonation and loss of OH^- from the alcohol with involvement of carbocations and/or carbanions (of some local residues and also the rest of the enzyme induces bond forming protolysis by local α helices and global β pleats and protolysis of bond breakage by local β pleats and global α helices) so that ^{13}C replacing ^{12}C may limit sp^3 to sp^2 for converting alcohol of ^{13}C to alkenes and the change of ^{15}N to ^{14}N may limit the Lys from acting as an acid to protonate the double bond or protonate the OH- after double bond formation as the ^{16}O replaces ^{17}O (in the substrate and/or water). The change of ^{14}N for ^{15}N would make the N in His 188 less basic and His may not bind the L malate very well but bind the Fumarate more strongly. Such

^{15}N in His may also weaken the ability of His to protonate OH- after double bond forms Fumarate. Such replacesment of ^{16}O by ^{17}O may cause hydroxyl on substrate to be stronger base for ready protonation for elimination to alkene but difficult elimination of proton from $^{17}OH^-$ after formation of the alkene. The local and nonlocal protolytic enzymatics of the whole enzyme also changes by such replacements of primordial with nonprimordial isotopes. This gives the molecular basis of the cancer genesis and carcinogenesis on basis of the Little Effect. This molecular basis for this 8th step by the Little Effect and Ferrochemistry is further justified as this enzyme which catalyzes sp^2 to sp^3 and reverse sp^3 to sp^2 is sensitive to Fe^{2+}. RBL has for many years reasoned and demonstrated the magnetics of Fe for rehybridizing carbon sp^2 to sp^3 and vice versa.

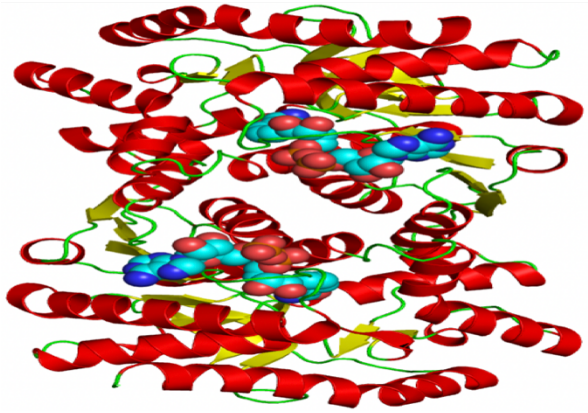
Nineth Step of Kreb Cycle

During the 9th step malate is converted to oxaloacetate as powered by NAD^+ reversibly under catalytic of malate dehydrogenase. As seen in Figure 19 [39], the enzyme malate dehydrogenase has corresponding shape and catalytic mechanism that fit the model and theory as given in this paper as the malate dehydrogenase has many β pleated regions and the theory discovers that β pleated regions support decompositional, catabolic biochemical changes. The conversion of malate to oxaloacetate involves such decomposition as p^+ and H^- are fragmented from the malate.



By Malate Dehydrogenase Active Site.jpg: Pssangderivative work:Miguelferig - This file was derived from Malate Dehydrogenase Active Site.jpg:, CC0, https://commons.wikimedia.org/w/index.php?curid=30281125

By KevinHuai - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=56421346



See Reference 39

Figure 19

The purpose of this step is fragmenting p^+ and H^- from the substrate. This step integrates with prior step 8 as furmarate is hydrogenated to malate but this step converts the malate to oxaloacetate for producing the substrate for the 10th step so that the subsequent step repeats for a cycle as by forming citric which is the substrate for the 1st step of the Kreb cycle so that the reactions spiral and repeat in space and time.

The enzymes of the 8th and 9th steps are compared for further demonstrating the consistency of the theory in this work. For the 8th step, the fumarate hydratase and for the 9th step the malate dehydrogenase act on the same substrate backbone as by the former adds water across a double bond and the later eliminates p^+ and H^- from the same back bones. As the 9th step is compositional it involves the enzyme with fewer β pleated regions in fumarate hydratase as this enzyme has fewer β regions as it combines reactants (water) to substrate and does not need many β regions in the fumarate hydratase as it adds water across the double bond. The 9th is decompositional and this 9th step involves the malate dehydrogenase with many β pleated regions in the malate dehydrogenase as this enzyme breaks p^+ and H^- from the substrate and it needs $\beta\ pleated$ regions for catabolism of the p^+ and H^- from the substrate.

Malate dehydrogenase exists in the cytoplasma and in the mitochondria. In the mitochondria this enzyme catalyzes malate to oxaloacetate. But in the cytoplasma this enzyme catalyzes oxaloacetate to malate. The malate dehydrogenase has a secondary subunit made of 9 β pleats with parallel backbone with wrapping by 9 α helices. The sodium bound end has a structure involving 4 small antiparallel β pleats and 1 small α helix. At the opposite to the sodium bound end, 6 α helices point to a common space with three on each side of the β pleats. NAD^+ is attached in a small groove of α helices and this is consistent with the model as the local α helices catalyze bond forming of NAD^+ to NADH. The catalysis involves some prime

residues: His 195 and Asp 168 via proton orbitals or quantum hydrogen bonding. Asp 53 is interacting with NAD^+ and 3 Arg residues 102, 109 and 171. Conformational change is induced by residues Arg 102 and Arg 109 which brings all these prime residues in proximity to the substrate to initiate the catalysis. The malate is stabilized by hydrogen bonding to the residues as a proton is transferred from NADH to form oxaloacetate.

Gluconeogensis also uses malate dehydrogenase in reverse sense to compose and form glucose. Oxaloacetate is formed from pyruvate by enzyme pyruvate carboxylase in the mitochondria; the pyruvate carboxylase is an intermediate of Kreb cycle. Although oxaloacetate is confined to mitochondria it can leave by conversion to malate by malate dehydrogenase; whereas oxaloacetate cannot cross the membrane the malate can cross the inner mitochondrial membrane and within the cytosol the malate can be converted back to oxaloacetate by malate dehydrogenase. Damaged oxaloacetate by nonprimordial isotopes can be removed from the mitochondria by such conversion to malate and damaged pyruvate also. A potential cure for cancer may in phosphoenol-pyruvate carboxyl kinase can be equipped with ^{13}C to remove ^{13}C damaged oxaloacetate. In the cytosol phosphoenol pyruvate can be formed from cytosolic oxaloacetate by phosphoenol pyruvate carboxy kinase.

The malate dehydrogenase catalyzes the conversion of malate to oxaloacetate. NAD^+ is reduced to oxidize the OH group on malate. The oxidation by NAD^+ involves a transfer of H^- in similar way as transfer in alcohol dehydrogenase and lactate dehydrogenase. Gluconeogenesis also is catalyzed by malate dehydrogenase. Pyruvate is catalyzed to oxaloacetate by pyruvate carboxylase in the mitochondria. Oxaloacetate cannot leave the mitochondria until it is converted to malate by malate dehydrogenase; once in the cytosol the malate can be reconverted to oxaloacetate by cytosolic malate dehydrogenase. NAD^+/NADH are cofactors that bind to malate dehydrogenase for ordering its activity as it then binds the substrate.

The pH modulates the binding of the malate and the binding involves p^+ transfer during the enzymatic action. The His (-cyclo-pentyl $(NH)NH^+$) residue of the enzyme is involved in the pH dependent binding as catalyzed by local α helices as the His binds more rapidly at high pH as the His is more basic for interacting with the enol form of oxaloacetate within the malate dehydrogenase NADH complex. Under such high pH conditions, the nonprotonated malate dehydrogenase preferably binds the L malate and the enol form of oxaloacetate as catalyzed by local α helical regions by induction of proton orbitals and hydrogen bonds. D malate (hydroxymalate) in the keto form interacts more strongly with protonated malate dehydrogenase. His (-cyclo-pentyl $(NH)NH^+$) forms hydrogen bonds to carbonyl oxygens of malate to induce shift in electron density toward the O to induce nucleophilic attack by hydride on the C of the carbonyl as catalyzed locally by α helices and globally by β pleats. So the residue binds to polarize and induce nucleophilic attack.

Under the high pH conditions, the His (-cyclo-pentyl $(NH)NH^+$) binds malate by O of carbonyl in the malate interacting with deprotonated N group of His to polarize C-O so hydride nucleophile attacks carbonyl for binding H- as catalyzed by global β pleats and the induction of proton orbitals and hydrogen bonding nonlocally.. Asp 168 $\{-CH_2-C(O^-)(O)\}$ also transfers protons to catalyze the protonation and deprotonation associated with the alcohol formation and the double bond formation. If the ^{12}C, ^{16}O and ^{14}N in the substrate and amino residue are replaced by ^{13}C, ^{17}O and ^{15}N then the His residue cannot hydrogen bond the carbonyl as strongly (and enzymatic activity is diminished) as ^{15}N is more basic than ^{14}N. So 15N in His pushes

negative electrons of O of carbonyl and this pushes electrons on the carbon and hinders hydride attacking the more negative carbon of the carbonyl. The ^{17}O (in the substrate) does not bind the H as strongly and enzymatic activity is suppressed; so interactions with ^{15}N is even more loose such that ^{15}N and ^{17}O suppress this step. The ^{13}C would tend to pull electron from ^{17}O to even further diminish its hydrogen bonding with ^{15}N with diminished enzymatic activity. So that isotopic changes suppress the Kreb cycle for this 9th step. The primordial ^{12}C, ^{14}N and ^{16}O more strongly bind the substrate to malate dehydrogenase relative to ^{13}C, ^{15}N and ^{17}O in substrate and enzyme.

The enzyme may have effective binding of substrate if the important binding amino acids Arg 31 {- CH_2-NH-C(NH_2)(NH_2^+)} of subunit C and Asp 82 {-CH_2-C(O-)(O)} have primordial ^{12}C, ^{14}N and ^{16}O isotopic compositions and also the substrates have the primordial isotopic compositions, but the binding of the substrate will be altered if some or all the primordial ^{12}C, ^{14}N, ^{16}O and ^{32}S in enzyme and/or substrate are replaced due to pollution of the environments by nonprimordial ^{13}C, ^{15}N, ^{17}O and ^{33}S.

A hydrophobic region within the enzyme provides the active site where NAD^+ and malate are bound as catalyzed by local α helices. The active sites within the enzyme manifest hydrophobic regions. The substrate is shielded internally from solvent molecules by conformational changes of the enzyme so that such conformational changes bring important amino acid residue near the substrate for enzymatics by local α helices and global β pleats. The substrate is locked into place for enzymatics by Arg 102 {- CH_2-NH-C(NH_2)(NH_2^+)} , Arg 109 {- CH_2-NH-C(NH_2)(NH_2^+)} and Arg 171 {- CH_2-NH-C(NH_2)(NH_2^+)} and proton transfer is induced by His 195 {--cyclopentyl –(NH)(NH^+)} and Asp 168 {-CH_2-C(O^-) (O)} as catalyzed by local β pleats and global α helices breaking OH and local α helices binding p^+ to His. The mechanism is altered as residues containing C, N and O are switched as by ^{12}C replaced by ^{13}C, ^{14}N replaced by ^{15}N and ^{16}O replaced by ^{17}O for the further suppression of the Kreb cycle by this 9th step.

