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An Overview for Living in Extraterrestrial Universe without DNA & RNA: Higgs Boson or God Particle as a Common Origin for Universal Life and Living Essence Existence

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Abstract: Obviously, the initial biopolymer for any type of universal life on another planet must satisfy other construction of life. Therefore, synthetic enzymes hinted related to cosmic life without DNA or RNA might be produced in another part of the universe. Enzymes can be made from quasi genetic material that does not exist on Earth. So, this discussion is a fundamental theory for the possibility of life that could evolve without DNA or RNA (whom these two self-replicating units for life on Earth). Our universe is surprising in many aspects, allowing for everything we see to exist. Therefore our universe might be the exception that is balanced in this way, and it is only in this balance can there be life. Interestingly, 3 quarks could still exist without the Higgs field, but the electron would remain massless, which means there would no longer be atoms of any kind, no biomolecules, DNA, RNA, and no life.

Keywords: Higgs boson; extraterrestrial universe; universal life.

1. Introduction

1.1. Unnatural XNA instead of DNA.

Holliger[1-3] had designed a novel kind of genetic material by replacing different sugars with other components of DNA known as XNAs. One of the first steps towards life on Earth is the evolution of RNA into self-copying enzymes [2,3]. So by showing that XNAs can act as enzymes, on top of storing hereditary information, Holliger [1-3] has recreated a second major step towards life. It is the first demonstration that, like prehistoric RNA, XNA can catalyze reactions, even if it cannot yet copy itself as RNA can [1-5]. Science fiction has long imagined alien worlds inhabited by silicon-based life. As for the implications these findings might have for alien chemistry over distant cosmic worlds, if a scientist being can synthesize life to build bonds between silicon atoms and carbon atoms in the Earth, certainly nature can also do it. Carbon is the backbone and bio foundation of every known genetic molecule on the Earth. Life on this planet has been started based on carbon, and it is because each carbon atom can form bonds with up to four other atoms simultaneously.

Meanwhile, scientists have long thought that alien life might be having a completely different chemical construction compared with life on Earth. In addition, silicon, the same as carbon, is also one of the most general elements in the cosmic planets. Arnold [6] steered microbes into creating molecules never before on Earth via a strategy known as "directed evolution". Obviously, evolution is an innovation machine, and products appear with a novel phenomenon in nature. Enzymes in nature result from evolution, not a design by humans. Evolution allows organisms to continuously update and optimize their enzyme repertoires by using generations of mutation and selection for fitness advantages. New enzymes are even produced in real-time in response to any challenges of nature [6]. In the universe of possibilities of anything that exists for life can appear. Once you can synthesize compounds with silicone instead of carbon on Earth, somewhere in the universe, it's probably being done automatically in nature.

1.2. Probability of another special cosmic life in the universe.

Is there any life in superheated areas deep within the Earth's crust? This question is not reasonable to answer whether a probability of another special cosmic life in the universe or not. In the past 10 years, astronomers observed thousands of exoplanets, while there are several orders of magnitude more than the solar system. Some of these should probably have habitable environments similar or non-similar to those we see in our solar system. It is difficult to detect the presence of biology on other planets. For instance, we are familiar with the mechanism of photosynthesis, and the produced oxygen can be accumulated in the atmosphere around the Earth, but this kind of life phenomenon is essential in other parts of the universe? Maybe yes or maybe not.

Therefore how we could recognize bio-signatures in other worlds. One way is to look for life on other planets or planets outside of our solar system same as life on Earth. Although maybe we won't even have to look for it. Maybe space life will come to us, but curiosity does not allow us to wait and see what happens. Scientists believe there is another life in the universe. Why haven't we found it yet?. If the universe is so full of the ingredients for alien life, why haven't we explored any yet? Or with a more accurate concept, considering historical humans' age are (150,000 years) compared to the age of the universe (around 14 billion years), why haven't any aliens found us? According to scientific evidence, Fermi (famous Italian physicist) about extraterrestrial life when other scientists talked about them said, so where are they in this fourteen billion years? Some astronomers believe that sending the message for aliens in cosmic to find them is a dangerous game to play. This is why many scientists have advised against sending messages out into the unknown. In my opinion, the answer to this question is that we are looking for a kind of life in other parts of the galaxy similar to terrestrial life, and this kind of attitude may lead us astray. And it is better to change our attitude or at least move towards an alternative type of thinking of both types, including terrestrial life and non-terrestrial life. My idea of life in extraterrestrial worlds has a completely different meaning than life on Earth. In other words, the terrestrial variables that are necessary to create life in distant galaxies are quite different from what is needed for terrestrial life. In other words, water, oxygen, and photosynthesis, which are essential for terrestrial life, do not mean for extraterrestrial beings, and life in that universe needs other components that we will address in this study. Energy necessity and the energy consumption is important variable that is the basic concept and identical for both terrestrial and extraterrestrial beings. In the meantime, the Higgs boson or God particle is independent of the type of universes (terrestrial, extraterrestrial, and parallel worlds).

