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Genetic and environmental factors in skin color determination

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Abstract

The origin of skin color has been significantly a discussion of importance among human biology scientists, anthropologists and others interested in evolution of human skin color. Experience was done to chimpanzee and other primates shared almost the same characters with mankind, and this impressed scientists to know what makes difference in skin color among people. Different researches conducted to know the real cause of dark skin and light skin among people of the same origin. There are no other results found out of permanent variation happened to our ancestors based on geographical location. Environmental factors played a huge role in skin color determination. High UVR has been led to dark skin color and low production of UVR led to lightly skin. By natural selection genes responded to environmental conditions for a human to survive in his own environment. Melanin production came as a response to UVR to protect against consequence of UVR in low latitude regions. Depigmentation happened due migration from low latitude to high latitude regions and led lightly skinned color for our ancestors. Everyone has skin color due to ancestry antique geographical location.

Keywords: *Skin color, Environmental factors, Human skin, Melanin, Ancestors*

1. Introduction

Human skin color has been discussed recently by researchers and scientists, and brought confusions in human knowledge. To understand origins of human skin color brought us to human evolution background and its reality. Since expanding of human population from Africa to other parts of the globe, different genetic variations have occurred. Genetic variation can lead to phenotype change. Natural selection is key fact to show the reality of the origin of human skin color. Genes adapt to environment and this may bring permanent change in human genome, external environment is agent of human skin color and influence genes responsible to human skin color (Franks and Munshi-South, 2014).

Genetic adaptation and natural selection need to be understood by scientists to clarify both environmental and genetic contribution in human skin color pigmentation. Genetic variation is correlated with our ancestry history, mankind migrated from Africa to other parts of the World and changes happened depending on geographical distribution. Adaptation to environment has been a key factor for permanent variation of mankind

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starting from our ancestries. Scientists did not describe about original human skin, was it black? Or white? Evolution has changed things until you cannot identify original skin color of a human (Harold F Blum, 1969; and Sunyaev, 2003).

Human species happened due to natural selection. Discrimination has grown in human races; due to skin color but skin color and its evolution show us the reality of natural selection of Charles Darwin. Scientists and anthropologists wondered for long about human races and its origin, and some of them differentiated human species and confirm that some species are privileged than others, whatever you consider, human races comes from natural selection. Instance on genetic participation has been also a challenge to scientists, but permanent genetic variation that happened to ancestors created human races. Genetic cope with environment for adaptation which lead to permanent changes of human genome. This paper explains both environment and genetic participation in skin color pigmentation. It responds to questions related to skin pigmentation and explain origin of skin color (Costin, 2007; and Alfred R Wallace, 1864).

2. Environment and Skin Color Determination

Human skin color difference has brought discussions and confusions among scientists interested in human race origin and evolution. Globally, to differentiate people's group we refer to their skin colors and their subgroup can refer to this physical trait. Environmental factors have been put in consideration during different evolution of human skin color including theory of natural selection by Charles Darwin who rejected human species difference based on skin color (Walter C Quevedo, 1985). Now how do we explain skin color difference due to environment? Now do we scientifically confirm that human skin color changed due to environment? Skin color change is affected by environmental conditions due to UVR capacity. High UVR leads to dark skin evolution. Skin color of a human is different rather than other primates. It has plenty of sweat glands that facilitate sweating to make the skin cool in a hot climate. The interested thing here is how human skin got pigmented. It is based on melanin pigment. As other species of primate, a human is a primate and act the same characteristics and long ago, some chimpanzees born with hair and lighter skin, but after exposing to the sun, their face became dark skinned (Nina G. Jablonski, 2004).