A hydroxyl group of malate is oxidized by NAD^+ within the malate dehydrogenase NAD^+ complex. The oxidation of the hydroxyl group shifts internal electron distribution so that the elimination of p^+ and H^- is induced in the substrate as catalyzed nonlocally by the whole enzyme by shift in proton orbitals. NADH forms as the NAD^+ of nicotinamide takes H^- while simultaneously a proton is removed by His 195 {--cyclopentyl –(NH)(NH^+)} as catalyzed by local bond breaking β pleats and nonlocal α helices and bond forming local α helices and nonlocal β pleats. During the removal of the p^+ by His, the His is stabilized by negatively charged Asp 168 {-CH_2-C(O^-) (O)}. The high pH in the enzyme as shielded by conformational enclosure leads to protonation of Arg 102{- CH_2-NH-C(NH_2)(NH_2^+)} , Arg 109 {- CH_2-NH-C(NH_2)(NH_2^+)} and Arg 171 {- CH_2-NH-C(NH_2)(NH_2^+)} and such protonated Arg allow strong binding of the end negative charge carboxylates of the substrate {by local bonding induction of α helices and nonlocal induction by global β pleats} for stabilizing the substrate in the site during the oxidation and p^+ and H^- transfers. The ability to protonate and deprotonate and stabilize the carboxylic ends of the substrate and the associate enzymatics are hindered by a switch of ^{15}N for ^{14}N and ^{17}O for ^{16}O in Arg and Asp as the switch would make the N and O groups more basic so this would alter binding and protonation//deprotonation the Asp {-CH_2-C(O^-) (O)} and Arg {- CH_2-NH-C(NH_2)(NH_2^+)} and the local and nonlocal induction of such by

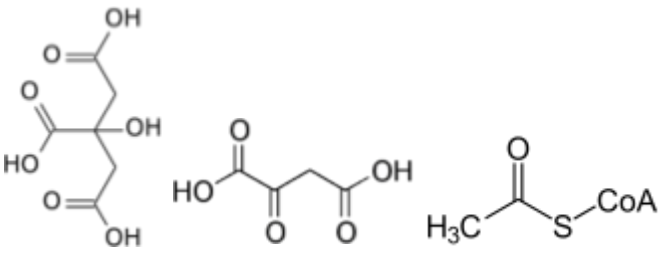
proton orbital dynamics across the whole enzyme. Carbonyl rehybridization sp^3 to sp^2 occurs as the carbonyl is oxidized by the Little Effect proton tautomerism between the Arg 171, Arg 109 and Arg 102 drives such rehybridization by perturbing the carboxyl sp^2 to sp^3 and the hydroxyl sp^3 to sp^2 for inducing the sp^3 carbon of the carbonyl to sp^2 to form the ketone group with enzymatics resonance by local β pleat global α helices and local α helical global β pleats. The ability of the Arg to tautomerize protons for resonating the rehybridization about the carbonyls is closely associated with the ^{12}C as if it is replaced by ^{13}C then the rehybridization dynamics about the carbonyl is altered. The alteration of the carbonyl by ^{13}C rather than ^{12}C and ^{17}O rather than ^{16}O would further suppress the rehybridization and associated enzymatics within the carbonyl to suppress the oxidation and this step of Kreb cycle. Such suppression can support cancer genesis.

It is noted that during this reaction the sp^3 of the malate has to transform to sp^2 in the oxaloacetate and although the C center is bond to O there is no nearby resonating double bonds to assist this. The formation of oxaloacetate requires the formation of sp^2 C center from sp^3 carbon center in the malate. Such rehybridization is more difficult as there is no nearby resonating double bond to assist. There is a vinyl resonating C=O and the C=O double bonds to help pump sp^2 into sp^3. If ^{13}C replaces ^{12}C then the sp^3 is favored due to the higher angular momentum of sp^3 and the formation of sp^2 is hindered for malate to convert to oxaloacetate. So this also manifest a difficulty of cycling the Kreb cycle. Damages oxaloacetate may be removed from the mitochondria by converting it to malate.

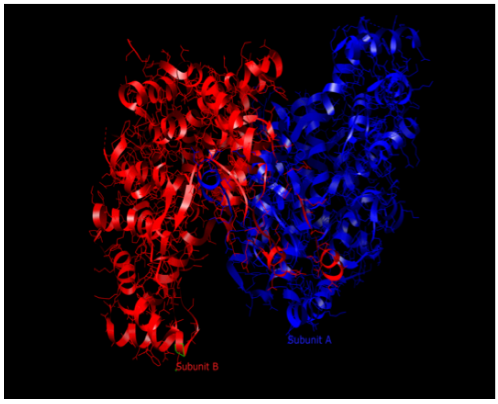
Tenth Step of Kreb Cycle

In the 10^{th} step of the Kreb cycle, acetyl – Co A and oxaloacetic acid are transformed to citric acid by catalysis by the enzyme citrate synthase. See Figure 20. [40] Such anabolism of acetyl Co A and oxaloacetic acid is consistent with the new model of RBL as α helical regions of citrate synthase cause compositional biochemistry as the enzyme has more α helical regions for its conformational active site.

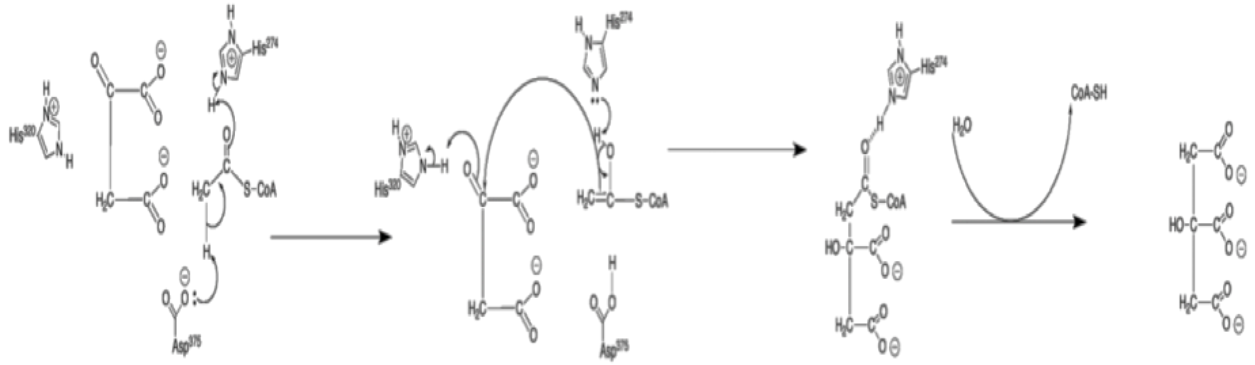
The purpose of this 10^{th} step of the Kreb cycle is to form citric acid (reactant for step 2) from oxaloacetic acid (product of the 9^{th} step of this cycle) and Co-A. The reaction is of the type aldol condensation of two acetates and it couples and integrates the prior dehydrogenation dynamics of step 9 and the subsequent oxidative dynamics of step 1. This purpose as other purposes of the citric acid Kreb cycle is achieved by protonation and protolysis for quantum of proton orbitals as governed by N groups and O groups and also S groups of bases with reinforcement from surrounding backbone of the enzyme.

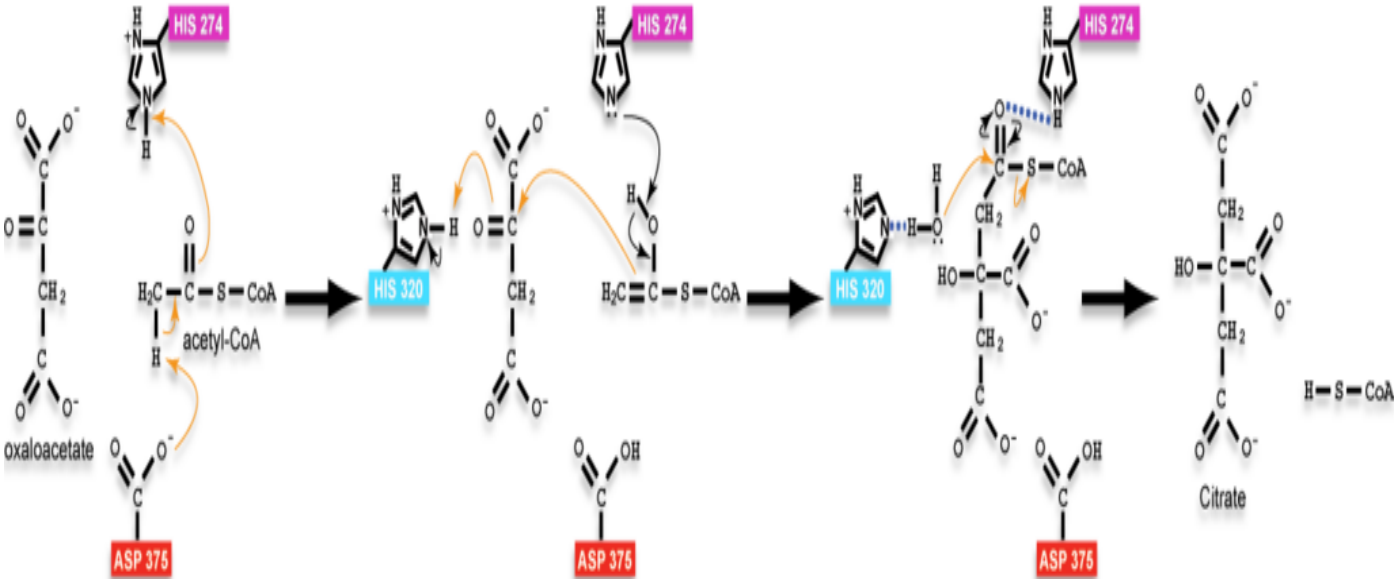


+→



by Vojtěch Dostál





http://proteopedia.org/wiki/index.php/Citrate_Synthase

See Reference 40

Figure 20

The citrate synthase is located in mitochondria matrix but it is formed in the cytosol so that the enzyme can incorporate nonprimordial ^{13}C, ^{15}N, ^{17}O, ^{25}Mg, ^{30}P, ^{32}P and ^{33}S from the cytosol during its anabolism in cytosol. Such acquisition of nonprimordial isotopes can suppress the enzymes of the citrate synthase to terminate the Kreb cycle for cancer genesis. The aldol type condensation of two carbon acetates is catalyzed by the citrate synthase on substrates of acetyl Co A and 2 carbon oxaloacetate with formation of citrate. This conversion is irreversible and manifest the overall rate limiting step of the Kreb cycle. This step is compatible with cancer genesis as demonstrated by this mechanism as the unusual nuclides in the cytosol can taint the citrate synthase with ^{13}C, ^{15}N, ^{17}O and ^{33}S to suppress the activity of the citrate synthase to terminate the Kreb cycle.

The citrate synthase catalyzes the condensation of oxaloacetate and S-Co A. The reaction has a free energy of -31.5 kJ/mol and the enzyme functions far from equilibrium. The enzymatics are likely to be very sensitive to malfunctions of stray fields and alterations like the nuclear spin moments. The citrate synthase is a homodimer of a single amino acid chain monomer. The citrate synthase has large and small domains and is composed almost completely by α helices. The aldol condensation is an exothermic, combinational, compositional reaction and this α helical nature of the citrate synthase fits the theory of this work perfectly! It must be wondered however what β pleats cause bond breakages to form the transition state of the step 10 of the Kreb cycle. It is reasoned in this work that conformational changes cause some α helices to form β pleats for induction of bond breakage and also the global α helices can nonlocally induce bond breakage. Without the oxaloacetate the citrate synthase forms an open conformation. Binding of oxaloacetate induces a domain rotation to confine the substrate and transformation of the enzyme to the closed conformation. The closing about oxaloacetate generates an opening to bind S-CoA. Three residues in each of the two domains holding the oxaloacetate and S-CoA are directly enzymatic. In the closed conformation, the direct residues and substrates are brought into proximity, but in the open conformation the direct residues and the substrates are not close in space.

The enzymatics involve ionizable residues in the active site of the citrate synthase are prime for catalyzing the condensation. These ionizable residues are His 274, His 320 and Asp 375. It is important to note that citrate synthase is rare in its catalysis as it form C-C bond without metal residues. It is important as done in this work to note the common His and Asp for

catalyzing different steps of both glycolysis and Kreb processes. There can be cross communications of these enzymatics between enzymes of the Kreb and or Glycolysis and within these processes. Asp 375 is one of the three prime residues as it acts as a base for removing a proton (as induced by global α helices) from the methyl of acetyl Co-A to form an enol of the acetyl Co A. The resulting enol of acetyl Co A is then stabilized by His 274 by donating a proton to the enol's oxygen. This sets up the acetyl Co A for nucleophilic attacking the carbonyl of the oxaloacetate as the surrounding residues protonate and deprotonate to induce negative charge in the enol so the resulting double bond is strong enough nucleophile to attack the carbonyl. This is a prime example of proton orbital dynamics about the two substrates locally inducing changing electronics within the two substrates so one substrate attacks the other substrate. This is what is meant by local induction by α helices for bonding dynamics. As the enol of acetyl Co A attacks the oxaloacetate (as induced by local α helices) simultaneously the enzyme induces the deprotonation of His 320 as induced by global α helices and the transfer of proton to the carbonyl of oxaloacetate as induced by local α helices to stabilize the citryl-CoA intermediate. The citryl-CoA intermediate is bound to the enzyme and undergoes a hydration as the enzyme induces by global α helices the deprotonation of water and local α helices bind the proton to His 320 as the induction further drives the OH from the water to attack the citryl-CoA. The S-CoA is released and the proton of the attach OH- is transferred to His 274 to regenerate the enzyme.

