Molecular Evolution of New Species without Modern Synthetic Theory (neo-Darwinism)

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Abstract

The modern synthetic theory (neo-Darwinism) is an extension of Darwinian Theory of evolution. It is a combination of mutations and natural selection. Both Darwinian and synthetic theory are based on mutation and population genetics. This theory is accepted by the most biologists. It advocates that molecular evolution occurs through the changes of gene structure or frequency via the agents of this theory especially by mutation. But mutations are random changes of DNA. Most mutations are homozygous recessive and harmful. It inhibits metabolic processes and produces dangerous diseases as well as opposed molecular evolution of new species. If accidentally possible (either naturally or artificially), this change is might be within the species and form variety (or race or strain). But aquirring of status of this variety to a species is less possible due to segregation and failure to gain reproductive isolation.

1. Introduction

All species of living organisms have evolved from simpler organisms over a vast period of time. Human beings, like all other plants and animals, have evolved from simpler organisms (WBES, 1994). According to Darwin, member of the same class evolve from same progenitor through natural selection (Darwin, 1859). The modern synthetic theory of evolution emerged around the middle of the 20th century from the ideas of Dobzhansky**,** Mayer, Simpson, Fisher, Haldane, Muller, Stebbins and Strutevant, which is based on genetic principles (Gardner et al., 1991). This theory is a combination of mutation and natural selection (Pai, 1986). Moreover, there are many other agents of synthetic theory put forwarded by different biologists such as, genetic drift, isolation recombination and hybridization. However, natural selection plays the driving and controlling force of evolution (Rastogi, 1994). Synthetic theory is the most modern theory of evolution and accepted by the most biologists (Ingold, 1977). It provides sufficient explanation of the evolutionary process (Grove and Newell, 1974; Young, 1986; Saunders, 1988).

On the other hand, there is a contradiction about this theory. Behe (1996) opined that many biological and biochemical systems are irreducibly complex at their molecular and cellular levels. So, evolutionary theory cannot be applied to the evolution of a life at this fundamental level. It is cited that synthetic theory is not a theory of evolution; it is tautology (true by definition) only. This theory is simplistic and false but widespread (Futuyma, 1984). The whole structure of this theory is being attacked from disciplines ranging from paleontology to molecular biology (Pollard, 1984). Likewise, it depends on the theoretical separation between organism and environment which is invalidated in the light of modern contemporary knowledge (Ho, 1988). Besides, the recent realization of genomic organization opposes this theory (Pollard, 1988). Even Darwinists, socio-biologists as well as modern punctuated equilibrium theory oppose evolution via the agents of this theory.

2. Difference between Synthetic Theory and Darwin's Theory

Darwin's theory is based on the observations- (a) Overproduction: All species have a high reproductive potential (2, 4, 8, 16, … ratio) from oyster to elephants. They are capable of filling the earth. But the number of any particular species remains more or less constant from year to year; (b) Variation: The individual members within any plant or animal species vary from each other by small differences; (c) Competition: Since fewer organisms live to maturity that is producing, all creatures must face a continual struggle for existing or survival for the limited resources; (d) Survival of the fittest: The variations within a species provides some individuals with advantage

and are better adapted to environments, which enable them to live longer and produce more offsprings than some others; (e) Inheritance of superior traits: If an advantageous variation is inherited by organisms it will also live longer and leave more offsprings, some of which may also inherit the variations. This phenomenon continues generation after generation and finally produces new species over millions of years. Darwin called the above entire process as natural selection or survival of the fittest (Darwin, 1859). Natural selection is the mechanism of individual matching with the environments (Bernstein and Bernstein, 1982). In Darwin's words 'Climate plays an important part in determining the average number of species, and periodical seasons of extreme cold or drought, and I believe to be the most effective of all checks' (Darwin, 1859). Furthermore, it is declared that extinction may be the accompaniment of the origin of new species. Dodson (1960) acknowledged that extinction determines the fate of most species since the origin of a life. The 'Cynodon' reptiles became extinct and they were succeeded by their own descendants, the adaptively superior mammals. In Darwin's words 'The extinction of old forms is the almost inevitable (predictable) consequence of the production of new forms' (Darwin, 1859).