1.3. Higgs boson or God particle.

Fermions are particles that follow Fermi–Dirac statistics, including half-odd integer spin. Fermions follow the Pauli Exclusion Principle, such as quarks and leptons. Combinations made of an odd number of those particles are also fermions, such as baryons and many atoms and nuclei. Some fermions are fundamental particles, the same as electrons, and others are composite of a few fermions, such as the protons [7, 8]. In contrast to fermions, a boson is a particle that follows Bose-Einstein statistics, such as photons, gluons, and W and Z (the four force-carrying gauge bosons of the Standard Model), in addition, Higgs boson [9,10], and the hypothetical graviton of quantum gravity. For bosons, it is notable that they have integer spin (s = 0, 1, 2, etc.) due to the spin-statistics theorem. Also, there is no restriction on the number of them. Although the usual bosons (photons, W and Z bosons, and gluons) are gauge bosons, the only exception is the Higgs boson [9,10], which is a scalar boson. While most bosons are composite particles, there are five elementary bosons, including ^{0}H or Higgs boson (scalar boson with spin=0) and the four-vector bosons (spin=1) that are the gauge bosons, Y or Photon, G or Gluons (eight different types), Z or Neutral weak boson and finally $W^{\pm}$ Charged weak bosons (two types). There may be a sixth *tensor boson* (spin=2), the graviton (G), the force carrier for gravity. Top quarks, which have about the mass of a Gold atom, have the strongest interaction with a Higgs boson. The Higgs boson has several ways (more than other kinds of particles) to interact with the Higgs field (which just causes a mass to appear) [11-14]. One of the most attractive phenomena is that the Higgs boson is accompanied by supersymmetry. Consequently, matter particles can acquire their masses from "spontaneous symmetry breaking" [15]. According to Bardeen, Cooper theory [16], and Ginzburg - Landau theory [17, 18], the photon captures an effective mass when propagating among real materials at sufficiently low temperatures.

1.4. Theoretical background.

Although in free space, the masslessness of the photon can be proved by Lorentz invariance and U(1) gauge symmetry, Lorentz invariance is broken completely via the superconductor, whereas the gauge symmetry is still present. In other words, the interactions with the photon of the Cooper pairs inside a superconductor caused to create an effective mass for a photon. The spontaneous symmetry breaking for particle physics (first was suggested by Nambu[13]) happens due to the low mass and low-energy interactions of pions if the up and down quarks were massless. In Figure 1, a spontaneous U(1) symmetry breaking with a single complex field φ is shown. The effective potential is unstable at the origin $<|\varphi|> = 0$, while the lowest-energy state, the vacuum, is at the bottom of the brim of the 'Mexican hat with $<|\varphi|> \neq 0$. However, the phase of φ is not determined, and all choices are equivalent with the same energy. The system must choose some particular phase value, but changing the phase would cost no energy.

Anderson conjectured that it should be possible to extend this mechanism to the relativistic case[19, 20], as did Klein and Lee [21], but it was argued by Gilbert [22] that Lorentz's invariance would forbid this. Spontaneous breaking of gauge symmetry was investigated into particle physics in 1964 by Englert and Brout (they accepted a non-Abelian theory from Yang-Mills) [14], followed independently by Higgs [9, 10], and then by Guralnik, Hagen, and Kibble [19].

