

# Revision and Supplement of the Theory of Dove-like Particles

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## Abstract

The theory of dove-like particles is a discussion on the reasons and mechanism of sporadic Alzheimer's disease, which was officially published on March 15, 2019. In this paper, the "basic content" of the theory of dove-like particles and the mechanism of action potential generation of Alan Hodgkin and Andrew Huxley are revised, the related contents of ion pump and sodium-potassium pump are deleted, and the discussion of "organic ions and acidity-alkalinity" is added, and at the end of the conclusion, the following contents are added: The A $\beta$  hypothesis misleads the research direction of the world's mainstream brain scientists. All the work based on the beta hypothesis has been unsuccessful. It may even become the confirmed habits are hard to get rid of "soft underbelly" of some scientists and "stumbling block" to conquered Alzheimer's disease. Its little results which seeming to be right but not so in fact is completely negligible compared with the enormous cost of human beings. Therefore, we must completely deny and abandon the A $\beta$  hypothesis from the strategic height and academic level. Trying to revision and supplement it to keep it reluctantly, it is not scientific and has no practical significance, it confuses the gap between theory and practice.

**Key words:** The theory of dove-like particles; Alzheimer's Disease; Pathogenesis; Revision and Supplement; Abandoning the A $\beta$  Hypothesis

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The theory of dove-like particles<sup>[1]</sup> is a heuristic viewpoint based on brain cell activation theory<sup>[2]</sup>. It explores the cause of disease and mechanism of sporadic Alzheimer's disease (AD) at molecular level based on the principles of cell physics biology. It elucidates the source of problems that have plagued the field of neurodegenerative diseases for a long time. The English version of the paper was published on March 15, 2019 in the American Journal of US-China Medical Science (UCMS)<sup>[1]</sup>, and the Chinese version was published on February 11, 2019 in China Sciencepaper Online<sup>[3]</sup>.

## I. Revision

Pre-revision "Basic Contents": Excess cations are transferred from extracellular to intracellular. They compete position with potassium ions on the inner surface of cell membranes, thus abatementing the membrane potential, making action potential unable to activate calcium channels normally, which eventually leads to abnormal apoptosis of brain cells. Amyloid spots are the remains of abnormal apoptotic brain cells. Amyloid plaque is the aggregation of amyloid spots by van der Waals force and electrostatic attraction, and its interstitium is amyloid protein. Brain cells consist of neurons, microglia and astrocytes in turn. Most of the spotted nuclei in the remains are cations.

The revised "Basic Contents":

Excess cations compete position with potassium ions on the inner surface of cell membranes, thus abatementing the membrane potential, making action potential unable to activate calcium channels normally, which eventually leads to abnormal apoptosis of brain cells. Most amyloid spots are the remains of abnormal apoptotic brain cells. Amyloid plaque is the aggregation of amyloid spots by van der Waals force and electrostatic attraction, and its interstitium is amyloid protein. Brain cells consist of neurons, microglia and astrocytes in turn. Most of the spotted nuclei in the remains are cations. Spots and plaque formation processes are like pearls and corals. The nomenclature of the theory of dove-like particles, to take the chinese idiom "Turtledove occupies the nest of magpies".

Other amendments:

1. Delete the title "ion pump" of section 3 of the third part of the paper. Delet the first natural paragraph.
2. Delete the sentence "sodium-potassium pump excessive consumed energy released by ATP."
3. "(1) Ion pump and epilepsy" was revised to "(1) potassium channel and epilepsy"; (2) ion pump and cancer" was revised to "(2) potassium channel and cancer".
4. Increase the section of "organic ions and acidity- alkalinity".
5. Delete "During the action potential process, the depolarization of cells is caused by the transmembrane influx of sodium ions, and the repolarization of cells is caused by the outflow of potassium ions, it was confirmed by Hodgkin and Huxley experiments: the ascending phase of action potential is caused by the instantaneous increase of  $g_{Na}$  and the influx of sodium ions, and the descending phase is related to the increase of  $g_K$  and the outflow of potassium ions." from the paper. Replace: Alan Hodgkin and Andrew Huxley recorded action potentials from inside cells for the first time, accurately guessed the protein structure of potassium channel, and established Hodgkin-Huxley model<sup>[4,5]</sup>.

