SETI and DNA

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Abstract

Four specific criteria for recognizing intelligence as the source of a coded signal from outer space have been delineated by Carl Sagan. When those criteria are applied to the genetic code, one may logically conclude that there is an intelligent source for the code. To conclude otherwise is to abandon the criteria that are so vital to the search for extra-terrestrial intelligence.

Introduction

The late Carl Sagan (1980, p. 296) identified several criteria to be used in the Search for Extra-Terrestrial Intelligence (SETI). He proposed to use these criteria to discover evidence for extraterrestrial intelligence when evaluating signals from outer space. Could these criteria also be applied to codes found in other fields in a search for evidence of intelligence? That is what has been proposed by several authors in the creation literature (Batten, 1997; Ham, 1992; 1994; Laughlin, 1996). They suggested applying SETI criteria to the genetic code in deoxyribonucleic acid (DNA), but did not mention what those criteria were. In this article Sagan's criteria will be discussed and applied to the molecular biology of the gene. I intend to show that intelligent design is the probable source for the genetic code and its expression in the synthesis of proteins in a cell, as described in common biology textbooks (Campbell, 1994, pp. 171–210).

Further, I plan to introduce only as much discussion of DNA and other nucleic acids as is necessary to evaluate Carl Sagan's criteria adequately. Much more detail about the structure of DNA and the creation science aspects of nucleic acids can be secured by consulting the following papers in *CRSQ*: Anderson, 1980; 1989; 1991; Bergman, 1999; 2000; 2001; Frair, 1967; 1968; Gish, 1967; 1979; Grebe, 1967; Lammerts, 1969; Lumsden, 1992; Moore, 1972; Quinn, 1975; Sharp, 1977; Smith, 1985.

If we should receive a radio message from an extraterrestrial civilization, Sagan (1980, p. 296) suggested that such an intelligent message would be: 1) elegant, 2) complex, 3) internally consistent, and 4) utterly alien. In the late 1960's, for example, amazingly precise signals from pulsars were first considered as possible indications of intelligent beings. The pulsars were ultimately shown to be a natural phenomenon; they failed the criteria.

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I shall examine the message of the DNA code itself, to see if it satisfies Sagan's four criteria of intelligence. In doing so, I am aware that the results will not be absolute "proof" of design. The DNA data, however, can be evaluated to see if they meet the criteria, implying that we are observing the handiwork of an intelligent mind.

Elegance

The first characteristic of a coded message from an intelligent source is elegance, which means exhibiting tasteful richness of design or organization. The elegance of the genetic code is reflected by its efficient storage in a double-stranded spiral molecule. The two strands are constructed in a way that permits complete replication of the code with each strand acting as a template for replication. Each strand contains four different chemical bases which bond in pairs between the strands.

These four compounds [G=guanine, C=cytosine, A=adenine, T=thymine in DNA, and U=uracil instead of thymine in messenger RNA (mRNA)] also serve as "chemical letters" to form three-letter "words" in the DNA and/or mRNA code. The letters are read in sets of three to form words or codons. The first letter of the codon could be any of the four, so there are four possibilities. By adding a second letter the possibilities increase to 16 because each of the original four can be combined with four letters (4 x 4 = 16). By adding a third letter, each of the 16 combinations is supplemented by four possible letters (16 x 4 = 64). This arrangement produces 64 possible codon combinations (Denton, 1985, p. 244), and all of these code for specific amino acids or functions. Thus, "...there is redundancy in the code but no ambiguity." (Campbell, 1994, p. 187). The code is elegantly simple and functionally optimal.

If codon words had only two letters, thus allowing only 16 combinations, there would be too few to code for the 20 kinds of amino acids plus the instructions for starting and stopping protein synthesis. On the other hand, if codons had four letters, there would be 256 codons (64 X 4 = 256), which would be unwieldy and wasteful. The three letter code with 64 codons is elegantly simple and functionally optimal. This in itself is an evidence favoring direct design in its origin.

The mechanism for transcribing, reading, and expressing the code in the synthesis of proteins is also elegantly efficient. The information for manufacturing the proteins is in the DNA. Portions of it must be copied (i.e. transcribed) as mRNA molecules to transport the information from the nucleus to the cytoplasm surrounding the nucleus. The process of transcription requires an enzyme, RNA polymerase and a supply of RNA nucleotides. The RNA polymerase binds to a specific site, called a promoter, on the DNA to unwind the DNA at the beginning of a gene. One of the two strands of DNA serves as the template for the mRNA synthesis from the given gene. The completion of the transcription of the gene is signaled by a terminator region in the DNA. When the transcription is terminated, the RNA polymerase and the newly formed, single stranded mRNA are released from the DNA, and the DNA helix reforms.

The RNA polymerase enzyme, which initiates the process, is a protein which is also made from an mRNA molecule created from a gene by this process. Which came first, the mRNA that is made by the process or RNA polymerase which initiates the process? They are each dependent on DNA for their synthesis and they are interdependent, exhibiting richness of design and organization.