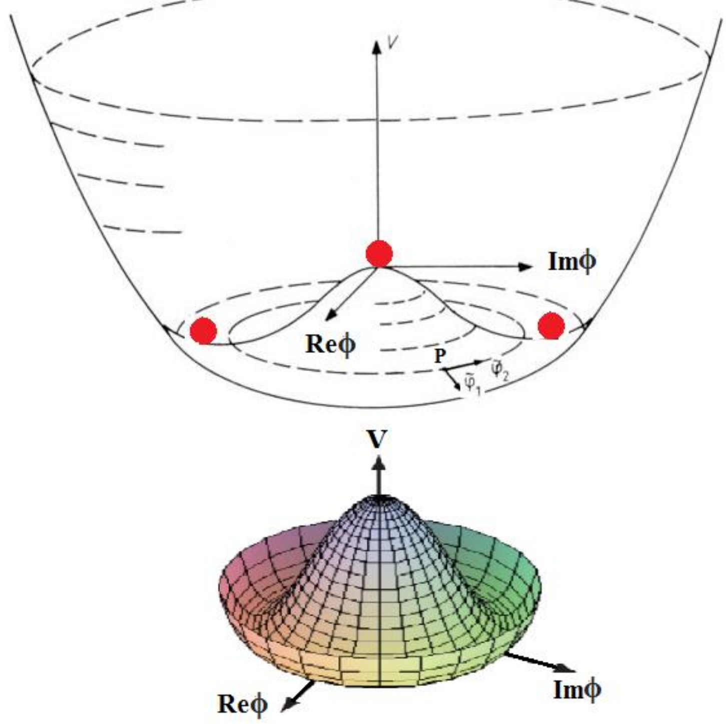


Figure 1. A prototypical effective 'Mexican hat' potential leads to spontaneous symmetry breaking. The vacuum, i.e., the lowest-energy state, is described by a randomly-chosen point around the bottom of the hat's brim. In a 'global' symmetry, movements around the bottom of the hat correspond to a massless spin-zero 'Nambu-Goldstone' boson [13]. In the case of a local (gauge) symmetry, as was pointed out by Englert and Brout [14], by Higgs [9,10], and by Guralnik, Hagen, and Kibble [19], this boson combines with a massless spinone boson to yield a massive spin-one particle. The Higgs boson [9,10] is a massive spin-zero particle corresponding to quantum fluctuations in the radial direction, oscillating between the center and the side of the hat.

They exhibited how one could be ignored of two massless bosons (a spin-less Goldstone boson and a gauge boson of an exact local symmetry) combining them into a single massive vector boson in a fully relativistic theory. The first paper by Higgs [10] explained that gauge symmetry provides a loophole (theorem of Gilbert), and his second paper [9] investigated this loophole to demonstrate mass generation (Abelian case). His second paper explicitly mentions the existence of a massive scalar particle associated with the curvature of the effective potential (Figure 1). The third paper by Higgs explained [23] the spontaneously-broken Abelian theory. He especially used the Feynman rules to show what has become known as the massive Higgs boson and its decay into 2 massive vector bosons(vector-scalar and scalar-scalar scattering). Kibble [24] has also investigated the non-Abelian case and confirmed the creation of massive, scalar Higgs bosons. Weinberg [15] and Salam [25], by two separate papers, introduced of non-Abelian spontaneous symmetry breaking into Glashow's [26] unified SU(2) × U(1) model of the weak and electromagnetic interactions. Weinberg was also the first scientist who explained that the scalar fields could also give masses to fundamental fermion particles. In a simple interpretation, fermions acquire their mass by passing through a molasses-like field called a Higgs field. The above ideas rapidly expanded by B. W. Lee and collaborators [27-30]. The Higgs field is often denoted as ϕ and in simple terms, $\sim\emptyset^2 w^2$ means that the Higgs field interacts with the WW-boson field, and also $\sim\emptyset\Psi_e^{\dagger}\Psi_e$ the electron field Ψ_e (Figure 2).