In contrast, synthetic theory is the combination of mutation, genetic drift, isolation, recombination and gene flow which change gene structure or frequency and create new variation for origin of new species (based on genetics); whereas, natural selection acts as driving force. In addition, in synthetic theory there is no influence of environment on evolution as it is based upon theoretical separation between organism and environment (Ho, 1988). Besides this, in synthetic theory extinction plays no role in evolution.

3. Gene Mutation is the only Agent of Synthetic Theory

Gene (DNA) carries and transmits hereditary information. So, evolution operates via gene. Deletion, insertion or substitutions of nucleotide in the DNA are also known as gene mutation as well as molecular evolution. All new genes arise by mutation; and eventually result the original source of genetic variation that provides the raw materials for evolution. In addition, if there is no mutation, there would be no evolution. Furthermore, according to neutral theory, the rate of evolution is equal to the rate of mutations. Therefore, mutation is the mechanism that underlies the evolution of a living organism. Consequently, mutations are main agent of synthetic theory as well as only agent of molecular evolution. Besides this, according to neutral theory (non-Darwinian theory) of evolution, the rate of evolution is equal to the rate of mutations (Kimura, 1983; Gardner et al., 1991).

Mutations primarily arise by two principal ways- by errors made by DNA replication machinery during cell division and by DNA damage through external agents. Most mutations arising from errors in DNA replication are harmful to the living organisms (Pai, 1986; Gardner et al., 1991). Subsequently, evolutionary geneticists also readily acknowledge that most observed mutations are harmful (99.90%) (NSE, 1984; Singh, 2000).

4. Most Mutations Express only in Homozygous Recessive State

Most mutations are recessive (Pai, 1986; Gardner et al., 1991). It would express its phenotype only in homozygous condition (Hickman, 1970). Natural selection favors heterozygotes (Tamarin, 1986). 'Balancing selection' hypothesis emphasizes on the heterozygote superiority (Ehrlich and Roughgarden, 1987). Homozygosity results from self-fertilization (inbreeding). Both inbreeding and homozygous condition reduce the qualities of offspring and their survival. Homozygous organisms are least fitted and disease susceptible. Furthermore, self-pollination or inbreeding is opposite to hybridization. But it has been reported that hybridization is the principal force of evolution (Starr and Taggart, 1989). In all domestic bird species studied to date, inbreeding has been shown to cause a decline in traits affecting reproduction and viability (Crawford, 1990).

5. Randomness of Mutations is Contradictory to Directional Evolution

Mutations are always random (Nebel, 1987). It is thus difficult to understand how random events have led to such a well organized directional process like evolution. The change in the sequence of a base may be plan wise to prove itself as a highly significant of a smoothly operating highly organized living system. Given the evolutionary time period it may be argued that modern day man has evolved from some random events from the nearest apes, or the origin of man is by accident.

6. Many Mutations Inhibit Metabolic Processes

Mutations inhibit metabolic processes of all animal and there are no known references that it is supportive to metabolic processes in animal but helpful for a few induced mutant crop varieties. According to Garrod's model one mutant gene–one metabolic block (Snustad and Simons, 2000). Gardner et al. (1991) stated that metabolism is genetically controlled. Mutation frequently blocks the metabolic pathway by changing the code of nucleotide. It decreases the fitness of their carrier by bringing various physiological disorders. As a result of bringing various physiological disorders mutated organisms suffer from various diseases. It has been reported that thousands of mutations that have been identified and studied by the geneticists have found to be harmful (Gardner et al., 1991). More than 3,500 abnormalities are observed from single-gene mutation in

human, which have no medical treatments. Of them the most important ones are Albinism, Sickle-cell anemia, Glactosemia, Phenylketonuria, Polydactyly, Achondrophasia, Hunting tows disorder, Hemophilia A, Testicular feminizing syndrome, etc. (Starr and Taggart, 1989).

