Brief Report
Volume 8:3, 2022

Journal of Food & Industrial Microbiology

ISSN: 2572-4134

Open Access

The Evolutionary Implications of Vitamin D

Jiang Paul*

Institute for Aging Research, Hebrew SeniorLife, 1200 Centre Street, Boston, MA, 02131, USA

Introduction

The development of biological processes and their adaptation to environmental changes are primarily driven by evolution. The adage "Nothing in biology makes sense except in the light of evolution" emphasises how important evolution is to understanding how these processes work. In light of evolution, this review will address vitamin D, its nuclear receptor (NR), VDR, and their molecular function. Vitamin D was first recognised as a vitamin exactly 100 years ago because it can treat experimentally caused rickets in rats and dogs. This and numerous other studies connected vitamin D to calcium homeostasis and bone remodelling since rickets is a bone malformation illness that affects youngsters. However, vitamin D also controls a number of other biological functions, including detoxification, energy metabolism, and innate and adaptive immunity, in addition to calcium homeostasis. In actuality, vitamin D's connection to bone remodelling emerged as one of the vitamin's most recent evolutionary activities [1].

Description

A four-ring structure, a hydroxyl group at carbon (C)3, and a flexible side chain are all features of the lipophilic compounds known as sterols. The utilisation of sterols in cell membranes distinguishes eu- and prokaryotes from one other. The so-called great oxidation event caused a sharp increase in atmospheric molecular oxygen (O_2) concentrations about 2.45 billion years ago. As a result, complex eukaryotes were stimulated to grow with the aid of new enzymes and metabolic pathways. A prime example is the manufacture of sterols, which calls for four distinct types of oxygen-consuming enzymes. Furthermore, oxidative phosphorylation, a type of aerobic metabolism, greatly boosts the production of energy from nutrients. The fundamental function of several of these novel enzymes and pathways, which may have also been the principal function of sterols, was to defend against oxygen toxicity. As a result, the occurrence of oxygen and sterols is complicated; without oxygen, sterol synthesis cannot occur, and many sterols offer protection from the harm caused by reactive oxygen species and oxygen dioxide. Some sterols can also be thought of as oxygen sensors [2].

Since the beginning of life on Earth, the possibility of harmful intruders has exerted a tremendous selective pressure on the evolution of defence mechanisms like the immune system. Since the beginning of evolution, many non-vertebrate organisms, including insects, have had the innate immune system. It uses a small number of pattern recognition receptors that can only identify the broad features of potential infections and involves several barriers, including skin and mucosa. Contrarily, the adaptive immune system, which utilises antigen receptors like B and T cell receptors that have a very high affinity and specificity to their antigens, evolved about 500 million years ago in ectothermic cartilage fishes [3].

While many modern humans had blue eyes due to mutations in their *OCA2* gene, they all had dark complexion like their African predecessors when they first arrived in Europe some 42,000 years ago. They outnumbered the ancestors Neanderthal hominins, who had been present in Europe for almost 400,000 years, through interbreeding. Overall, modern Europeans have 2.3 percent on average of Neanderthal DNA in their genomes. These hunter-gatherers initially inhabited ice-free southwestern Europe before beginning to invade northern Europe between 11 and 12 thousand years ago. The evolution and timing of characteristic changes within European populations had been revealed using archeogenomic data. First, people from northwest Anatolia migrated across southern Europe between 8400 and 6000 years ago [4,5]. By teaching the hunter-gatherers about agriculture, or the domestication of animal and plant species, these Anatolian farmers kicked off the Neolithic revolution in Europe. Additionally, the Anatolian farmers passed on to the native European population their lighter skin *SLC24A5* gene variation through interbreeding. Yamnaya pastoralists from the Eurasian steppe entered Europe in a second wave about 5000 years ago and settled primarily in the North. They gave the pre-existing European populations the horse, the wheel, their Indo-European languages, and lighter complexion as a result of SNPs in their *SLC45A2* and *SLC24A5* genes. Thus, the variance in skin tone (as well as many other features) of modern Europeans can be explained by the relative admixture of the hunter-gatherers, Anatolian farmers, and Yamnaya pastoralists [5].

Conclusion

In fungi, some plants, and animals that scavenge UV-B light, vitamin D2 and vitamin D3 first began their "career" more than a billion years ago. The endocrinology of vitamin D and the physiologically active form of vitamin D evolved just half a billion years later. The bulk of human populations are not suited to a diet centred on seafood; hence, vitamin D deficiency has become a widespread issue. More than a billion people suffer from vitamin D insufficiency worldwide, which can lead to health issues like bone deformities and weakened immune systems.

Conflicts of Interest

The authors declare no conflict of interest.

References

1. Levine, Michael A. “Diagnosis and management of vitamin D dependent rickets.” *Front Pediatr* 8 (2020): 315.
2. Bouillon, Roger, Geert Carmeliet, Liesbet Lieben, and Mitsuhiro Watanabe, et al. “Vitamin D and energy homeostasis-of mice and men.” *Nat Rev Endocrinol* 10 (2014): 79-87.
3. Sessions, Alex L., David M. Doughty, Paula V. Welander, Roger E. Summons, et al. “The continuing puzzle of the Great Oxidation Event.” *Curr Biol* 19 (2009): R567-R574.
4. Raymond, Jason, and Daniel Segrè. “The effect of oxygen on biochemical networks and the evolution of complex life.” *Sci* 311 (2006): 1764-1767.

***Address for correspondence:** *Jiang Paul, Institute for Aging Research, Hebrew SeniorLife, 1200 Centre Street, Boston, MA, 02131, USA; E-mail: Paul.jiang1449@gmail.com*

Date of Submission: 03-May-2022, Manuscript No. jfim-22-70385; **Editor assigned:** 05-May-2022, PreQC No. P-70385; **Reviewed:** 19-May-2022, QC No. Q-70385; **Revised:** 24-May-2022, Manuscript No. R-70385; **Published:** 31-May-2022, DOI: 10.37421/2572-4134.2022.8.246

5. Haak, Wolfgang, Iosif Lazaridis, Nick Patterson, Nadin Rohland, et al. “Massive migration from the steppe was a source for Indo-European languages in Europe.” *Nat* 522 (2015): 207-211.

How to cite this article: Paul, Jiang. “The Evolutionary Implications of Vitamin D.” J Food Ind Microbiol 8 (2022): 246.