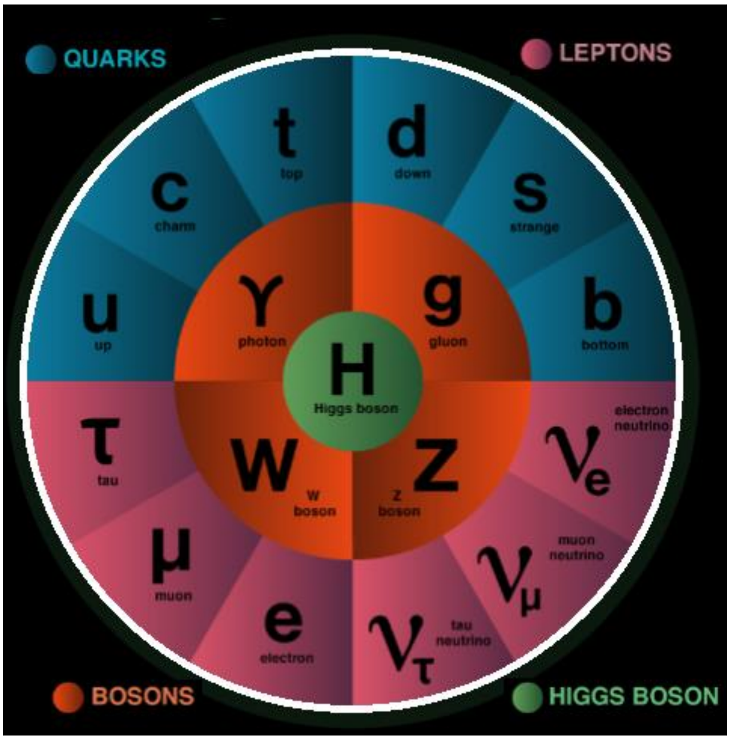


Figure 2. The standard model.

The standard model also has several problems in its theorem. For instance, Although the Higgs boson gives mass to quarks, charged leptons (like electrons), and the W and Z bosons, it is unknown whether the Higgs boson can give mass to neutrinos particles or not. Also, the universe consists of dark matter and dark energy that can not be interpreted with the standard model [10-14].

1.5. Higgs boson - a piece of the matter-antimatter puzzle.

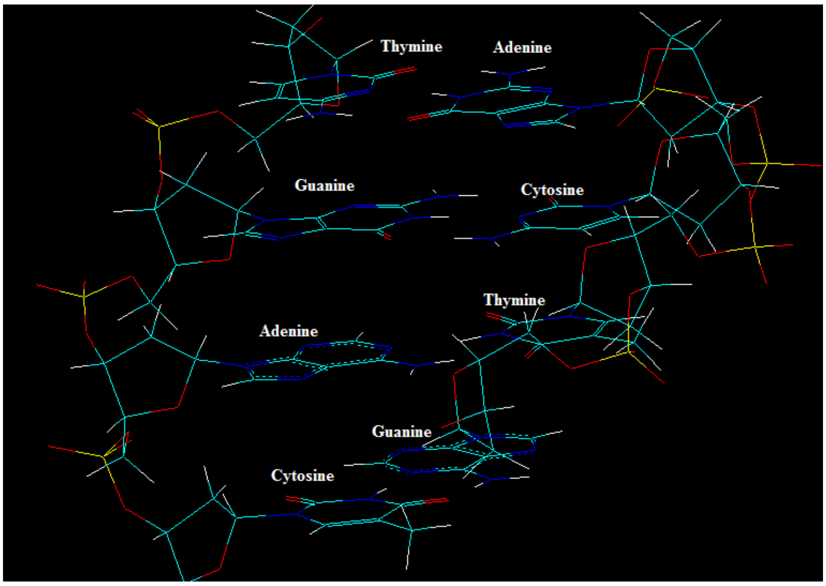
Why there is more matter than antimatter is one of the important questions confounding particle physicists and cosmologists. What is that? Is it Higgs Fields? [9,10]. Higgs boson is completely connected to the issues of matter and antimatter, and probably Higgs is involved in the preponderance of matter over antimatter which means, nature treats a particle and its mirror-image version (antimatter) differently. Up to now, the Higgs into the standard model is the best explanation of matter-antimatter relates energy. Therefore the researchers look for a process in which a Higgs decays into two tau particles that are like supersized cousins of electrons. The stars, the planets, and all of us are made of matter, not antimatter. Something happened early in the universe's big bang to give the matter the upper hand, leaving a world of things built from atoms and little trace of the antimatter that was once plentiful but rare today. A new theory suggests the Higgs boson particle may be responsible more, especially for the Higgs field associated with the matter particles. The Higgs field [9,10] seems to pervade all of space and imbue particles that pass through it with mass. Suppose the Higgs field had been turned on in the early universe with a strong amount and decreased time by time to its current position. In that case, it might have differentiated the masses of matter particles from their antimatter particles. There is a very high probability for the Higgs field to have a high initial value after inflation. Inflation has been done in the universe due to space-time ballooned that allows fields to jump around. During this phenomenon, the Higgs field might have reached from one value to another due to quantum fluctuations and give mass to matter (not antimatter) particles. Because lighter particles require less energy to form, they arise more often. Thus, light-matter might be produced more than the heavier particles. The Higgs field would have had such fast and easy jumping around during universal inflation because the mass of the Higgs boson is relatively low. The boson appeared in 2012 inside the Large Hadron Collider (LHC) in Switzerland, revealing its mass to be about 125 GeV or approximately 120 times the mass of the proton. Focus your mind on the Higgs field, such as a valley between two cliffs, that amount of the field is equal to the valley's elevation, and the boson's mass shows the slope of the cliff walls. Although somewhat more speculative, this phenomenon is unique and strong evidence that caused the matter to split from antimatter.

