



Evolution of First Life without Oparin (Primordial Soup) Theory of Evolution: a Critical Review

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Abstract

Oparin theory (also known as Oparin- Haldane theory) states that the first life was formed by a series of chance actions in the ocean and appears to have been the ancestor of the primitive cell- the first form of life. Currently this theory is known as the most modern and naturalistic theory about origin of the first life. Organic compounds are still present in huge amount in this planet, so life could be generated to it, and newer species of unicellular organisms could be produced frequently. But it is not happening at all. Modern cell theory, principle of biogenesis and Vitalism does not agree with Oparin theory at all. World renowned classical scientists such as Francesco Reddi, Antony Van Leuwenhok, Abbe Spallazani and Louis Pasteur were proved by different experiments that life does not come spontaneously from organic matter or any other sources, and a life only comes from a life. If Oparin theory be right then the classical experiments about the abiogenesis of the above scientists will be proved as wrong, as well as they become as nonscientist; but nobody will admit this. Recent theory of Nick Lane (origin of life at a special kind of deep-sea hydrothermal vent) and Helen Hansma (possible origin of life between mica sheets) opposed Oparin theory. Father's of modern evolutionary theories such as Buffon, Lamarck and Darwin believed that life was first breathed by the Creator.

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1. Introduction

Mankind, who does not believe on special creation theory, has long sought to learn when and where life was originated. Furthermore, they investigated the ways through which enormous kinds of animals and plants have come into life form. They also proposed various theories on the origin and evolution of life on the earth surface and tried to put evidences in support of their theories. In 1924, the Russian biologist A. I. Oparin published in Moscow a short monograph entitled 'The Origin of Life' (Parves and Orians, 1987). Five years later (in 1929) J. B. S. Haldane also arrived at the same idea independently (Campbell, 1996). The theory is thus also known as Oparin-Haldane theory of origin of life. Oparin theory argues that life was evolved from organic chemicals (H_2O , CH_4 , and NH_3) in the primitive seas at the time when earth atmosphere was free from oxygen (Gerking, 1974; Verma and Agarwal, 1999). The first cells were formed by a series of chance actions. The primordial atmosphere of the earth had water, methane, and ammonia. These compounds tended to be washed out by the driving rainwater, collected in the oceans and appear to have been the ancestor of the primitive cell—the first form of life (Raven et al., 1980) and UV radiation provided the energy to

convert methane, ammonia and water into the first organic compounds in the oceans of the early earth (Lane et al., 2010). It is declared that from this simpler organism, all species of living organisms have been evolved through gradual changes over vast period of time. Even human beings, like all other plants and animals, have been evolved from this simpler organism (Buffaloe, 1963; WBES, 1994).

Oparin sometimes is called 'Darwin of the 20th century' (Wikipedia, 2010) and currently this theory is known as the most modern and naturalistic theory about origin of the first life on earth (Storer et al., 1980). Supporting this theory in 1953, two American chemists Stanley Miller and Harold Urey at the University of Chicago produced amino acids by chemical synthesis using Miller apparatus. An electric current was passed through a mixture of methane, ammonia, hydrogen and water and showed that some amino acids could be synthesized from ammonia and methane. So, the idea of spontaneous origin of life gained scientific acceptability. The experiment is now famous and the theory still prevails today (Chadwick, 2005; Young, 2006). The result of this experiment and many other similar tests support the Oparin's hypothesis, as it produces the biologically important molecule like amino acid (Bernstein and Bernstein, 1982). As a result, most biologists agree



that early form of life arose naturally from non-living matter (Simpson and Beck, 1969; Hickman, 1970). But there are also opposition group and they do not believe this theory. Nick Lane (University College London) drew attention that first life arose from gases (H_2 , CO_2 , N_2 , and H_2S) and the energy came from tied together geochemical gradients created by mother earth at a special kind of deep-sea hydrothermal vent (Lane et al., 2010). Moreover, Helen Hansma (University of California, Santa Barbara) stated that mica sheets might be a good place for the origins of first life. The energy needed for life to evolve from non-living molecules might have come simply from the sun and the waves (Hansma, 2010). These two recent theories do not support Oparin theory. Graham (1986) questioned that as the same ingredients, which made the first life are still existing; why they cannot produce any life again and again? Lapointe (1995) pointed out that evolutionists confirmed that life resulted from non-life, and matter resulted from nothing, each of these is an impossibility of science and the natural world, and even common sense cannot account for it.