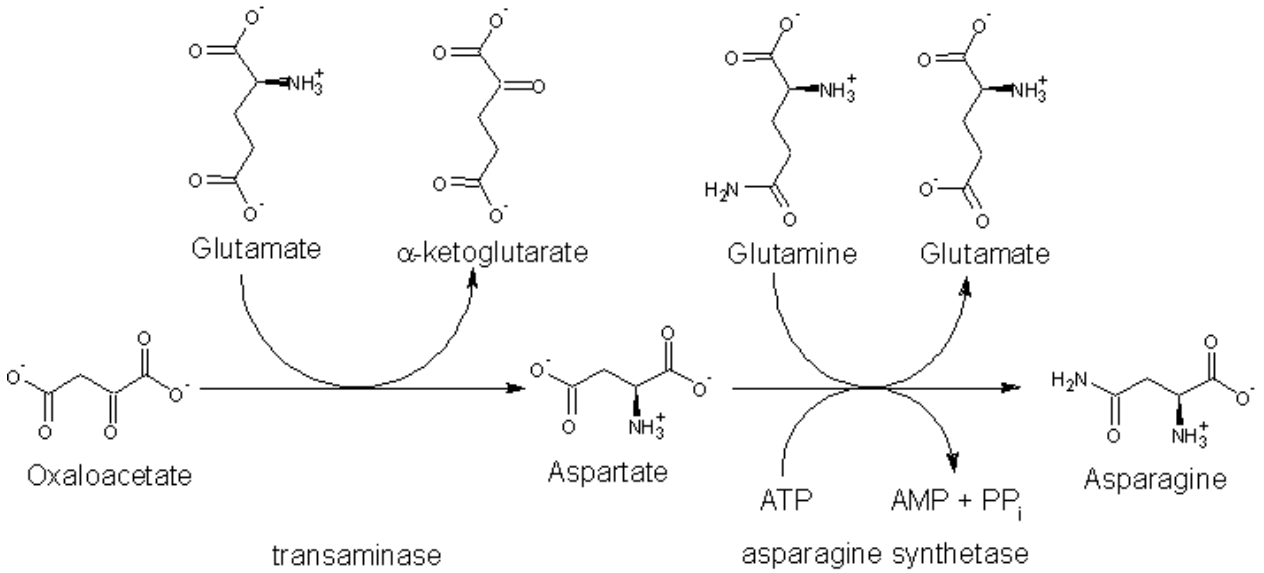
So in this mechanism it is reasoned that the ^{14}N of His 274 and His 320 and the ^{16}O of the Asp 375 act as weaker bases than if these are replaced by ^{15}N and ^{17}O as the ^{15}N and ^{17}O have negative nuclear magnetic moments so such replacements would cause the His 320, His 274 and Asp 375 to be more basic for accepting protons but less acidic for giving protons. So some reactions would be accelerated by the nonprimordial isotopes but others would be suppressed. The residues are not activating as nucleophiles so the negative magnetic moments of ^{15}N and ^{17}O does help the basicity as in glycolysis where the residues may have played role of nucleophiles so the more basic residue also became stronger nucleophiles. The critical substeps in this step is the first of Asp 375 taking a proton from methyl of acetyl Co A. And the His 274 gives a proton from hydroxyl of the acetyl to drive the attack on the oxaloacetate. It is interesting that if the Asp 375 and His 274 are externally stimulated by dynamic magnetic fields this highly exergonic first step may be ignited and this may cause cancer to goto normal. The external magnetic field may cause the His 274 and Asp 375 to loose their abilities to accept protons and to give protons by either polarizing spin of proton and the nuclear moments of the C and O or by dynamics fields rotating the nuclei so that they lose their pulling of protons. It is important further to note the role of ^{32}S in the co-enzyme as ^{32}S is primordial and lacks nuclear magnetic moment but if it is replaced by nonprimordial ^{33}S then the enzymatics are affected as the ^{33}S is a stronger base. The ^{33}S would pull electrons from the carbonyl in the acetyl Co A so that the C=O can better deprotonate His 274 and the C=C can better nucleophilicly attack the carbonyl of oxaloacetate. This would cause the nonprimordial ^{33}S to also enhance the Kreb cycle.

Three key amino acids have been identified in the citrate synthase for catalyzing the conversion of acetyl Co A and oxaloacetate. (Asp-375) {-COO^-} is one of the triad and it catalyzes the transformation by deprotonating acetyl Co A α carbon to form an enolate anions by locating its carboxylic group near the acetyl Co A. The enzymatic activity of citrate synthase involves nonlocal global α regions guiding the Asp 375 to the acetyl Co A where local β pleated

regions catalyze decomposition of acetyl CoA's α carbon to release p^+ as nearby local α helices of approaching Asp 375 catalyze compostional adding p^+ to carbohydrate of Asp. Substituting ^{17}O for ^{16}O causes the Asp to better accept a proton from the acetyl CoA. So this seems to accelerate the 10^{th} step. The second amino acid of the triad (His 274) (-cyclo-pentyl $(NH)NH^+$) neutralizes the enolate anions by protonation to form enol intermediate. The citrate synthase catalyzes the protonation of the enolate by global β pleats guiding the His 274 to the enolate where the β pleats catalyze deprotonation of the His and local α helices catalyze the combination of the p^+ to the enolate substrate. See Figure 40a. (40) But if the ^{14}N of the His is replaced by ^{15}N then the His is more basic and cannot release a proton to the enolate anion and would not stabilize the enolate anion for suppressing this step 10 of the Kreb cycle.

During this transformation the α carbon to carbonyl center undergoes rehybridization from sp^3 to sp^2 as driven by O of the Asp 372 {$-COO^-$) and also that the proton of N of His 274 simultaneously attacks the carbonyl to rehybridize the carbonyl from sp^2 to sp^3 with pushing electrons from α carbanion to carbonyl. The citrate synthase locally and globally also drives the rehybridization of the α carbon to the carboxyl as by the fission translation and fusion to local β pleats global α helices and fission, translation fusion of local α helices global β pleats for driving O of Asp 327 and β pleats from His 274 to alter the C sp^2 to sp^3. Large orbital changes occur during such dynamics and the N and O are important for driving such orbital dynamics during this step of the Kreb cycle so that altering nuclear moments of primordial ^{12}C, ^{14}N, ^{16}O and ^{32}S to nonprimordial ^{13}C, ^{15}N, ^{17}O and ^{33}S alters this step to suppress the Kreb cycle for the molecular basis for the cause of cancer.

The change of ^{14}N and ^{16}O to ^{15}N and ^{17}O also changes the ability of enzyme to locally and globally catalyze such bond rearrangements. There is a direct role of C, N, O and S isotopes for stopping Kreb cycle. The His enzyme can acquire nonprimordial ^{13}C, ^{15}N and ^{17}O from the cytosol of the cancer cells or forming cancer cells. This alteration of the His is the first step by which Kreb cycle is altered and suppressed for transforming normal cells to cancerous cells. So isotopic scrambling can disrupt this 10^{th} step of Kreb cycle. The external magnetic fields more act on the terminated Kreb to try to force the catalysis externally.



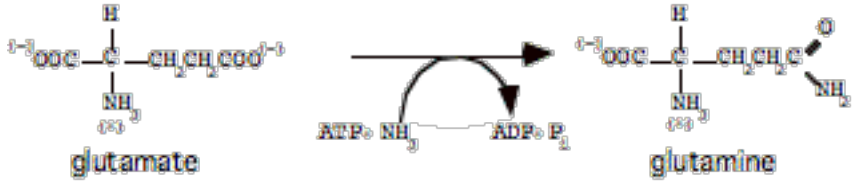


Figure 20a

The cancer cell may by coupling the hexokinase to the mitochondria prevent the mitochondria from converted oxaloacetate but instead the oxaloacetate is converted to Asn and Asp. Eating Asn can increase odds of ^{15}N and/or ^{17}O which can form oxaloacetate with ^{17}O and glutamine with ^{15}N. Foods rich in Asn dairy, whey, beef, poultry, eggs, fish, lactalbumin, seafood. asparagus, potatoes, legumes, nuts, seeds, soy, whole grains. The ^{17}O may stop Kreb. Use of Asn with ^{16}O may fire up Kreb if it replaces polluted ^{17}O in oxaloacetate. The glutamine with ^{15}N is critical elsewhere for causing cancer! The Asn can form Aspartate by convert ADP to ATP and form glutamine from glutamate. The glutamine can reform glutamate by ADP + P + glutamine going to Glutamate + ATP + NH_3. So in this way the cancer cells can reuse NH_3 to produce energy as they take the Asn + glutamate and form Glutamine +ATP and Aspartate. The glutamine then reforms glutamate + NH_3 by convert ADP to ATP. The glutamate + fresh Asn and recycle glutamate form more glutamine. So the asparatate can form oxaloacetate + glutamate. The oxygen of glutamate gets circulated until it accumulates ^{17}O which is tossed to oxaloacetate rather than glutamate. The many oxygens of the oxaloacetate can take in the ^{17}O as the other O pull the electron away from C bound to ^{17}O. So ^{17}O goes to oxaloacetate rather than glutamate. The ^{17}O enters citric acid cycle and stops citric acid cycle. As C-^{17}O cannot goto sp CO_2! Is there a way to remove ^{17}O from oxaloacetate? If eat arginine then it can form arginosuccinate in the mitochondria to drive asparate to orinithine and consume urea to arginine so oxaloacetate is not formed use new succinate to clean oxaloacetate. Maybe cure cancer?

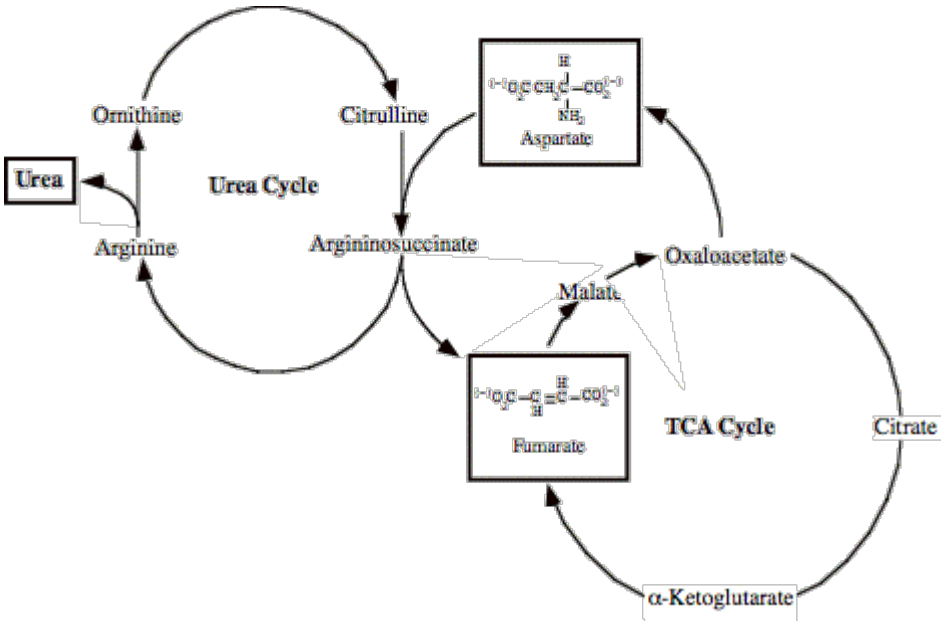


Figure 20b

Proton (p^+) from Hydroxyl enol is taken by ϵ nitrogen (lone pair) of His 274 (-cyclo-pentyl (NH)NH^+) to reform the enolate anion. Global α helices catalyze the deprotonation of the hydroxyl enol as local α helices catalyze the combination of the resulting p^+ to ϵ nitrogen of His 274 for reforming the enolate oxaloacetate by local α helices while the simultaneous deprotonation of ϵ nitrogen of the His 320 by global α pleats for the resulting proton to combine with the oxaloacetate accelerating the nucleophilic attack by enolate by local α helical regions of the enzyme. Nucleophilic attack is induced on the oxaloacetate at the carbonyl position with deprotonation of ϵ nitrogen of His 320 (third of the triad) as catalyzed by the whole enzyme as part of the enzyme conformationally change to fluctuate global α helices for including the deprotonation of the ϵ nitrogen of His 320 while other regions simultaneously in the conformational change fluctuate local α helices to induce nucleophilic attack and bonding on the carbonyl position as induced by the deprotonation. If His 320 is involving ^{15}N rather than ^{14}N then it will not be able to release a proton from episilon N of His to the enolate to induce nucleophilic attack on the enolate by S-CoA. This replacement of ^{14}N by ^{15}N in His 320 thereby also suppresses this step of the Kreb cycle. These triad may be directly involved, but by this model many other residues contribute to the enzymatics nonlocally.