Such splitting between matter and antimatter might be related to undetected particles, such as neutrinos [11-15]. Neutrinos are fundamental particles that three models know as Electron, Muon, and Tau. A fourth neutrino might also exist. However, that is expected to be heavy and thus difficult to detect (The heavy particle needs more energy from the collider to create it). This particle's strange behavior is that, in other words, "being its antimatter partner", instead of a matter and antimatter version, the matter and antimatter Majorana neutrinos would be the same. At the beginning of the universe, the character of neutrino allowed matter particles to cross over into antimatter particles and come back. Although quantum laws allow particles to transform into other particles for brief moments, it is usually forbidden to convert matter to antimatter and vice versa. But if antimatter, such as antielectron neutrino, converted into a Majorana neutrino, it would be unknown whether it was first matter or antimatter and consequently, easily turned to a normal neutrino (electron). And if these neutrinos are lighter than the antineutrino, then potentially matter can be overcome to antimatter[16,17].

2. Genetic Materials.

2.1. Alternative nucleic acids as genetic materials.

DNA is a basic foundation genetic material of all living organisms on Earth that stores and propagates genetic information and, with a very uniform structure, consists of four nucleic bases (A, adenine; G, guanine; C, cytosine; T, thymidine), 2'-deoxyriboses, and charged phosphate backbones (Figure 3).



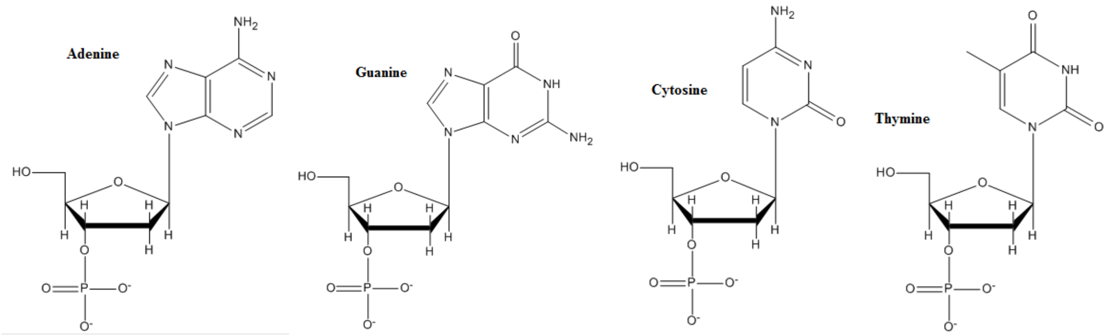


Figure 3. Structures of DNA containing sugar, base, and phosphate.