7. Successive Mutations are Less Probable, which Create New Species

Actions of mutations on successive generations produce new species (Mackean, 1976). Again, mutations are rare; in human one mutation in 10^4 to 10^6 people (Gardner et al., 1991) if the rate of mutation for the first gene is one in a million cell^{-1} generation (10^6) and the rate for the second one is one in a billion (10^9) (Starr and Taggart, 1989). So, successive positive mutations are expected to be extremely rare. It may be argued that if successive mutations are occurring, why bacteria (as it is the first organism and arise more than 3.8 b years ago) are still unmodified and remain in their own kinds? Would it have not been modified into another organism through evolution?

8. Natural Mutants are Less Adapted to the Environment

Mutate organisms are less adapted to the environments. The Ancon sheep appeared due to spontaneous recessive mutation. These sheep were then breeding together and a line was developed thereby originating the Ancon breed of sheep. But it has been cited that this breed was extinct about 80 years ago (Banerjee, 2002; Sinnott et al., 1998). Hickman (1970) confirmed that most animals are already adapted and any new changes would likely to be disadvantageous. Mutated organism generally fails to compete with the other wild types and therefore, perishes. Likewise Wallace (1858), co-author of natural selection, drew concentration that quickly fattening pigs, short-legged sheep, pouter pigeons, and poodle dogs could never have come into existence in a state of nature. What is more, Hornless cattle, Pacing horses, double-toed cats, mule-footed swine, albino rats, and other new and distinct type have appeared through spontaneous mutations (Sinnott et al., 1998). As mutate organisms are less adapted to the environments, these animals do not exist in the present world.

9. Some Mutations Revert Back to the Original Wild Type

Strickberger (1996) declared that due to reverse mutation a mutant genotype change into wild type. Kuckuck et al. (1991) mentioned that if a gene mutation occurs in a barley seed, the plant deriving from this seed will be heterozygous and its progeny segregates 25% mutants due to heterozygous condition. Besides this, Lewin (1988) cited that all changes through artificial breeding are lost just after a few generations. Moreover, the best-known mutant among farm animal is tail-less Manx cat (Ritchie and Carola, 1983). But when it breeds with normal cat, one-third offsprings are produced normal due to segregation (Weaver and Hedrick, 1997). Likewise, Graham (1986) pointed out that breeders developed many animal and plant varieties but they lost their purity after just a few generations. But evolution is irreversible, which is known as Dollo's Law. Consequently, evolution through mutations or synthetic theory violates Dollo's Law.

10. No Major Success in Animal Breeding through Artificial Mutation

The mutant hairless 'Sphynx cat' have to be kept indoors because their lack of hair makes them vulnerable to cold in the winter and sunburn in the summer and they have also been linked to other skin diseases. The mutant 'Burmese cats' can suffer from pain around their face which can lead them to scratch themselves.. Breeders have been accused of creating 'bizarre mutant cats' after a new scientific report described a series of deformities found in some highly-prized pets.
Crawford (1990) mentioned that mutations were incorporated in poultry breeding purely to poultry fanciers. Over hundreds chicken mutant have been shown to have lethal effects; for example blindness, wingless, etc. Additionally, Banerjee (2002) drew attention that the improvement of domestic animals through mutation breeding is hopeless from the beginning; it has almost no practical significance.

11. Other Agents of Synthetic Theory Closely Interrelated to and Dependent on Mutations

Some biologists opined that (except mutation) genetic drift, isolation, recombination and gene flow are also element of synthetic theory. These elements are interrelated to mutation and also depend on mutation. Evolution of small population (isolation) through genetic drift is dependent on mutations (Hickman, 1970). Recombination is obtained by combining isolated mutations in various combinations (Starr and Taggart, 1989; Freifelder, 1997). Gene flow occurs when individuals move from one population to another and hybridize (Ayala and Kiger, 1980). Hybridization has been practiced continuously from the early stage of civilization, but still breeders are unable to produce a single new species but developed some races or varieties only. Consequently, Sinnott and Wilson (1963) declared that objection arise against evolution why new and distinct varieties of corn, apple or other plants, which have been developed by hybridization, are not regarded as new species.