Therefore, it is necessary to remove this contradiction for the cause of biological science. But a review of literatures reveals that such type of work is scanty in the world. This paper would give a clear and elaborate idea about Oparin's theory, its weakness as well as its optimistic side, and would come to a conclusion whether the theory is correct or not.

2. Impossibility of Arising of a New One-celled Organism through Abiogenesis

Organic compounds are still present in huge amount in this planet, so life could be generated from that and newer species of unicellular organisms could be produced frequently. But it is not happening at all. World renowned three American geneticists (E. D. Sinnott, L. C. Dunn, and T. Dobzhansky (one of the originators of modern synthetic theory) drew attention in their 'Principles of Genetics' (5th Edn.) that a living individual always arises from another living individual of the same species and never from another species or from lifeless matter (Sinnot et al., 1998).

Furthermore, living organisms are mainly composed of 21 elements with varying percentages such as C-0.03, H-0.10, N-trace, O-46.06, P-0.10, S-0.05, Na-2.90, Mg-2.10, Cl-0.05, K-2.60, Ca-3.60, Fe-5.00, etc. (Wallace, 1990). Spontaneous chemical evolution of one-celled organism in the primitive sea means that naturally occurring 21 scattered elements would had to mix in the same place in appropriate percentage. Moreover, not only these 21 elements simultaneously need to come together in precise sequence but also have to form appropriate amount of protein (71%), carbohydrate (5%), lipid (12%) and nucleic acid (7%) with their specific components such as

amino acid, fatty acid, glycerol, etc. with a proper sequence by different bonds as found in protein, carbohydrate and nucleic acid of different living organisms.

Ranganathan (1988) pointed out that survival of a cell needs all its basic organelles (parts) with their various functions. Therefore, if a cell had to evolve, it means that numerous parts would have had to come into survival at the same time, in the same place, and then simultaneously come together in a precise order. According to Meyer (2003), Oparin assumed that in the early atmosphere there was no free oxygen. But geochemical studies showed that significant amount of free oxygen was also present there. World renowned classical scientists Francesco Reddi (1623-1698), Antony van Leauwenhok (1632-1723), Abbe Spallazani (1729-1794) and Loius Pasteur (1822-1895) proved by different experiments that life does not come from organic matter or any other sources spontaneously, and a life only comes from life (Cockrum and McCauley, 1965; Kimball, 1974; Purves and Orians, 1987). If Oparin theory be right then the classical experiments of these world renowned scientists will be proved as wrong, and will be considered as unscientific; but nobody would admit this.

Furthermore, many biologists consider Oparin theory as a hypothesis. Such as Bernstein and Bernstein (1982) cited this theory as a hypothesis in his book 'Biology: the Study of Life'. Besides these, if the first cell was a prokaryotic why does single microorganism, e.g. bacteria, which were evolved about 3.5 million years ago, exist as prokaryotic, and did not evolve into another animal?

3. How the Miller Experiments Support Oparin Theory?

The evolutionary scientists claim that evolution of life from organic compound is right, as Miller (1953) was able to produce amino acid, the basic molecule of any life, through Miller apparatus. But is it possible under natural condition? Again, they are successful to produce amino acid only, but still biologists are unable to produce a one-celled organism like protozoa or bacteria. Even they are unable to produce a single molecule of carbohydrate. The themes of evolutionists are such that all were possible during that time but it is quite impossible now. Purves and Orians (1987) asked why in nature, a cell cannot simply be formed by a combination of its organelles, nor has such a chance of synthesis could be achieved in a laboratory. This situation raises the important question, i.e. where did the first cell come from?

4. Chemical and Biochemical Impossibility of Chemical Evolution

According to the Oparin theory, the primitive seas must have accumulated a thick solution—soup of organic molecules. But



recent calculations suggest that organic content of the primitive seas could have been 10% only (Case, 1979). Likewise, Meyer (2003) drew attention that in recent years this theory has severe, even fatal criticisms such as i) geochemists have failed to find any evidence of the nitrogen-rich 'pro-biotic soup' required for Oparin model; ii) new geological and geochemical evidences suggest that pro-biotic atmospheric conditions were antagonistic to the production of amino acids and other essential elements of life. Vuletic (2003) pointed out that nucleic acids could not replicate without the help of proteins. Protein, however, cannot be formed unless specified by nucleic acid sequences. Thus, genetic systems naturally could not have started. He also pointed out that in nature, equal amounts of left-handed and right-handed amino acids are formed. So, one would expect it to occur in equal proportions in living organisms, if abiogenesis were true. But surprisingly all the amino acids in living organisms are left-handed!