The alteration of ^{14}N to ^{15}N, ^{12}C to ^{13}C, ^{16}O to ^{17}O and ^{32}S to ^{33}S slows this step. The deprotonation of the O by His depends on the ^{14}N and its strong basicity such that if ^{14}N is substituted for ^{15}N then the stronger basicity of ^{15}N (but ^{15}N is of stronger nucleophilicity) cannot better protonate the O of the carbonyl. (The stronger basicity of ^{15}N in glycolysis led to greater nucleophilicity for substitution in glycolysis but for Kreb the N deprotonates so the isotopic shift suppresses Kreb but accelerates glycolysis). Nucleophiles and electrophiles operate by nuclei

and e^- e^- spin up and down bosons electrical attacking or being attacked; charges drive attacks; but what happens as nuclei have spin and e^- e^- spin up and down bosons are separated; new dynamics occur as outlined here. Furthermore, the substitution of ^{13}C for ^{12}C affects the ability of the carbonyl to release proton from the OH to the N and the enzyme ability to catalyze such on His such that the ^{13}C pushes one electron toward the O and pulls the other to itself so that the O is magnetic electronically and the proton is bound more to the O with resistance to deprotonation.

The substitution of ^{17}O for ^{16}O on the carbonyl causes the O to be less acidic as it pushes one electron on the H and pulls one electron to itself so the proton is less pulled from the O. The substitution of ^{13}C and ^{17}O on the carbonyl causes the O to be a stronger nucleophile although it is weaker base so that it may not attack the carbonyl nucleophile as ^{13}C would resist nucleophilic attack on the carbonyl of oxaloacetate to disrupt the Kreb cycle. It is important to further note that ^{17}O attack relative to ^{16}O attack would be more resisted by the ^{13}C relative to ^{12}C; the positive nuclear magnetic moment of the ^{13}C pulls the electron closer to it for greater basicity but pulling one electron more closely to its nucleus and pushing the other electron more away as the ^{17}O is trying to push one electron up so that the other electron down is pushed onto the ^{13}C as it attacks the nucleophile and the ^{13}C is pushing one electron on ^{17}O as the ^{17}O attacks for causing poor nucleophilic attack of the ^{17}C on the carbonyl of the oxaloacetate. {as this step is the rate determining step of the Kreb cycle}; so the isotopic scrambling to these unusual isotopes of ^{13}C, ^{15}N, ^{17}O and ^{33}S causes cancer by suppressing this first step of Kreb cycle.

The formations of enol and enolate are altered by the scrambling of ^{12}C with ^{13}C and ^{16}O by ^{17}O with further alterations of these in support by ^{15}N rather than ^{14}N of His (-cyclo-pentyl $(NH)NH^+$) so the enolate cannot form so it cannot attack the carbonyl of oxaloacetate. Due to the shift in the isotopes, the nucleophilic electron of the attacking ^{17}O of the enolate has more spin separation due to stronger acidity of ^{13}C and the greater nucleophilicity of ^{17}O. Furthermore, isotopic scrambling of the carbonyl of the oxaloactetate from ^{12}C to ^{13}C may further alter the nucleophilic attack by the O of the enolate in unusual ways by spin nucleophilicity rather than charge nucleophilicity. The dynamics and kinetics of this first step and eminent rate determining step of the Kreb cycle are altered and modified by the shift from primordial ^{12}C, ^{14}N, ^{16}O, and ^{32}S to nonprimordial ^{13}C, ^{15}N, ^{17}O and ^{33}S.

The nucleophilic attack causes the formation of citroyl –CoA. A nearby H_2O starts hydrolysis for deprotonating the ϵ nitrogen of His 320 (-cyclo-pentyl $(NH)NH^+$) as global α helices drive the breaking of the water and the taking of proton from epsilon nitrogen of His. The ^{15}N may not deprotonate the H_2O for initiating hydrolysis if the His $^{32}0$ (-cyclo-pentyl $(NH)NH^+$) has been modified by the cytosolic construction of the enzyme so it has ^{15}N rather than ^{14}N. The carbonyl of citrosyl CoA attacks the OH^- for nucleophile attacks for formation of a tetrahedral intermediate with the release of –SCoA to reform the carbonyl as catalyzed by local alpha helices and global β pleats. The substitution of ^{33}S for ^{32}S will alter the –SCoA and its ability as leaving group from the tetrahedral intermediate as the ^{33}S makes sulfur a poorer leaving group. If ^{17}O is on OH^- then it may not act as a strong nucleophile on the carbonyl of CoA depending if the carbonyl has ^{13}C and ^{17}O or ^{12}C and ^{16}O of primordial isotopic distribution.

The S CoA is re-protonated by the HSCoA. The substitution of ^{33}S for ^{32}S alters this reprotonation ability of the -SCoA. The deprotonation of the hydroxyl bond reforms citrate from this prior step. The ϵ N of His 274 removes a proton as induced enzymatically by local β pleats and global e^- e^- spin up and down helices while the ϵ H of His 320 adds proton by local e^- e^- spin

up and down helices and global β pleats to the carbonyl for protonation and deprotonation dynamics and rehybridization dynamics about the α carbon of the oxaloacetate as driven by whole enzyme to induce the carbanion attack on this carbonyl with rehybridizing the α carbon of citroyl CoA and the rehybridization of the citroyl CoA ; the change of ^{12}C to ^{13}C can alter the rehybridization dynamics of such from sp^2 to sp^3 to sp^2 as driven by the N and O of the amino acid residues. The rehybridization dynamics are further altered by changing ^{14}N to ^{15}N and ^{16}O to ^{17}O on the enzyme amino residues.

This demonstrates how the Kreb cycle is suppressed by changes in isotopes from primordial ^{12}C, ^{14}N, ^{16}O and ^{32}S to more nonprimordial ^{13}C, ^{15}N, ^{17}O and ^{33}S for causing cancer in animals and humans. Protonation and deprotonation and OH^- abstraction and proton catalysis as are characteristic of the Kreb cycle so proton orbitals drive this suppression of Kreb for cancer unlike different dynamics of phosphates during glycolysis for the accelerated cancer due to nuclear magnetic effects from isotopic changes to nonprimordial ^{13}C, ^{15}N, ^{17}O and ^{33}S from primordial ^{12}C, ^{14}N, ^{16}O, and ^{32}S. On the basis of this mechanism, it is explicitly reasoned how the cytosol and its buildup of nonprimordial ^{13}C, ^{15}N, ^{17}O and ^{33}S can construct the enzyme citrate synthase for not allowing the catalysis of this 10^{th} step so as to suppress the Kreb cycle.

Scientific Cure for Cancer

Prior treatments have focused on drugs that bind to block actions of the enzymes. This cure involves many photons and static magnetic fields to alter the rotation of magnetic isotopes in the cancerous enzyme. This cure further uses radiofrequency electromagnetic radiation, X-rays, and/or neutrons to selectively excite isotopic nonprimordials in cancer cells to block the enzymatics and demagnetize the enzyme to alter enzymatic dynamics. This cure further involves the use of neutrons to selectively transform nonprimordial isotopes in cancer cells for altering the enzymatics to selectively kill cancer cells. It seems that intense stochastic and/or modulated RF fields will kill cancer as it will rotate dense nuclear spins in Glycolysis process so they alter the enzymatics and the normal cells have normal zero nuclear spins and positive spin of ^{14}N. The positive nuclear spin of proton and ^{14}N cause normal cells to absorb RF but at different frequency so the treatment will not affect the normal cells. The RF can be driven so as to couple only to negative nuclear magnetic moments of ^{15}N and ^{17}O. Also the rotations of negative nuclear magnetic moments with the ^{14}N nuclear moments can cause different fields in the cancer and normal cells so this difference is a basis for selectively killing the cancer.

Cure for cancer as by radio frequency. It should also be note in this report how many radio frequencies cause cancer as prior researchers have only used one wavelength and vary the amplitude. But here multiple amplitudes are used with modulation of the waves. But with many wavelengths the proteins not only couple to the wavelengths of RF but also the coupled states are twisted before the protein can renature. RBL here discovers that whereas proteins can denature and renature in water as by thermal agitation perturbation, the dense RF of many different wavelengths is a dense thermal energy and the dense thermal energy denatures the protein. The protein may renature. But now if the protein is metabolic and has substrates inside of it then the many wavelengths of the RF denature and the presence of the substrates and energy of the catabolism will not allow the enzyme to renature. This is beautiful and powerful as the presence of the substrate itself can denature the enzyme and this is why chemicals cause cancer. So now radiation can also denature the enzyme and cause cancer in particular the neutrons, beta, gamma,

and alpha; while the enzyme is catalyzing the abnormal energy can cause irreversible damage to the protein to cause cancer. But just as these many RF waves can cause cancer they can also kill cancer. Scientists have missed this as they look only at the inactive enzymes but life is more complex. So, the enzyme in action is more complicated and coupling in cancerous ways than an inactive enzyme. So now what about HIV, can neutrons and RF kill HIV? This is a future project. But back to cancer, the normal cell has active enzymes with interior substrates that can couple to RF and by coupling the high-energy intermediates can be irreversibly damaged. Even the Second Law of Thermodynamics is violated causing such irreversible damage to the enzyme. Scientists have missed this as they in the past have focused on inactive enzymes. But the active enzymes are different from dead enzymes. So, this is how the cell becomes cancerous and with more nonprimordial isotopes the couplings of the enzymes are more sensitive to shut down Kreb cycle and alter nuclei acid and protein anabolisms. So now the glycolysis is more robust. But the resulting cancer has these nonprimordial isotopes and it is these that RBL focus on to kill the cancer selectively. As the RF can coupled selectively on glycolytic enzymes and not affect the Kreb cycle enzymes. But how? Different environments of glycolysis as these enzymes associate with C-OH and are higher energy. But in Kreb cycle enzymes couple with aldehydes, ketones, and carboxylic acids of higher energy, the corresponding substrates have lower energy enzymes; so, it is harder to perturb the lower energy enzymes of Kreb cycle and easier to perturb the sugar pieces of Kreb cycle; the nonprimordial isotopes do this to jam up Kreb cycle as cannot couple to sugars or alter couple to sugars to goto cancer. The nonprimordial couple to enzyme of glycolysis and accelerate glycolysis via enzyme. The nonprimordial couple to sugar in Kreb cycle to stop Kreb cycle as by sugar pieces. So, glycolysis enzymes is better subject to driving by B_{ext} than Kreb cycle enzymes. This is the cure. Also, high energy B_{ext} may couple to Kreb cycle enzyme to disrupt the defective jammed sugar to unclog so mitochondria resume its normal activity. So, no the B_{ext} would not suppress Kreb cycle enzyme in normal as Kreb cycle energy in normal cells are of low energy. B_{ext} may couple to sugars in Kreb cycle to make them more transformable. But sugars differ from protein so there are some regions of wavelength where only N and protein are excited in glycolytic enzymes and these would not couple into sugars. This further explains why the smoking, obesity, nonexercise (as thermal energy couples to sugars of Kreb cycle and enzyme of glycolysis drive the malfunction. UV, X-ray, neutrons, beta, gamma and alpha rays cause cancer.