12. Function of Natural Selection in neo-Darwinism (Synthetic Theory)

Natural selection plays controlling and driving force behind the synthetic theory (Rastogi, 1994). Mutations are raw mate-

rial of evolution by natural selection (Vidyarthi, 1992). But it is seen mutation fails to create fittest organism, which may be regarded as species. So, to whom 'natural selection' will select? As a result, it has been reported that most mutations either lethal or are disadvantageous to a greater or less degree and therefore tend to be eliminated from population by natural selection (Sinnott and Wilson, 1963). Moreover, Wainwright (2010) messaged the origin of species without Darwin and Wallace theory.

13. Population Genetics Conflicting about Synthetic Theory

Darwin's idea of evolution combined with Gregor Mendel's genetics is known as the synthetic theory of evolution (Gardner et al., 1991; Watson, 1977). On the other hand, Mendel's law only explains how genotypic and phenotypic characters pass from parents to offsprings generations to generations as unmodified form and express different ratio. He never opines that characters pass from parents to next generations with modified form and evolution may occur. It has been cited that if a red-flowered plant is crossed with a white-flowered one, all the F_1 plants become red-flowered but both of these characters (red and white flowers) reappear in the F_2 generation. In all successive generations only these two colours appear (Sinha and Sinha, 1997). Applying of algebra of population genetics (Hardy-Weinberg law) to Darwin theory leads to the modern concept of evolution: neo-Darwinism (Tamarin, 1986). The Hardy-Weinberg's principle provides a baseline for measuring of evolutionary change (Wolfe, 1963; Mader, 2001). Any change of allele frequencies in the gene of a population signifies that evolution has occurred (Mader, 2001). This principle is based on population genetics. It is a mathematical expression of Mendellian inheritance in a population. According to this principle, gene frequency remains constant generation after generation. If it is disturbed by mutation, natural selection, etc., it will be reestablished just after one generation of random mating (Tamarin, 1986). It is cited that mutated albino is common among mammals (Weaver and Hedrick, 1997); since albino organisms are reestablished and back to the original parent type just in one generation of random mating. Consequently, an albino mammal variety is not yet developed spontaneously or even artificially by action of the agents of synthetic theory. It was shown mathematically, notably by Fisher and Haldane that evolution occur by small mutation (Groveand Newell, 1974). It is also pointed out that the complete sequences of the genomes of 18 species of bacteria and yeast *S. cerevisiae* are now available (Snustad and Simons, 2000). But there is no record that as an evidence of changes of gene frequency the total number of gene of a plant or animal species is calculated and after effect of mutation or other agents again its gene is counted again. Therefore, a question arise how biologists apply this law or population genetics to prove that evolution is mathematically proved. Saunders (1988) drew attention that of course population genetics has been a fruitful subject but quite apart from its relation to the study of evolution. In addition, it is also pointed out that since evolution is a change in the genetic composition of population, the mechanisms of evolution constitute problems of population genetics 'www.uames/...cienas/msadinsynthetic_theoryhtml'. As a result, evolution through mutations or synthetic theory violates two major law of genetics such as Gregor Mendel's and Hardy-Weinberg's law and stand opposite pole of their objectivity . So, normally a question arise how evolutionists connect this two laws with evolution?

14. Modern Punctuated Equilibrium Theory Opposes Molecular Evolution

Based on fossil evidences, two American paleontologists Stephen J. Gould and Nile Eldredge developed a new model; call punctuated equilibrium (theory of macro-evolution). This theory resists molecular evolution as well as Dawinian evolution. This theory is being adopted by more and more evolutionists. According to this model, species remain essentially unmodified for millions of years (*statis)* and after that evolution takes place rapidly or suddenly during the formation of species (Eldredge and Gould, 1972; Gould and Eldredge, 1977). Besides, it has been declared that at the end of 19th century the neo-Darwinism theory was one thing, in the middle of the 20th century something else, due to the *s*ynthetic theory, and at that century it changed again due to the new 'Theory of Punctuated Equilibrium ['www.molwick.com/en/evolution/038-neo-darwinism.html']. It is also pointed out that the fact that the fundamental problems still unanswered by modern synthetic theory are exactly the same that Darwin posed from the beginning: the stability of living species, and sudden changes in the fossil record 'www.uames/...cienas/msadinsynthetic_theoryhtml'.