5. Mathematical Impossibility of Spontaneous Origin of First Life

The Swiss mathematician Eugene Gai calculated that the possibility of naturally occurring C, H, N and O₂ to mix together forming a protein molecule has the probability of 1/16000 (Monsma, 1958); which is tiny enough, so may be ignored. The biologist Lecomte du Nouy calculated in his book 'Human Destiny' that according to the laws of probability, the emergences of living organisms from inorganic molecule would have been less than one in a hundred billion, which is too small and may be ignored. He furthermore noticed that there were no experimental evidences to support the Oparin theory (Christian, 1977).

As well, there is $n!$ (n factorial) ways of an enzyme (or DNA strand) of n parts to form pro-biotically. Since the smallest proteins have at least 100 amino acids, the chance of forming a particular enzyme pro-biotically is at most 1/100, which is little enough and so may be disregarded (Meyer, 2003). Mayer (2003) supplemented that scientists not known for a loyal assurance to materialistic philosophy now admit that materialistic science in no way be sufficient to explain the origin of life.

6. Controversy between Cell Theory and Oparin Theory

The cell theory is one of the greatest foundations of biology (Simpson and Beck, 1969). It still remains as a very important concept (Gupta, 1997). According to cell theory, a cell comes only from a pre-existing cell; on the other hand, Oparin theory declared that the first cell was evolved from organic chemicals (H₂O, CH₄, and NH₃) in the primitive seas. So, Oparin theory violates the universally accepted 'cell theory' as stated hereunder.

According to the law of cell theory put forward by the German physician, anthropologist and father of modern pathology Roudolf Virchow, a cell comes only from a cell, which is the basic theory of modern biology (McElory et al., 1975).

Starr and Taggart (1989) and Gupta (1997) drew attention that all new cells arise only from pre-existing cells.

Nobel laureate Watson (1977) pointed out that cell theory is the second great principle of biology of the 19th century and this is universally accepted. This theory explains that all cells come from pre-existing cells (*Omonia cellula e cellula*). Comparable judgments have also been forwarded by Wallace (1990), and Sinha and Sinha (1997).

So, cell theory does not support Oparin theory.

7. Contradiction between Principle of Biogenesis and Oparin Theory

According to the law of biogenesis, a life only comes from life. It is commonly understood that new organism whether a simple or complex one comes from concerned parents (Buffaloe, 1963). Two American geneticists Brewer and Sing (1983) conformed that life comes only from pre-existing life.

Oparin theory, of course, is unproven and an improvable assumption. The probability of life originating from non-living matter through a chemical evolution by an accident is comparable to the complete dictionary resulting from an explosion (blast) in a printing supermarket (Ranganathan, 1988).

World-renowned geneticist Strickberger (1996) drew attention that the birth of new organisms arises only through the continuity of life. He quoted the words of Pasteur, 'Every living thing comes from a living thing' (*Omne vivum e vivo*).

Vuletic (2003) acknowledged that the law of biogenesis is universal but Oparin theory does not obey this major law of biological science.

8. Contradiction between Modern Evolutionary Theory and Oparin Theory

Georges-Louis Leclerc de Buffon (1707-1788), the father of evolution, originally believed that all organisms had been especially created for different ways of life (Starr and Taggart, 1989; Wallace, 1990; Purves and Orians, 1987).

Lamarck also believed the same opinion. According to him, life had been created in the past in a simple state (Starr and Taggart, 1989).

Darwin too did not believe about the arising of the first life from organic compounds. In the words of Darwin, 'I should infer from analogy that probably all the organic beings, which have ever lived on the earth, have descended from someone primordial form, into which life was first *breathed by the Creator*' (Darwin, 1859). 'There is grandeur in this view of life, with its several



powers, having been *originally breathed by the Creator into a few forms or into one*' (Darwin, 1859).

9. Contradiction between Vitalism and Oparin Theory

The idea of vitalism is that life has a unique spiritual property that is quite distinct from those ascribed (attributed) by chemical and physical laws (Wallace, 1990).