In considering the cure reasoned for cancer for this work, first the critical conventional chemical dynamic is given.. Second the alteration of this critical chemical dynamics is presented if the primordial isotopes are replaced by nonprimordial isotopes. Third the use of multiple frequency modulated RF dynamics magnetic fields, static magnetic fields, UV fields, neutrons are presented for suppressing or accelerating glycolysis selectively in the cancer cell with no affect on normal cells. Emaphasis is give n for this third purpose in this section with a structure of enzyme and substrate; b attack and binding of substrate to form bonds; c binding alters internally shifts electron wavefunctions in the substrate and enzyme for chemical change; d the products are released and enzyme is restored to native state. A contrast is given for conventional Lewis acid and Lewis base and the attack by electron pairs on bosonic nuclear centers and the new consideration of the attack of electron pairs on fermionic nuclear centers and the new attack of single Reggie fermion on bosonic nuclei and the new attack of Reggie electron on fermionic nuclei for different dynamics.

Step 1

In general as glucose enters the hexokinase the enzyme has an Asp that interacts and binds the glucose by proton orbital as contributing an electron pair from ^{16}O of the Asp.. The binding and interaction of the Asp with the glucose causes the O of the proton orbital to become more nucleophilic and it attacks the P center of the gamma phosphate. Surrounding $^{24}Mg^{2+}$ stabilize the intermediate of the nucleophilic attack. As ^{16}O replaced by ^{17}O the Asp can more strongly give electron pair to H of C-OH to accelerate this step. Mg^{2+} stabilizes the O^- s of the intermediate so as ^{24}Mg replaced by $^{25}Mg^{2+}$ the proton is buried inside valence and the electron pairs cause Mg to less stabilize the intermediate or to transfer electrons onto P center d orbitals to make the P less electrophilic. So $^{25}Mg^{2+}$ would kill both normal and cancer cells. But the ^{17}O in Asp is a basis for coupling modulated RF into cancer cells to disrupt this first step. An NV center in a diamond can detect the magnetic oscillations of the first step of glycolysis and give a modulating RF to drive this Asp interacting with the gamma phosphate to disrupt or over accelerate to kill the cancer cell. The rhythm in the cancer cell is different from the rhythm in the normal cell as the normal cell has ^{16}O in its Asp. For instance, an NV center in diamond can detect the magnetic dynamics and rhythms by the hexokinase of this mechanism as the hexokinase catalyzes the phosphorylation on $glucose$ so as to use the output from the NV center in the diamond to modulate RF radiation onto the cancer cell to selectively tune into the phosphorylation enzymatics in the cancer cells so as to suppress and/or over drive the phosphorylation enzymatics in the cancer cells to kill the cancer cell for curing cancer. Also X-rays or UV rays can selectively excite the outer edge of ^{17}O in Asp in cancer cells without exciting any other elements in the human body and without exciting ^{16}O in asp in normal cells. Such X-rays would demagnetize the hexokinase enzyme and suppress the glycolysis in the cancer cell. Polarized neutrons can be used to selectively absorb into ^{17}O of the Asp in the cancer without absorption in the ^{16}O in normal cells to transmute the ^{17}O to ^{19}F to inactivate the hexokinase in the cancer cell without effect in the normal cells. These processes would cure the patient of cancer.

Step 2

Ring opening involves the binding of the glucose 6 phosphate by the Lys 210, Gln 353, Gln 511, Lys 518, His 388. Lys 210, His 388 and Glu 357 are more involved in chemical changes that open the ring. C5 oxygen is protonated by His 388 with the protonation altering internal electron density in the substrate to push and pull to open the ring. The OH on C1 is deprotonated by Lys 518. Glu 357 deprotonates C2 to form cis enediolate intermediate which is stabilized by Arg 271 via p^+ from Arg. The Lys 518 deprotonates C5 to close rotate and close the ring. So the replacement of ^{14}N with ^{15}N in His 388 slows the protonation of C5 oxygen. replacement of ^{14}N by ^{15}N in Lys 518 accelerates the deprotonaton of OH of C1. The replacement of ^{16}O by ^{17}O in Glu 357 accelerates the deprotonation of C2 to form the intermediate enediolate. Replacing ^{14}N by ^{15}N in Arg 271 causes strong stabilization of the enediolate. An NV center diamond can detect magnetic changes this second step of glycolysis and give a modulating RF to drive the His 388, Lys 518, Glu 357 and Arg 271 to disrupt the protolysis and proton orbitals in the cancer cell having ^{15}N and/or ^{17}O in these residues without disrupting the ^{14}N and ^{16}O in these residues of normal cells. The magnetic rhythms of these

nonprimordial isotopes in cancer cells is different from the rhythm of the primordial isotopes in normal cells so the cure for cancer selectively suppresses by the external RF or selectively accelerates by the RF these nonprimordial nuclides in ways to kill the cancer cells. For instance, an NV center in diamond can detect the magnetic dynamics and rhythms by the glucose 6-phosphate isomerase of this mechanism as the glucose 6-phosphate isomerase catalyzes the ring opening and closing on α D glucose 6 phosphate so as to use the output from the NV center in the diamond to modulate RF radiation onto the cancer cell to selectively tune into the ring opening and closing enzymatics in the cancer cells so as to suppress and/or over drive the ring opening and closing enzymatics in the cancer cells to kill the cancer cell for curing cancer. Also X-rays or UV rays can selectively excite the outer edge states of ^{15}N and ^{17}O in these residues in the glucose 6 phosphate isomerase so as to demagnetize the enzyme and suppress this second step. Polarized neutrons can be used to selectively absorb into the ^{15}N and ^{17}O in these residues to transmute the ^{15}N to ^{16}O and to transmute the ^{17}O to ^{19}F to inactive the glucose 6 phosphate isomerase. These RF, X-rays and neutron processes would selectively terminate the glycolysis only in cancer cells to cure cancer.

Step 3

The phosphorylation in this third step involves binding both ATP and Mg^{2+} and fructose 6 phosphate in the R active site with Asp 127 binding the phosphate via proton from Asp and electron pairs into P center of the phosphate. The Arg 171 binds the fructose 6 phosphate via the proton from Arg. Arg 162 also binds the negatively charged phosphate of glucose 6 phosphate via proton from Arg. Due to the binding by Arg 171 and Arg 162 electron density shifts in the substrate from the anhydride oxygens of β and γ phosphates of ATP to steer the nucleophilic attack on the ATP to phosphorylate the substrate. If ^{16}O is replaced by ^{17}O in Asp the the Asp would better bind the phosphate via electron pair of ^{17}O and slight spin separation of the electron pair to couple to the magnetic ^{31}P center of the phosphates of ATP to accelerate the glycolysis as in cancer cells. If ^{14}N is replaced by ^{15}N in Arg then the glucose 6 phosphates would be bound more tightly by the two Arg residues and the internal electron redistribution to the anhydride oxygens of the phosphate would be stronger for steering the nucleophilic attach on the ATP to accelerate this step of glycolysis for causing cancer. Such effects in the cancer cells provides a cure as the ^{15}N in Arg and ^{17}O in Asp can be measured by NV center in diamond and the readout can modulate frequency of RF for selectively coupling to cancer cells having these nonprimordial isotopes of ^{15}N and ^{17}O so as to disrupt the Asp binding of phosphate in the cancer cell for this third step and to disrupt the Arg binding and internal electronic shifting of the glucose 6 phosphate for this third step for suppressing this step for cancer cells without affecting normal cells. For instance, an NV center in diamond can detect the magnetic dynamics and rhythms by the phosphofructokinase of this mechanism as the phosphofructokinase catalyzes the phosphorylation on β D fructose 6 phosphate so as to use the output from the NV center in the diamond to modulate RF radiation onto the cancer cell to selectively tune into the phosphorylation enzymatics in the cancer cells so as to suppress and/or over drive the phosphorylation enzymatics in the cancer cells to kill the cancer cell for curing cancer. Also X-rays and UV rays can be used to selectively excite the ^{15}N in Arg and ^{17}O in Asp so as to demagnetize the enzyme to suppress this third step to selectively kill the cancer cells without harm to normal cells. Polarize neutrons can be used to selectively absorb in to the ^{15}N and ^{17}O in these residues to transmute the ^{15}N to ^{16}O and to transmute the ^{17}O to ^{19}F to inactive the glucose

6 phosphate isomerase. These RF, X-rays and neutron processes would selectively terminate the glycolysis only in cancer cells to cure cancer.

Step 4.

The ring cleavage in this fourth step involves binding of the phosphate at C1 by Ser 271 and Gly 272 and the binding of phosphate at C6 by Lys 41, Arg 42 and Arg 303. Lys 229 nucleophilically attacks the carbon of the substrate giving electron pair to the carbon with flow of electrons to the O of the C=O bond to form oxide which protonates and leaves as water. The N of Lys double bonds the C. The open ring is stabilized by Asp 33 via electron pair from Asp to proton of C3-OH. The resulting positive charge Schiff base induces cleavage of C3-C4 bond. As the ^{16}O is replaced by ^{17}O in Ser and Asp the phosphate is more tightly bound by the ^{17}O pushing one electron into the magnetic ^{31}P center for stabilizing the substrate and the ^{17}O of Asp more strongly pushing electron pair into the C-OH to accelerate this step of glycolysis. As ^{14}N is replaced by ^{15}N in in Lys and arg the phosphate at C6 is more tightly bound as the ^{15}N pushes separated electron pair into the ^{31}P center to bind the phosphate more tightly and the ^{15}N in Lys 229 is a stronger nucleophile than ^{14}N so it attacks the C5=O double bond more strongly to accelerate this step of the glycolysis. But these isotopes in the cancer cell and their acceleration of the glycolysis provide a basis for a cure as the ^{17}O in the Ser and Asp and the ^{15}N in the Lys and Arg can be detected by NV center in diamond and the signal can be used for frequency modulating RF waves to tune into the fourth step of glycolysis so as to disrupt the Ser binding the phosphate of glucose and the Asp binding the open ring C3-OH and to disrupt the Lys and Arg binding the phosphates of the substrate and the Lys 229 nucleophilic attack on the C5=O. For instance, an NV center in diamond can detect the magnetic dynamics and rhythms by the aldolase of this mechanism as the aldolase catalyzes the cleavage on β D fructose 1,6 bisphosphate so as to use the output from the NV center in the diamond to modulate RF radiation onto the cancer cell to selectively tune into the cleavage enzymatics in the cancer cells so as to suppress and/or over drive the cleavage enzymatics in the cancer cells to kill the cancer cell for curing cancer. Also x-rays and UV rays can be used to selectively excite the ^{17}O in Ser and Arg and to selectively excite the ^{15}N in the Lys and Arg to demagnetize this enzyme to selectively killthe cancer cell without harm to normal cells. Polarize neutrons can be used to selectively absorb in to the ^{15}N and ^{17}O in these residues to transmute the ^{15}N to ^{16}O and to transmute the ^{17}O to ^{19}F to inactive the glucose 6 phosphate isomerase. These RF, X-rays and neutron processes would selectively terminate the glycolysis only in cancer cells to cure cancer.