Meanwhile, in nature, numerous chemical variations of the nucleic base, generally referred to as epigenetic markers, are appeared in both prokaryotic and eukaryotic genomic DNA [31-34]. Methylated nucleases, such as 5-methylcytosine, are appeared in bacteria to care DNA from endonuclease-mediated that destroys the invading bacteriophage or virus [35]. In most living tissue, only a small portion of the bases is modified in genomic DNA for any further protective functionality. Meanwhile, certain modified bases can potentially replace in canonical bases of a bacteriophage [33, 36]. Sometimes, in Bacillus phages' DNAs, thymidine is replaced by 5-hydroxymethyl-deoxyuracil. Thymidine is substituted for deoxy-uracil in the whole genome of Bacillus bacteriophages [37].

2.1.1. Xeno nucleic acids.

Artificial analogs nucleic acid with different sugar and backbone compared with DNA and RNA. Although they can store and retrieve genetic information, polymerases cannot read and duplicate it. Therefore the genetic information stored in XNA is invalid and disappears for translation [38].

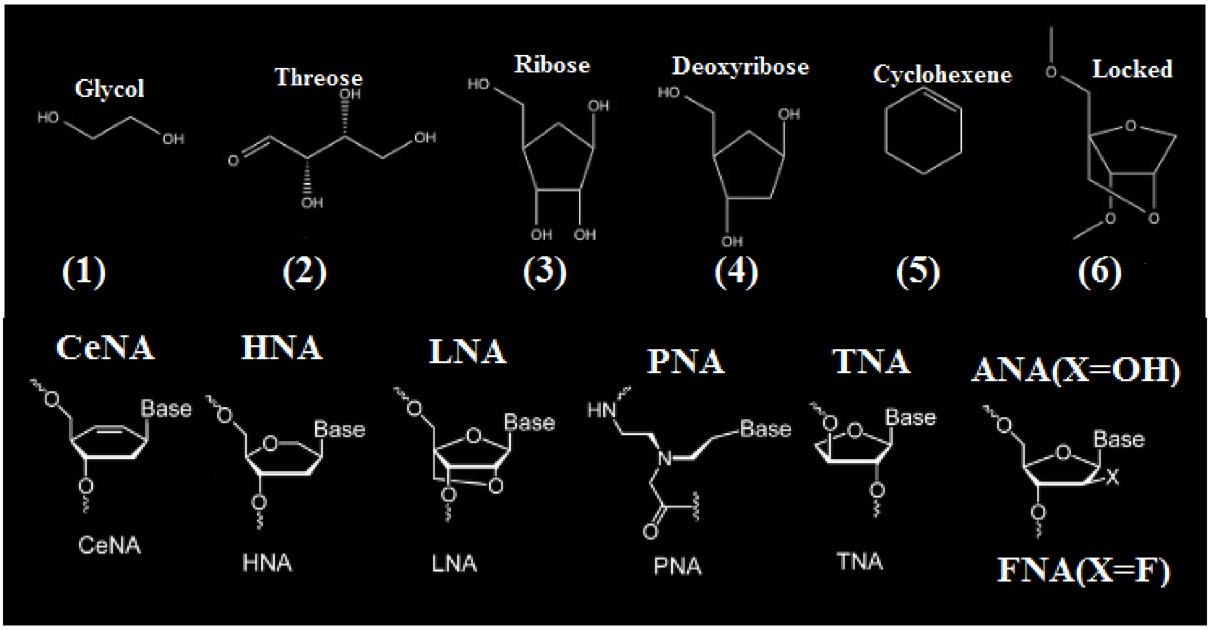


Figure 4. XNAs with artificial backbones.

Three subunits of xenobiotic-nucleic acids (XNAs) can be synthesized as (1): sugar-modified XNAs, (2): phosphate-modified XNAs, as well as (3): base-modified XNAs, or their combination. In addition, some of them potentially can be to form a stable double helix between DNA/RNA, same as Watson–Crick base-pairing rules. Because genetic information transfer is achieved through DNA replication mediated by DNA polymerases in nature, in most XNAs, unnatural nucleotides are not good substrates for DNA polymerases [39, 40]. Although several XNA polymerases have been synthesized to transmit and propagate the genetic information stored in XNAs, a few items have unsuitable interactions with polymerases [41-46]. The Xenos are almost identical to DNA and RNA, with some differences. For example, in XNA nucleotides, the deoxyribose and ribose sugar groups of DNA and RNA have been replaced with other chemical structures. XNAs have different properties of the structural, chemical situations compared with their natural counterparts. Types of synthetic XNA created so far include 1,5-anhydrohexitol nucleic acid (HNA), Cyclohexene nucleic acid (CeNA), Threose nucleic acid (TNA), Glycol nucleic acid (GNA), Locked nucleic acid (LNA), Peptide nucleic acid (PNA), and FANA (Fluoro Arabino nucleic acid) (Figure 4).