Reasons for revision:

1. Excessive cations are not confined to "extracellular transfer into cells", but also include intracellular proteins below isoelectric point.
2. Amyloid spots include, but are not limited to, the remains of abnormal apoptotic brain cells. They may also be formed by bacteria and viruses, like bacterial emboli and seedless pearls.
3. It supports Hodgkin, Huxley 's experimental the results of action potential, and does not support their explanation of the mechanism of action potential generation in cells and the core ideas of "membrane theory"

and "ion theory". It typed that the main role of "sodium-potassium pump" or "ATPase" is not responsible for the transport of  $\text{Na}^+$  and  $\text{K}^+$  from the inside and outside of the cell and maintaining cell membrane potential [6-8].

## II. Supplementary Contents

### 1. Organic ions and acidity- alkalinity<sup>[9]</sup>

If a highly polar covalent bond is formed between a molecule's hydrogen atom and another atom, then when the molecule dissolves in water, the simplest chemical reaction that is of great significance to cells occurs. The hydrogen atom of this molecule almost completely transfers its electrons to neighboring atoms, forming a positively charged nucleus, a proton ( $\text{H}^+$ ). When this polar molecule is surrounded by water molecules, protons are attracted by the local negative charge of oxygen atoms in adjacent water molecules. This proton left from an atom that was originally bound and then combined with the oxygen atom in the water molecule to produce a hydrated hydrogen ion ( $\text{H}_3\text{O}^+$ ).

The substance that dissolves in water and releases protons ( $\text{H}^+$ ) to form the hydrated hydrogen ion  $\text{H}_3\text{O}^+$  is called acid. The higher the concentration of  $\text{H}_3\text{O}^+$  is, the stronger the acidity of the solution is. The concentration of  $\text{H}_3\text{O}^+$  is expressed logarithmically and is called pH. pH 7.0 is neutral, more than 7.0 is alkaline and less than 7.0 is acidic. That corresponding to acid is alkali. Any molecule that can receive protons is called a base. Like acids, acids provide protons and transfer them to water molecules, thus increasing the concentration of  $\text{H}_3\text{O}^+$ . Therefore, the nature of alkali is to make the water molecule lose one proton, thus increasing the concentration of  $\text{OH}^-$  ion. Therefore, NaOH is alkaline because it dissociates in aqueous solution to form  $\text{Na}^+$  and  $\text{OH}^-$ .

Protein molecule is composed of a long chain of amino acids, and the adjacent amino acids are linked by covalent peptide bonds. Amino acids are the basic constituent units of proteins. Some amino acids are nonpolar and hydrophobic, and some are positively or negatively charged. For any protein, they have a characteristic pH, which is called isoelectric point. At the isoelectric point, the protein has not any charge, so it does not move in the electric field. Proteins are negatively charged at high pH and correspond to alkalinity; proteins are positively charged at low pH and correspond to acidity.

Important weak bases in many cells contain the  $-\text{NH}_2$  group, which can obtain one proton from water to produce  $\text{OH}^-$ :  $-\text{NH}_2 + \text{H}_2\text{O} \rightarrow -\text{NH}_3^+ + \text{OH}^-$ . One  $\text{OH}^-$  ion and one  $\text{H}_3\text{O}^+$  ion combine to form two water molecules, so the higher the concentration of  $\text{OH}^-$  ion, the lower the concentration of  $\text{H}_3\text{O}^+$  and vice versa.

There are 20 kinds of amino acids in protein. The side chains that each amino acid linked to  $\alpha$ -carbon atoms is different. Among them, the side chains of the five amino acids can form ions in the solution, which can carry charges, while the rest are not charged. Negatively charged are aspartic acid, glutamic acid, arginine, lysine and histidine. Containing polarity but not charged include asparagine, glutamide, serine, threonine and tyrosine.

For living cells, the more important thing is weak base, which can get one proton from water molecules.

### 2. Additions at the end of the paper

The  $\text{A}\beta$  hypothesis misleads the research direction of the world's mainstream brain scientists. All the work based on the  $\text{A}\beta$  hypothesis has been unsuccessful. It may even become the confirmed habits are hard to get rid of "soft underbelly" of some scientists and "stumbling block" to conquered Alzheimer's disease. Its little results which seeming to be right but not so in fact is completely negligible compared with the enormous cost of human beings. Therefore, we must completely deny and abandon the  $\text{A}\beta$  hypothesis from the strategic height and academic level. Trying to revision and supplement it to keep it reluctantly, it is not scientific and has no practical significance, it confuses the gap between theory and practice.

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