Step 5

The isomerization in this fifth step involves electric attraction of the negative phosphates of the substrate to the positive charge of Lys 12 for interactions of the Lys 12 with the phosphate to stabilize the substrate. Glu 165 takes a proton from Carbon 1 of DHAP or carbon 2 of GAP. His gives a proton to C1 or to C2 to help the Glu take a proton from these carbons in the substrate. The proton from His 95 stabilizes the resulting enediol(ate) intermediate. The Lys 12 And Asn 11 further stabilize the negative charge on the intermediate. In reverse the Glu gives a proton and the His 95 takes a proton from OH of C1 to form GAP. As ^{14}N is replaced by ^{15}N in Lys the ^{15}N pushes magnetic separated electron pair from ^{15}N into the phosphate to stabilize the phosphate as the ^{31}P excepts one of the electron spins by a magnetic binding to accelerate this step. The ^{15}N in His cause push of separated magnetic spin pair into C1of C2 and the separation

of the electrons of the boson causes a stronger give and take of the proton from the His as one electron pulls the proton and the other electron pushes the proton by opposing spin interactions. The Asn with ^{15}N and ^{17}O pushes spins of internal separation into the intermediate to stabilize the intermediate as the separates spins magnetically drive the enediol to enediolate and vice versa with consequent acceleration of this step by the nonprimordial isotopes and the consequent cancer of such cells. As ^{17}O replaces ^{16}O in Glu the Glu is better able to take a proton from the C1 or C2 carbon and can push spin separated electron pair into C1 and C2 to accelerate this step magnetically for causing cancer. But these nonprimordial isotopes in cancer cells and their acceleration of the glycolysis in this 5^{th} step provides a basis for a cure as such nonprimordial isotopes are not in the normal cells so these nonprimordial isotopes in the cancer cells provide a handle that can be externally driven by changing magnetic field of RF radiation as frequency modulated. For instance, an NV center in diamond can detect the magnetic dynamics and rhythms by the triose-phosphate isomerase of this mechanism as the triose-phosphate isomerase catalyzes the isomerization on dihydroxyacetone phosphate to D glyceraldehyde 3 phosphate so as to use the output from the NV center in the diamond to modulate RF radiation onto the cancer cell to selectively tune into the iosomerizationn enzymatics in the cancer cells so as to suppress and/or over drive the isomerization enzymatics in the cancer cells to kill the cancer cell for curing cancer. Also X-rays and UV rays can be used to selectively excite the ^{17}O in Glu and the ^{15}N in Asn and His so as to demagnetize the enzyme during the glycolysis so as to kill the cancer cells. Also polarized neutrons can be used to selectively absorb in to the ^{15}N and ^{17}O in these residues to transmute the ^{15}N to ^{16}O and to transmute the ^{17}O to ^{19}F to inactive the glucose 6 phosphate isomerase. These RF, X-rays and neutron processes would selectively terminate the glycolysis only in cancer cells to cure cancer.

The phosphorylation in this sixth step involves the intermediate formation of a thioester to raise the energy of the intermediate relative to the corresponding ester so as to allow the attack by the phosphate. As the substrate is transported to the active site the aldehyde carbon is nucleophilically attacked by the sulhydryl of Cys 151 for forming a thiohemiacetal. The attack of the nucleophile induces internal electronic rearrangement in the substrate for releasing a H- to nearby NAD^+. The higher energy of the C-S center of the intermediary thiohemiacetal relative to corresponding C-O so the nucleophilic attack by a phosphate group is induced on the C center to push out the sulfhydryl group of Cys with the protonation by His 178 for forming 1,3 bisphospoglycerate. Thr 210 and Arg 233 are involved in transport of the substrate to the active site. As ^{32}S is replaced by ^{33}S in the Cys 151the positive nuclear moment of ^{33}S relative to zero nuclear moment of ^{32}S causes weaker basicity of the S of sulfhydride so the ^{33}S-H in Cys releases proton to the O of carbonyl and the ^{33}S more vigorously nucleophilically attacks the C of the carbonyl to accelerate the step relative to ^{32}S in normal cells. The replacement of ^{14}N in His 178 by ^{15}N leads to better protonation of the ^{33}S in Cys as the magnetically separated electron pair in the ^{15}N involves push pull of the proton by the two opposing electron spins for one electron spin magnetically pushing the proton to the ^{33}S of positive nuclear moment for the nuclei binding the proton magnetically in balance with a Meissner Effect of the intervening electron base pair. As the ^{15}N replaces ^{14}N in Arg, the negative nuclear magnetic moment of ^{15}N causes stronger basicity of the imidazole relative to ^{14}N so the separation of the spins of the pair in interacting with the ^{15}N negative nuclear magnetic moment causes one spin to pull toward the ^{15}N and the other spin to push into the ^{31}P of positive nuclear magnetic moment for accelerating

this step for cancer as by the substituting the ^{14}N by ^{15}N and/or ^{33}S replacing ^{32}S. But these nonprimordial isotopes of ^{33}S and ^{15}N in the cancer cells and their acceleration of the nucleophilic attack magnetically by ^{33}S and the binding and transport of the substrate to the active site in this 6^{th} step of glycolysis provides a selective magnetic handle for stimulating cancer cells by modulated dynamics magnetic fields without stimulating the primordial isotopes in the normal cells which are of different energies. For instance, an NV center in diamond can detect the magnetic dynamics and rhythms by the glyceraldehyde phosphate dehydrogenase of this mechanism as the glyceraldehyde phosphate dehydrogenase catalyzes the phosphorylation on glyceraldehyde 3 phosphate so as to use the output from the NV center in the diamond to modulate RF radiation onto the cancer cell to selectively tune into the phosphorylation enzymatics in the cancer cells so as to suppress and/or over drive the phosphorylation enzymatics in the cancer cells to kill the cancer cell for curing cancer. Also X-rays and UV rays can be used to selectively excite ^{33}S and ^{15}N in these residues so as to demagnetize the enzyme only in the cancer cell to starve the cancer cell and kill it by suppressing this sixth step of glycolysis only in the cancer cell for a cure for cancer. Also polarized neutrons can be used to selectively absorb into the ^{33}S and ^{15}N to transmute them to ^{35}Cl and ^{16}O respectively for inactivating the enzyme for killing the cancer cell for a cure. These RF, X-rays and neutron processes would selectively terminate the glycolysis only in cancer cells to cure cancer.

Step 7

The dephosphorylation in this seventh step involves the binding of the ADP and the binding of the 1,3 bisphosphoglycerate with guiding the 1,3BPG to the ADP for nucleophilic attack to form the 3 phosphoglycerate. A single displacement reaction occurs by nucleophilic substitution as oxygen of ADP β phosphate nucleophilically attacks the 1 phosphate on the 1,3 BPG. Lys 197 binds the 1,3 BPG and guides it to the ADP and Lys 219 binds the ADP and guides it to the 1,3 BPG. The Lys 197 transfers phosphate to ADP. The ATP product of the reaction is bound by Arg 36. The replacement of ^{14}N in Lys by ^{15}N leads to stronger basicity of the Lys and a slight separation of the spins of the electron pair of the bases as one electron is pulled close to the negative nuclear moment of the ^{15}N and the other electron spin is pushed into the magnetic ^{31}P (of opposite positive nuclear magnetic moment) for stabilizing a strong interaction between the Lys and the phosphate of ADP and the phosphate of 1,3 BPG magnetically by the ^{15}N negative nuclear magnetic moment and the ^{31}P positive nuclear magnetic moment. This strong magnetic interaction allows the ADP and 1,3 PBG to be pulled magnetically together in the enzyme by the Lys 197 and the Lys 219 during conformational dynamics of the enzyme with the consequent nucleophilic attack of the O of β phosphate of ADP on the phosphorus center of 1 phosphate of 1,3 BPG. The nucleophilic attack is accelerated by the magnetic exchange between the two P centers in the ADP and the 1,3 BPG as mediated by the Lys 219 and Lys 197 so the Lys magnetic exchange (as enhanced by the ^{15}N relative to the ^{14}N) is replaced by the O exchange as the O of one phosphate attacks the P of the other phosphate. It is important to emphasize the ^{14}N Lys couples magnetically to the ^{31}P in a weaker way in normal cells due to both nuclei having positive nuclear magnetic moments in the normal cells. But in the cancer cell, the ^{15}N and ^{31}P have opposing magnetic moments as ^{15}N in the Lys has negative nuclear magnetic moment and the ^{31}P in the phosphates have positive nuclear magnetic moment for stronger binding as magnetic attractions in the classical glycolysis process with acceleration as the glycolysis is classical physics. But in the Kreb cycle the mechanics are

quantum mechanical and the opposing nuclear moments of ^{15}N and ^{31}P is of higher energy relative to the ^{14}N and ^{31}P in correlation so in Kreb the ^{15}N and ^{31}P suppresses the enzymatics due to quantum dynamics. But in the glycolysis, as by classical physics the ^{15}N and ^{31}P of opposing nuclear magnetic moments accelerate the enzymatics. Likewise, the replacing the ^{14}N in Arg by ^{15}N causes stronger magnetic binding of the ATP product to accelerate this seventh step of the glycolysis by the nonprimordial isotopes. But these nonprimordial isotopes of ^{15}N in Lys and Arg in the cancer cells and their acceleration of the binding and magnetic exchange for O induced nucleophilic exchange for direct O exchange between the nuclear spins as accelerated and organized by the catalyzing preparing Lys intermediary exchange these nonprimordial isotopes provide magnetic handles for selectively stimulating the cancer cells without affecting the normal cells containing ^{14}N in their Lys and Arg so as to allow magnetic stimulating the seventh step in the cancer cell to suppress or overdrive this step to kill the cancer cell with no harm to the normal cells. For instance, an NV center in diamond can detect the magnetic dynamics and rhythms by the phosphoglycerate kinase of this mechanism as the phosphoglycerate kinase catalyzes the dephosphorylation on 1,3 bisphosphoglycerate so as to use the output from the NV center in the diamond to modulate RF radiation onto the cancer cell to selectively tune into the dephosphorylation enzymatics in the cancer cells so as to suppress and/or over drive the dephosphorylation enzymatics in the cancer cells to kill the cancer cell for curing cancer. Also X-rays and UV rays can be used to selectively excite the ^{15}N in these residues so as to demagnetize the enzyme for this seventh step to starve the cancer cell for killing the cancer selectively with no effect on normal cells. Also polarized neutrons can be used to selectively absorb into the ^{15}N to transmute it to ^{16}O in the Lys and Arg to inactivate the enzyme in the cancer cell to kill the cancer cell. These RF, X-rays and neutron processes would selectively terminate the glycolysis only in cancer cells to cure cancer.

Step 8

The isomerization in this eighth step involves isomerization His 8 binds a phosphate via the ^{14}N in it. It is important to consider that the phosphate on C2 is not the same phosphate removed from C3. The His 8 transfers its phosphate to C2 of the 3 phosphoglycerate to form an intermediary 2,3 bisphosphoglycerate –enzyme complex. Afterward the phosphate on C3 is transferred to His 8. His 181 and His 179 are also involved in the protolysis associated with transport and binding of the reactants and the alterations of their internal electronics for forming the 2 phosphoglycerate. Arg is also important for the enzymatics. Glu 15 and Glu 86 contribute proton withdrawing effects in the interactions with the substrate to assist the enzymatics. So as the ^{14}N in all these residues His and Arg are replaced by ^{15}N the positive nuclear moment of the N becomes negative nuclear magnetic moment in ^{15}N for magnetically slightly separating the spin up spin down electron pair of the base so one electron is pulled to the negative nuclear moment of ^{15}N and the electron of opposite spin is pushed into the ^{31}P center of the 3 phosphoglycerate to strongly bind the 3 phosphoglycerate magnetically. The His 8 strongly binds the phosphate magnetically in this way and the transfers its phosphate to C2 in this way as it pulls phosphate from C3. Likewise, the replacement of ^{16}O by ^{17}O in Glu leads to a change from zero magnetic moment of ^{16}O to negative magnetic moment of ^{17}O with consequent pull of an electron of one spin type to the ^{17}O and pull of the other electron spin to the ^{31}P positive nuclear moment for strongly binding the phosphate to the Glu magnetically so that the

nonprimordial isotopes ^{15}N in His and ^{17}O in Glu cause acceleration of this step. But these nonprimordial isotopes of ^{15}N and ^{17}O in the His and Glu in the enzyme accelerate the glycolysis in cancer cells and moreover provide magnetic handles to selectively manipulate the cancer cell and not affect the primordial ^{14}N and ^{16}O in His and Glu or normal cells. So that the NV center in a nanodiamond can couple to the magnetic dynamics during the isomerization as induced by the His and Glu in the cancer cells to detect the fluctuating magnetic fields during the process and to modulate an external RF field to disrupt the enzymatics of this eighth step to selectively kill the cancer cell without affecting the normal cells. For instance, an NV center in diamond can detect the magnetic dynamics and rhythms by the phosphoglycerate mutase of this mechanism as the phosphoglycerate mutase catalyzes the isomerization on 3 phosphoglycerate to 2 phosphoglycerate so as to use the output from the NV center in the diamond to modulate RF radiation onto the cancer cell to selectively tune into the isomerization enzymatics in the cancer cells so as to suppress and/or over drive the isomerization enzymatics in the cancer cells to kill the cancer cell for curing cancer. Also X-rays and UV rays can be used to selectively excite the ^{15}N and ^{17}O in the His and Glu in these residues so as to demagnetize the enzyme only in the cancer cell to starve the cancer cell and kill it by suppressing this eighth step of glycolysis only in cancer cells for cure for cancer. Also polarized neutrons can be used to selectively absorb into the ^{15}N and ^{17}O to transmute them to ^{16}O and ^{19}F respectively for inactivating the enzyme for killing the cancer cell for cure for cancer. These RF, X-rays and neutron processes would selectively terminate the glycolysis only in cancer cells to cure cancer.