In XNAs investigation, modified oligonucleotides with replaced chemical compounds could enable them to more effectively over DNA/RNA for biomedical, biotechnology, and nanotechnology applications, such as bicyclo-DNA [47], LNA (locked nucleic acid) [48,49], and HNA (hexitol-nucleic acid) (Figure 4) [50]. The ability of XNAs for heredity and evolution is so much important. Therefore, non-enzymatic replication of nucleic acids has been studied widely by researchers for finding the chemical origin of genetic materials [51]. Although in nature, replication is catalyzed via DNA polymerase with high performance, due to the systematic difference among XNAs and DNAs/RNAs, Specific XNA polymerases were obtained in a suitable attempt to transfer the genetic information between XNA and DNA [42]. Self-tagging selection strategies were designed by Holliger and coworkers [42,43] through synthesizing HNA/CeNA from DNA templates. Therefore by investigating the Higgs field knowledge and understanding of matter and antimatter creating in the universe, current achievements are encouraging the integration of unnatural genetic materials into the living system to create synthetic life forms [52,53]. Based on several recent works[54-76], it is obvious that the construction of synthetic life forms is helpful to reveal the fundamental principles of living systems and enlighten our understanding of current life on.

3. Discussion

3.1. The Higgs particle (god particle) in all living beings.

The Higgs field is related to the state of the universe[9,10]. Therefore our universe might be the exception that is balanced in this way, and it is only in this balance that there can be life, and maybe there is the other kind of life in other parallel galaxies without DNA and RNA (sub environment of Higgs fields). Perhaps the Higgs field will lead to discoveries that turn on the origin and life on other parallel universes and the root of dark matter or dark energy. The Higgs field theory shows a community could come together in their conviction that one should make bold predictions and then test them[9,10]. I don't believe that "speculative" thought is a damning indictment of someone's science. In other words, my opinion is that forward progress in science depends mainly on the interplay between bold and brave predictions and careful measurements specifically targeted for testing them. In this work, I will discuss the meaning of life without DNA and RNA, based on Higgs fields. Specifications of a living thing can be concluded as; (1) A living thing must be organized, (2) A living thing must be able to reproduce, (3) All living things grow, (4) All living things respond and adjust to their environment (5) All living things, can take the energy from the environment and then converts these energies to other energies in their systems, (6); All living things adapt to their environment, so they have a better chance at survival, (7) All living things excrete waste, (8); All living things have limitation in their age and life. These items can exist in living things without DNA and RNA in many other parallel worlds. Chris McKay of the NASA Ames Research Center in Moffett Field, California, says. The search for extraterrestrial life might be explained as one approach to test a standard biology model. If life fundamentally different from this standard model, perhaps relying on wildly different biochemistry, were found on another planet, and it can be indicated that there is more than one way to produce a living system [29]. The idea is not as far-fetched as it might sound, says Steven Benner, a chemist at the Foundation for Applied Molecular Evolution in Gainesville, Florida. Researchers have found shadow biospheres before. The invention of the microscope revealed whole new worlds, and the discovery of a new realm of microorganisms opened a window on another [29]. Felisa Wolfe-Simon and her coworkers searched for life in the arsenic-rich environment of California's Mono Lake [30]. We will come to a point where researchers learn how to synthesize an evolving, replicating system from scratch in the near future. But for a new life from a primordial foundation, what does it take to create.

4. Conclusions

Based on Higgs fields, Alien life could contain life that relies on a fundamentally different biochemistry, using different forms of amino acids or even entirely novel ways of storing, replicating, and executing inherited information that does not rely on DNA or proteins. Any further study on the Higgs field and related its concept of the matter and antimatter can be helped us for understanding the unknown variables in our galaxy and also our universe

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Conflicts of Interest

The authors declare no conflict of interest.

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