Chimpanzees are our near relatives and what happened to chimpanzee happened to mankind. Melanin is produced from melanocytes to respond to high UVR and this phenomenon is shared among primates. primate lived in equatorial regions experienced hair loss, and losing hair exposed them in dangers from environmental chemical and UVR, this is why permanent pigmentation happened to people located in sunny regions, mostly in Africa to fight against UVR consequences. Evolution of current human being are from Homo sapiens who evolved in Africa, and exercised skin evolution in sunny environment where UVR is too much, he was dark skinned for his protection to dangers from UVR. Scientists need understand well this concept, our ancestors were to adapt to environment, skin pigmentation is due high UVR not explains a certain race. Lightly skin developed due to low UVR location of our ancestors (Rouzaud, 2006).

First ancestors were to spread; leaving from UVR region to low UVR region led to depigmented skin color development or lightly skin color. This depigmentation was limited to ancestors but also to descendants exercising the same environmental conditions and this has been permanent and cause discrimination and created races in human populations which is not true in scientific analysis of human skin evolution (Paul Tanner, 2013; and Gregory S Barsh, 2003).

3. Genetic Variations in Skin Color Determination

Genetic variations among genes and cells responsible of skin color determination, has put researchers on pressure since the evolution of science. Among one hundred genes that contribute to skin color, few of them about three-four genes play a remarkable role in the process which includes melanocortin 1 receptor (MC1R), Kit ligand gene Kitlg and SLC24A5. Skin color reflects the pigmentation effect of skin by melanin, melanin is a pigment produced by skin cells called melanocytes and it has two types which are pheomelanin and eumelanin. Persons whose skin color is darker they have high levels of eumelanin where as those whose skin color is lighter the dominant melanin is pheomelanin (Ze'ev Hochberg, 2010).

Normally the production skin pigment is controlled by genes, which work together to result into your final normal skin color according to which melanin and dominant genes present in your skin. The question that was and still being asked is "what makes us look different on your skins?, researches have been conducted to determine genetic differences that makes us look different , some found that black Africans , Europeans and west Asians have similar genetic variations in when studied and compared in their respective regions

(geographic locations). And this would simply signify that physical impact (environment) had more to work with skin color determination, due to ancestral spread from Africa to other current parts of the globe (Sunderland, 1999; and Jefferson M Fish, 1998).

From here the theory of nature selection defines it very well, genetic adaptation which took many generations to permanently change of genetic compositions especially skin color genes of populations in their regions. In response to environmental exposure changes happen onto human skin which also affects the amount of pigments produced, therefore there is no single factor to determine individuals' skin color neither genetic nor environmental rather a combination of these two factors (Peter W Post, 1977; and Wolf, 2000). Melanin protects skin from ultraviolet lights, which can damage the skin in cases of low melanin production including skin cancer (melanoma) which is common in populations with lighter skins or whites with low melanin levels. Melanin is being produced in form of pheomelanin which is later converted into eumelanin (dark skin), the more skin gets dark more it's effective to protect itself from UV lights. In regions of heavy sun seasons melanocytes respond to high ultraviolet lights by producing higher amounts of melanin compared to people in regions of low sun (Bruce Bower, 2014). Genetic mutations which involved alterations in DNA sequences in centuries ago led to a bit of genetic differences among light skinned populations and dark skinned in respective regions. Both highly pigmented with melanin and less pigmented skins, however each is group is surviving in its environment, there is no disadvantageous nature of their skin biology. Dark skinned individuals have higher amount of melanin which makes their skin more protective from UV lights, unfortunately UV lights helps in vitamin D production therefore melanin may somehow inhibit normal vitamin D production. Like lighter skinned individuals who don't easily get UV lights from sun also at a risk of getting trouble in manufacturing vitamin D (Michaela Brenner, 2007).

4. Conclusion

Skin color has been a factor to classify people in different races globally. This is not scientifically proved. Evolution of science showed that evolution of mankind came up with different variation in a human being. Environmental conditions and genetic variation are agents of skin color determinations and all changes to human skin are related to climate condition and this happened to our ancestors, and faced permanent change of the skin color as well permanent variation as genes responded to environment. People are from the same origin but skin color came due to environmental conditions and genetic permanent variation.

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