Today, we take for granted the 'common sense' approach of the scientific method and the validity of cause-and-effect reasoning. During Darwin's time, however, this was not the case. Biologists were divided over two philosophies of living processes, which we now call vitalism and mechanism. Vitalism is the philosophy of life that views life processes as depending for their efficiency upon forces that exist in addition to physical and chemical ones. Mechanism, in contrast, views life processes as depending exclusively upon physical and chemical principles. For example, suppose a question were to arise over why the pancreas of a higher animal body secretes pancreatic juice at exactly the right time in the digestive process. Assuming that neither knows the answer, the vitalist might answer, 'It secretes its product because it is supposed to'. The mechanist however, would probably say, 'I don't know, but I believe that there is an answer which can be understood in terms of physics and chemistry. Now which of these answers is the satisfactory? Vitalist's answer implies that the pancreas possesses built-in intelligent or that has been set in an operation directly by supernatural force and his answer is a dead end; it will never lead him any closer to solving the problem. Although the mechanist is obliged to confess ignorance in this case, his is the answer that leads to a hypothesis and hence to investigation of the problem' (Buffaloe, 1963).

Scientists still cannot say exactly what life is and how it began (Wallace, 1990). It implies that scientists still do not believe Oparin theory as well as any other theory of evolution of first life.

10. Contradiction between the Law of Thermodynamics and Oparin Theory

The second law of thermodynamics rules out abiogenesis. This law states that disorder in the universe always increases; therefore the universe could not have started in an ordered state unless it was 'wounded up' by a Creator. For life come into existence spontaneously would be like a whirlwind blowing through a junkyard assembling the loose parts into a functioning pickup truck (Vuletic, 2003).

'Despite bioenergetics and thermodynamics rejecting the 81-year-old concept of primordial soup (Oparin theory) it remains central to mainstream thinking on the origin of life', Opined William Martin, an evolutionary biologist from the Institute of Botany in Düsseldorf. He also stated that soup has no capac-

ity for producing the energy vital for life (Lane et al., 2010). It has also been testified that thermodynamic constraints mean chemiosmosis is strictly necessary for carbon and energy metabolism in all organisms that grow from simple chemical ingredients (autotrophy), today, and presumably the first free-living cells. They questioned that how the earliest cells might have bound a geochemically created force and then learned to make their own? (Lane et al., 2010).

11. Nick Lane and Helen Hansma Theory Oppose Oparin Theory

Lane et al. (2010) drew attention that new research rejects 80-year-old theory of Primordial Soup (Oparin theory) as the origin of life. They pointed out that early life began in a 'primordial soup' of organic molecules (Oparin theory) but today the 'soup' theory has been over turned in their pioneering paper in BioEssays. They claimed that it was the earth's chemical energy, from hydrothermal vents on the ocean floor, which kick-started early life. Lane and his team provided this new perspective as the old and familiar view (Oparin theory) would not work at all. They mentioned that life arose from gases (H_2 , CO_2 , N_2 , and H_2S) and the energy came from tied together geochemical gradients created by mother earth at a special kind of deep-sea at alkaline hydrothermal vent. Lane concluded that it is far from being too complex to have powered early life, it is nearly impossible to see how life could have begun without chemiosmosis. It is time to cast off the shackles of fermentation in some primordial soup as 'life without oxygen' (Lane et al., 2010).

Besides this, Hansma (2010) refused Oparin theory and opined that mica sheets might be a good place for the origin of life that can move up and down in response to flowing water, which could have provided the mechanical energy for making and breaking chemical bonds. The energy needed for life to evolve from non-living molecules might have come simply from the sun and the waves (Hansma, 2010).

Mader (1997) point out that the transformation of non-living matter into living matter still astonishes and challenges investigators.

Castro and Hubner (1997) confirmed that any theory might overturn at any time by new evidence. So, Oparin theory of evolution might be rethought.

12. Conclusion

Oparin theory, Nick Lane theory and Helen Hansma theory about origin of first life reject each other. However, modern cell theory, principle of biogenesis, Vitalism and law of thermodynamics does not agree with Oparin theory at all. Even fathers of modern evolutionary theories such as Buffon, Lamarck and Darwin believed that life was first breathed by the Creator. Furthermore, so many weaknesses of 'Oparin theory' and other



theories showed that the *life must be created by the Creator*.

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