Step 9

The dehydration and elimination in this ninth step involves many residues in the active site: Lys 345, Lys 396, Glu 168, Glu 211 and His 159. Mg^{2+}, Glu 211 and Lys 345 bind the 2PG. Mg^{2+} binds the 2PG at the carboxylated C1. Glu 211 forms hydrogen bond with OH of 3C by taking proton. Lys 345 deprotonates the 2C. 2C and 1C form double bond with electron flow onto the oxygen to develop it negative charge as pulled and induced by binding Mg^{2+}. Glu 211 forms hydrogen bond with OH of 3C. Lys 245 deprotonates 2C to induce negative charge on 2C with flow of negative toward oxygens of carboxyl group. The 1C and 2C form a double bond as the charge gathers on the O of 1C. The induced positive charge on the 3C by the proton of OH sharing with Glu 211pulls the double bond of 1C=2C to 2C=3C as the OH is protonated and eliminates a H_2O. As ^{16}O in Glu is replaced by ^{17}O the stronger base of the ^{17}O in Glu forms a stronger hydrogen bond with OH of 3C. As ^{14}N is replaced by ^{15}N in Lys 345 the stronger base of ^{15}N more strongly deprotonates the H from 2C. Also the replacement of ^{16}O by ^{17}O in Glu forms a stronger basic ^{17}O in the Glu for more strongly deprotonating the OH of 3C. Thereby it is very clear that the replacement of primordial isotopes by nonprimordial isotopes causes the acceleration of this step for cancer genesis. But these nonprimordial isotopes of ^{17}O and ^{15}N in the cancer cell rather than the primordial ^{14}N and ^{16}O in the normal cells produce a magnetic handle for selectively stimulating the enzyme of this mechanism in the cancer cells without affecting the normal cells. For instance, an NV center in diamond can detect the magnetic dynamics and rhythms by the enolase of this mechanism as the enolase catalyzes the dehydration and elimination on 2 phosphoglycerate so as to use the output from the NV center in the diamond to modulate RF radiation onto the cancer cell to selectively tune into the dehydration and

elimination enzymatics in the cancer cells so as to suppress and/or over drive the dehydration and elimination enzymatics in the cancer cells to kill the cancer cell for curing cancer. Also X-rays and UV rays can be used to selectively excite the ^{15}N and ^{17}O in the cancer cell so as to demagnetize the enzyme only in the cancer cell to starve the cancer cell and kill it by suppressing this ninth step of glycolysis for curing cancer. Also polarized neutrons can be absorbed into ^{15}N and ^{17}O to transmute to ^{16}O and ^{19}F to inactivate the enzyme in the cancer cell to selectively kill the cancer cell. These RF, X-rays and neutron processes would selectively terminate the glycolysis only in cancer cells to cure cancer.

Step 10

The dephosphorylation and protonation in this last step involves an enzyme that binds many Mg^{2+} and K^+ in the active site. These cations interact with the PEP and ADP in ways to prevent the reverse exothermic dephosphorylation of ATP as catalyzed by the nitrogenous and oxygenous residues in enzymes in prior step of glycolysis via proton orbitals. But in this step ten, the Mg^{2+} and K^+ interact with the oxygens in the substrate PEP in different ways so as to induce the endothermic dephosphorylation and ATP formation. In consistence with the proposed magnetics of the accelerated glycolysis by magnetic moments in the nonprimordial isotopes for this discovery, here it is important to note the magnetic moment in K^+ cations and its inhibition of the loss of CO_2 from the PEP during the endothermic process in this 10^{th} step of glycolysis. This is consistent with RBL discovery in 2005 of nuclear spins affecting rehybridizations of the oxygens and carbon centers [19] and magnetic slowing of CO_2 formation by RBL in 2014 [14]. So that the Mg^{2+} interacts with the O of PEP differently from protons so as to polarize the O without binding or hydration as in the case of p^+ and water so that the O form double bonds and the O attacks the P center for ATP formation. Thereby the Mg^{2+} interacts with the O of C1 and O of C2 so as to positively polarize these oxygens so as to pull electron density from the P center of C2 for driving a nucleophilic attack on the P center of C2 by the oxygen of β phosphate of ADP to form ATP which is also stabilized by Mg^{2+} rather than amino bases and protons for preventing the exothermic reverse for loss of phosphate to substrate pyruvate but for this endothermic gain of phosphate by ADP from the PEP. As ^{16}O in normal cells is replaced by ^{17}O on the phosphates there is an acceleration of this step for causing cancer of the normal cells. The ^{17}O accelerate this step as the negative nuclear magnetic moment slightly separates the electron pairs of its valence so the negative nuclear magnetic moment pulls one electron more and pushes the other electron of opposite spin to attack the P center of the phosphate on 2C of PEP and the positive nuclear magnetic moment of the ^{31}P pulls this single electron nucleophile of the ^{17}O nucleophile of ADP to accelerate the nucleophilic attack of the ADP on the phosphate of 2C of PEP. The magnetics accelerate this endothermic reaction. But this nonprimordial ^{17}O in the ADP and AMP of the cancer cells provide a magnetic handle to selectively separate the cancer cells from the normal cells (having nonmagnetic ^{16}O in their ATP, ADP, AMP) by the negative magnetic moment of the ^{17}O in the ATP, ADP and AMP of the cancerous cells. The NV center in diamond can detect the magnetic rhythm of the ^{17}O during the dephosphorylation in this step 10 and the NV center diamond can feed this rhythm of the cancer cells to an RF generator to provide a frequency modulated RF tuned selectively to the ATP, ADP, and AMP of cancerous

cells having ^{17}O without registering and stimulating normal cells for suppressing the cancer cell dephosphorylation in this step or over driving the dephosphorylation in this step for killing the cancer cells and curing cancer without harming the normal cells. Also X-rays and UV rays can be tuned to excite the band edge of only the ^{17}O in the ATP, ADP and AMP of these cancerous cells without exciting the ^{16}O in normal cells so as to demagnetize the pyruvate kinase of the cancer cell without affecting the pyruvate kinase of the normal cell to kill the cancer and cure cancer. Also polarized neutrons can be tuned to absorb into the ^{17}O to transmute it to ^{19}F to inactivate the ATP, ADP and AMP for killing the cancer selectively without harm to normal cells. These RF, X-rays and neutron processes would selectively terminate the glycolysis only in cancer cells to cure cancer.

Conclusion

So now the electron and nuclei the electrons move about the nuclei; and the nuclei move as vibrate in solid; but motions in gases and liquids but within the protein the nuclei have a liquidity a time crystal motion of spinrevorbitals but unlike in solids where the nuclei vibrate about some fixed lattice point. The motions of the nuclei in the proteins are superluminous and by fractional fissions of the many so they move with release of fissing fields in relative rotation revoluion and translation in interactive with mutually released fields from many other fractionally fissioned nuclei with visiting many cyclic states and in the motions they return in space to same location but still retain same amorphousness in time internally to each nucleus. But yet relative to other nuclei in the protein the space is more crystalline but there is some crystallinity in the time at different spaces.

So the protein catalyzes the substrate by the fractional fissing translating fusing these many nuclear fields about the substrates. This gives potential fields energy for the substrates to cross the reaction coordinates to form products. Specific type residues, compositions of protein, bonded in particular sequences give time crystalline patterns so timing is proper for the fields to collapse at the space of the substrate to alter the substrate catalytically with release of the fields back to residues. And such fields via water involve this enzymatics. And such fields via the water autocatalyze the protein so as to field the protein superluminously. So now the fractional fission in the H_2O translation and fusion select superluminously between primary, secondary, and tertiary interactions as superluminous nuclide kernels move in the fissing interact in the fissing and find the lowest potential energy for the native structure of the protein. So here it is predicted that as ^{17}O substitution for ^{16}O and ^{15}N substitutes for ^{14}N then the protein folding kinetics and dynamics will change. As the negative nuclear magnetic moments of ^{15}N and ^{17}O will cause backward motion of nuclei to slow folding and alter folding dynamics.

So as the nuclear moments are changed within the enzymatic proteins, then the fields the fiss, translate and fuse to the substrates will change. (with it superluminous slvent liquid crystal of nuclei in dense thermal, electrical, gravity magnetic QF, SF, WF). The liquid crystalline superluminous nuclide kernels with surrounding fields act on e- in valence and covalence in novel ways. The e- move about nuclei in conventional chemistry. And e^- can move between nuclei reversibly for covalence or irreversibly for ionic bonding: e^-can move between many nuclei for metallic nature motion with resistance due to q, E, B, and G fields. Superconduction will occur as q , E, G, and B fields goto QF between the e^- moving between nuclei. But within the protein water the nuclei move as fast as e- due to their fractional fusion as the nuclei and e^- have superfluidity within the protein in hidden ways. e move between atoms by q, E, G, B, with

dissipation to heat by conventional conductivity. But e^- move nondissipatively by RBL as q, E, G, B, and QF. And nuclei inside the protein also move with nondissipative as by q, E, G, B, and QF goto SF + WF fragments for time crystallization motion of residue and backbone of the protein. The fields and fissed kernel nuclei and e^- produce enzymatic catalytic fields to internal molecules that are not bound as strongly to the protein.

The substrates are gas and/or liquid within the protein. So now the fields push, pull, twist curl, and uncoil e^- and nuclei of substrates in new ways. The lighter fiss more so as N> Li > C > N > O > F > Na > Mg > P > S > Cl. Within the enzyme but the heavier nuclei move in the fissed fields but the lighter move faster. The relative motion superluminously causes the slip so that the field momentarily escapes and the interactions of other nuclides mutually help the escape. The escape fields are unusual to other nuclides of the protein but the similar superluminous of other residues and back bone allow reversing of the stimulating fields. But residues lack such fiss, translate fuse motions and are affected by these fields in different ways. The substrates are enzymatically catalyzed by these fields.

The enzyme fissed, translated, fused fields from the protein act on nuclei and e^- in substrates in totally novel ways so as to catalyze bond rearrangement at room temperature. The substrate nuclei are rotate/ revolve and e^- of substrate are rotate/ revolve so core, valence, covalence e^- and associated nuclei are altered to change motions of e^- in valence relative to nuclei to change motion of electron in covalence between bound atoms in substrates for bond cleavage, enzymatic catabolism to change and introduce new motions of e^- in valence into covalence between unbound atoms to form covalence for compositional enzymatics anabolism. Such fissed, translated, rotated, and fused fields come locally and globally from the amino acids in the protein. Alpha helices locally and global beta pleats fiss, translate and fuse to form bond formation in the substrate. So that the whole protein involved in enzymatics. Beta pleats locally and alpha helices globally fiss, translate, rotate and fuse to break bonds so that the whole protein is involved in the enzymatics.