15. Modern Evidence of Synthetic Theory is Suspicious

The best and dramatic example of evolution is the white moth (*Biston betularia*) which has been modified into black moth (*Biston carbonaria*) in England by mutation of single gene (*carbonaria*) due to industrial pollution. However, the selective force of *B. carbonaria* is not the pollution itself rather the predatory birds. In England, before the Industrial Revolution trees were often covered with white lichens. As a result white moths could hide themselves because they were hardly seen on the bark of trees, whereas the black moths were easily seen; birds ate the dark moths. During the worst years of the Industrial Revolution the air was very sooty so tree bark was

black because of soot. Dark moths were hardly seen, whereas the white moths were easily seen; birds ate the white moths. As a result the black moths became more and the white moths became less (Purves and Orians, 1987; Smith, 1990; Wallace, 1990). But when industrial melanism began to reverse due to enactment of Clean Air Legislation in 1956, the frequency of black moth dropped from a high of 94% in 1960 to low 19% in 1995 (Johnson, 2003); about similar opinion are given by Starr and Taggart (1989) and Wallace, (1990). Even *B. betularia* is still common in the unpolluted areas in Western and Northern Great Britain (Smith, 1990). The modern concept of evolution is that an individual does not evolve; rather the entire population of a particular species evolves (Ritchie and Carola, 1983). But in case of *B. betularia* it has not happened so. Moreover, Macken (1976) declared that the *B. carbonaria* is a variety, not a new species as it interbreeds with *B. betularia* and produces fertile offspring. Furthermore, insect population that develops resistance to insecticides provides another example of mutation. But Smith (1990) cited that if DDT spraying is stopped, DDT resistant mutant flies will be reversed and resistant flies will largely disappear from the fly population. In addition, some disease-causing bacteria have become resistant to various antibiotics by mutation (WBES, 1994). However, Sinnott et al. (1998) reported that bacterial mutants may lose virulence even susceptible to antibiotics, and can be attacked by bacteriophages. So, modern evidence of synthetic theory is suspicious.

16. Opposition of World Renowned Biologists about Origin of New Species

Three renowned American geneticists, E. D. Sinnott, L. C. Dunn and T. Dobzhanskey, one of the originators of modern Synthetic Theory, drew attention in their 'Principles of Genetics' (5th Ed.) that a living individual always arises from another living individual of the same species and never from another species. They again declared that so long as diverging races are not yet reproductively isolated, they are potentially able to hybridize and merge back into a single population. Human races are an excellent example of such merging process (Sinnott et al., 1998; Ahad, (2011). The famous geneticists Brewer and Sing (1983) and Strickberger (1996) have also given the same opinion. Matzke and Gross (2006) drew attention that evolutionary change is possible within the species, but deny that one species can evolve into another. Castro and Hubner (1997) confirmed that any theory might overturn at any time by new evidence. So, synthetic theory of evolution might be rethought.

17. Conclusion

Molecular evolution of new species via the agents of this theory is less possible. If accidentally possible (either naturally or artificially), this change is might be within the species and from variety (or race or strain). But aquirring status of this variety to a species is less possible due to segregation and failure to gain reproductive isolation. Sinnott, Dunn and Dobzhanskey as well as Matzke and Gross argued the same. Moreover, Darwinists and socio-biologists as well as modern punctuated equilibrium theory oppose molecular evolution through the agents of 'modern synthetic theory of evolution'. Therefore, the modern synthetic theory of evolution is missed leading.

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