In the glycolysis, the replacement of primordial ^{12}C, ^{14}N, ^{16}O, ^{24}Mg, ^{31}P and ^{32}S by nonprimordial ^{13}C, ^{15}N, ^{17}O, ^{25}Mg, ^{30}P, ^{32}P, ^{33}S leads to fractional fiss, translate, rotate and fuse fields with more nuclear magnetic moment for forward backward rotations. The residue in fiss, rotate, translate and fuse act on H_2O, PO_4^{3-} acting in C-OH. So water and substrates have HOH OP O – HO=C with nuclear moments in phosphorus. The enzymes act more directly on phosphate. So P is more important. The nuclear moment in phosphorus has nuclear spin fermion up interacting with e^- e- spin up down boson with Meissner Effect of the interaction. So with other nonprimordial isotopes of magnetic moments they couple to accelerate the enzymatics of glycolysis to cause normal cells to become cancerous. But in Kreb cycle H-O-H – H – O=C the proton spin acts on bosons of e^- with nuclear ^{14}N and ^{16}O bosonic nuclear O so proton fission fusion more directly involved with enzymatics as PO_4^{3-} is directly to the side. The amino acids act directly on sugar and also directly on PO_4^{3-} . The change in isotopes in the residue cause altered p^+ acting on O=C(O)R and alter NH, NH_3, SH, COO acting on the O=C- (R) R to suppress Kreb cycle. The negative ^{15}N ^{17}O nuclear spin and positive ^{33}S spin are repelled by ^{12}C center in sugar to suppress Kreb. But in glycolysis the ^{15}N, ^{17}O spins and positive ^{33}S spins were attracted by ^{31}P in phosphorylated sugars. The ^{12}C=O diamagnetically push out these spins in Kreb cycle to suppress enzymatics. The ^{31}P glycolysis couples and pulls in the ^{17}O ^{15}N ^{33}S in the enzymes. It may be important to consider not only magnetic moment of nuclei but also spin, magnetic moment is ratio of angular momentum / spin. But spin is just spin momentum. So the glycolysis of cancer cells can be suppressed if the ^{33}S, ^{17}O and ^{15}N nuclei are caused to repel ^{31}P.

B_{ext} can cause orienting of spins that can bind them. Dynamics B_{ext} can break the magnetism of enzyme and heat can break magnetism.

The enzyme is not like ferromagnetic like Co, Ni, and Fe. The enzyme are softer magnets and paramagnets. The nuclear spins are coupled by C-O-P, N-H-O-C, S-C=O type bonds. So the cure can rotate nuclear spins or reorient nuclear spins. The cure can alter the exchange between spins as by vibrating $e^- e^-$ up down bonds. The cure can couple to novel negative nuclear magnetic moments and $e^- e^-$ up down boson. The cure can excite nuclear spins up up to couple more energy into one spinrevorbital irreversibly. X-rays can selectively excite ^{15}N, ^{17}O, ^{33}S The X-ray penetrate. The x ray would be great as it penetrates the whole body.

Acknowledgement: I thank GOD for allowing me this reasoning. This work may go unacknowledged but as with others it is original and real.

Correspondence to redge_little@yahoo.com

Reference

1. Little R. B. (2008) The ferrochemistry of carbon nanotubes, diamond, nucleic acids and proteins: the magnetic synergism of macromolecules and life's chemical patterns. Book Chapter; Carbon Nanotubes: New Research; Nova Science Publishers. https://www.novapublishers.com/catalog/product_info.php?products_id=16065
2. Little R.B. Under review (2018)
3. Hallberg O and Johansson Cancer trends during the 20th century. (2002) J of Austrailian College of Nutritionaland Environmental Medicine. 21(1), 3-8.
4. DeVita V T, and Rosenberg A A (2012) Two hundred years of cancer research.
5. Johnson K. J., Carozza S. E>, Cho E. J., Fox E. E., Horel S, McLaughlin C. C., Mueller B. A., Puumala S. E. , Reynolds R., Von Behren J., Spector L. G. (2009) Parental age and risk of childhood cancer: A pooled analysis. Epidemiology 20(4), 475-483.
6. Li D, Chen H, Ferber J. R., Odouli R., Quesenberry C (2017) Exposure to magnetic field non-ionizing radiation and the risk of miscarriage: A prospective cohort study. Scientific reports 7, 17541.
7. Little RB (2006) Magnetocatalytic adiabatic spin torque orbital transformations for novel chemical and catalytic reaction dynamics: The Little Effect. International Journal of Physical Sciences 1(4) 175-200.
8. Zhao Y., Tyshkovskly A, Munoz-Espin D, Tian X, Serrano M., Pedro de Magalhaes J, Nevo E. Gladyshev V. N., Seluanov A., Gorbunova V. Naked mole rats can undergodevelopemental, oncogene-induced and DNA damaged induced cellular senescence. (2018) Proceeding of National Academy of Science 10.1073/pnas.1721160115
9. Millions of volts per sec on earth
10. Haber F (1922). The production of ammonia from nitrogen and hydrogen. Naturwissenschaften.10:1041-1049
11. Little RB (2008) Treatise on Resolution of Diamond . Progress in Solid State Chemistry 36 (3) 223-251.
12. *Warburg O (1956)). "On the origin of cancer cells". Science.* ***123*** *(3191): 309–14*

13. Little RB, Gex GJ, Ansari M, and Mitchell JW (2011) Magnetically controlling the explosion of Dirac fermions during the oxidation of graphene. arXiv1110.6060.
14. Little RB, McClary F, Rice B, Jackman C, Mitchell JW. (2012) Nuclear spin Hall and Klein tunnel effects during oxidation with electric and magnetic field induction in graphene. PCCP 14, 16096-16110.
15. Ali M. R. K., Rahman M. A., Wu Y, Han T., Peng X., Mackey M. A, Wang D., Chin H. J, Chen Z. G., Xiao H., Wu R., Tang Y., Shin D. M, ElSyaed MA. (2017) Efficacy, log term toxicity, and mechanistic studies of gold nanorods photothermal therapy of cancer in xenograft mice. PNAS 114(5) E3110-E3118.
16. Kirson E D, Dbaly V, Tovarys F, Vymazal J, Soustiel J. F, Itzhaki A, Mordechovich D., Steinberg-Shapira S, Gurvich Z, Schneiderman R., Wasserman Y, Salzberg M, Ryffel B., Goldsher D, Dekel E, and Palti Y. (2007) Alternating electric fields arrest cell proliferation in animal tumor models and human brain tumors. PNAS 104 (24) 10152-10157.
17. Lippmaa E T, Pehk T L, Buchachenko A L, Rykov S V, Chemically induced dynamic nuclear polarization of 13C nuclei in the thermal decomposition of organic peroxides.. Chem Phys. Lett, 5, 521-526.magnetic isotope effect buchachenko
18. Little RB (2002). Magnetic production of carbon nanotubes and filaments. US Patent (2002). US 6761871 B2.

19. Little R. B. (2005) Theory of the relativistic fermionic spinrevorbital. Sciprint.org (2005), ViXra (2012) viXra:1212.0011.
20. Adrian M, Dubochet J, Lepault J, McDowall A W (1984) Cry-electron microscopy of viruses. Nature 308 5954. 32-36.
21. a.{https://commons.wikimedia.org/wiki/File:Glycolysis_metabolic_pathway_3.svg}; Thomas Shafee
    b. Hexokinase.pdb2.jpg: Jmol development teamderivative work: Boghog (talk) - Hexokinase.pdb2.jpg, CC0, https://commons.wikimedia.org/w/index.php?curid=12012673

    c. { http://proteopedia.org/wiki/images/3/3f/Hexokinase_mechanism2.GIF}

22. Image from Wikipedia (https://en.wikipedia.org/wiki/Glycolysis)

    By Richard Wheeler (Zephyris) - en:Image:Alpha-D-glucose-6-phosphate wpmp.png, Public Domain, https://commons.wikimedia.org/w/index.php?curid=1551876

    By Deposition authors: Jeffrey, C.J., Lee, J.H., Chang, K.Z., Patel, V.;visualization author: User:Astrojan - http://www.rcsb.org/pdb/explore/explore.do?structureId=1hox, CC BY 3.0, https://commons.wikimedia.org/w/index.php?curid=48668746

    By Rob Hooft, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=920748

http://proteopedia.org/wiki/index.php/Image:Mech.png

23. a. { Image from Wikipedia (https://en.wikipedia.org/wiki/Glycolysis) }.
    b. del G
24. a. http://www.ebi.ac.uk/pdbe-srv/view/images/entry/1fdj600.png}.
    b. http://proteopedia.org/wiki/index.php/Image:Aldolase1.jpg
25. a. { https://commons.wikimedia.org/wiki/User:Dcrjsr }
    b.. http://proteopedia.org/wiki/index.php/Image:Crisscross2.png
26. { https://commons.wikimedia.org/wiki/File:GAPDH_with_labels.png}
27. { By Thomas Splettstoesser - Own work, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=27500408}
28. { By Nsae - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=3884242 }
29. { By Richard Wheeler (Zephyris) 2006. For the metabolic pathways wikiproject }
    b. {https://en.wikipedia.org/wiki/Enolase#/media/File:Enolase_mechanism2.png}
30. { Thomas Splettstoesser (www.scistyle.com) }
    b. { http://proteopedia.org/wiki/images/1/17/Pyruvatekinasemechanism.gif}
31. { by Vojtěch Dostál
    b. http://proteopedia.org/wiki/images/9/98/Aconitase.JPG
32. { By Nmorrison89, using F. Takusagawa as a reference. - Own work, using information from http://web.ku.edu/~crystal/taksnotes/Biol_638/notes/chp_16.pdf, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=15224703
33. By Jawahar Swaminathan and MSD staff at the European Bioinformatics Institute - http://www.ebi.ac.uk/pdbe-srv/view/images/entry/1aco600.png, displayed on http://www.ebi.ac.uk/pdbe- srv/view/entry/1aco/summary, Public Domain, https://commons.wikimedia.org/w/index.php?curid=6164417 }
34. { By Haynathart - Own work, Public Domain, https://commons.wikimedia.org/w/index.php?curid=3196178 }
35. { By Haynathart - Own work, Public Domain, https://commons.wikimedia.org/w/index.php?curid=3190879. }
36. By Blowry88 - Own work, CC0, {https://commons.wikimedia.org/w/index.php?curid=15234158}
37. { By Blowry88 - Own work, CC0, https://commons.wikimedia.org/w/index.php?curid=15234158 }
38. { http://jmg.bmj.com/content/43/9/755 }
    b. { http://proteopedia.org/wiki/index.php/Image:Fumarase_2.jpg}
39. { By The original uploader was Bradleyriley 2010 at English Wikipedia - Image self made using ChemDraw Standard Edition., Public Domain, https://commons.wikimedia.org/w/index.php?curid=16394762
    Pithukpakorn and others, '*Fumarate hydratase enzyme activity in lymphoblastoid cells and fibroblasts of individuals in families with hereditary leiomyomatosis and renal cell*

cancer' ; http://dx.doi.org/10.1136/jmg.2006.041087 / ;
http://jmg.bmj.com/content/43/9/755 }

Bradleyriley 2010 at English Wikipedia

40. By Malate Dehydrogenase Active Site.jpg: Pssangderivative work:Miguelferig - This file was derived from Malate Dehydrogenase Active Site.jpg:, CC0, https://commons.wikimedia.org/w/index.php?curid=30281125.
b. http://proteopedia.org/wiki/index.php/Citrate_Synthase
Vas, M, Varga, A et al. 2010. Insight into the Mechanism of of Domain Movements and their Role in Enzyme Function: Example of 3-Phosphoglycerate kinase. Current Protein and Peptide Science. Jan 21, 2010.