Complexity

Sagan's second evidence for intelligence as the source of a code is complexity. He was looking for something complicated, intricate or involved. Complexity in DNA is reflected by the fact that there is no punctuation in the genetic code, which is a continuous stream of information. A shift of one or two base pairs in reading the codons results in a totally different protein being produced. For example, the sequence UCUGCAGGCUGA in mRNA codes for serine-alanine-glycine-"stop". If the sequence is delayed by one base and starts with the second base (i.e. C or cytosine rather than U or uracil) the amino acid sequence in the polypeptide would be leucine-glutamine-alanine. The polypeptide would be entirely different. Thus, the starting point is critical and must be marked.

Also, there are several large molecules (e.g. polymerase enzymes, mRNA, tRNA, ribosomes, and many other enzymes) that are necessary to open the DNA strand in order to transcribe the gene as mRNA in the cell nucleus. This host of other molecules is required then to transport and read the copy in the cytoplasm outside the nucleus, and to express the code by way of forming a protein molecule. Note that all the molecules that are required for this biochemical process to function are made by the same copying process, and the process is much more complex than outlined here.

Complexity is also seen when we further consider the translation of the copied information in the mRNA to make proteins. First, free amino acids in the cytoplasm of the cell become bonded to specific transfer RNA (tRNA) molecules. This requires a specific enzyme and adenine triphosphate (ATP) to provide the energy. The second step brings together the tRNAs, with their amino acids attached, and the mRNA with its codons. This occurs when the mRNA is fed through the ribosomal unit. The union between the sequence of codons in the mRNA and the complementary anticodons on the tRNA places the amino acid that is attached to the tRNA in a specific position to form the peptide bond and lengthen the protein that is being produced. The synthesis is complete when the ribosome reaches a stop codon on the mRNA, and the completed protein is released into the cell's cytoplasm as the product of this complex process. Much more detail exists in the processes of transcription and translation, but even this brief description of those processes underscores their amazing complexity. This supports a belief in intelligent action in creation.

Furthermore, DNA is also found in mitochondria and in chloroplasts where there are some minor code differences. Still, coding complexity is present and speaks for itself.

Internal Consistency

Sagan's third characteristic is internal consistency. This is reflected by the fact that usually each of the 64 codons has a single meaning in all organisms (Campbell, 1994, p. 187). The codons usually code for the same amino acids and functions. For example, in mRNA the codons AAA and AAG usually code for lysine. Also, UAA, UAG, and UGA usually code for the stop or termination process. The codon AUG does have a dual function, however. It codes for methionine and can also signal for the start of a polypeptide chain.

The many recombinant DNA applications of microbiology are dependent upon a code that is consistent. In one of these many applications, microbiological engineers can extract a gene of interest or produce a synthetic gene. That gene, which can code for a protein like somatostatin, for example, would then be inserted into the plasmid of a bacteria. When the genetically altered bacteria are grown in a culture, they produce somatostatin. Finally, as in this example, the somatostatin can be isolated from the culture and purified for use in a pharmaceutical product (Tortora, 1995, p. 237). The internally consistent code for amino acids makes these commercial ventures possible and successful.

Utterly Alien

In the fourth place, Sagan required that an intelligent message from space should be "utterly alien". By this Sagan (1980, p. 311) meant the coded message might contain "...insights on alien science and technology, art, music, politics, ethics, philosophy and religion...".

This fourth criterion raises several complex questions. Does "alien" mean another rational mind besides a human mind? If so, we would need to find ways to distinguish these non-human signals and to classify them as "intelligent". In the case of DNA, I submit that the *determinative* code relationships evident between codons, anticodons, and the amino acids in the resulting proteins are complex in a manner that is different or "alien" in comparison to the *symbolic* code relationships in human code systems.

In some instances the codons of DNA have been shown to code for such esoteric or "alien" phenomena as animal behavior. An example is the Tarantula Hawk, a blue wasp that preys on tarantulas. As seen in the Walt Disney Home Video, *The Living Desert* (1953), the female wasp, when ready to lay an egg, finds a tarantula and stings it, causing the tarantula to go into suspended animation. The wasp then digs a hole in the ground, places the spider in it, lays her egg on the spider, and covers it. The egg hatches into a larva that feeds on the tarantula. The larva then pupates to become an adult. The adult female subsequently repeats this unusual behavior. This is not a learned behavior because the mother leaves after laying the egg and never associates with her offspring. The only connection between the mother and daughter is the egg, indicating that the behavior is coded in the DNA in the egg in some fashion. Perhaps this sequence also classifies as alien with respect to ordinary coding relationships.

Conclusion

Sagan and other evolutionary astronomers have set up clear criteria for recognizing intelligence in messages from space. If the DNA code beautifully satisfies these same criteria, should we not embrace its intelligent creation? The characteristics observed in the genetic code and the mechanism for transcribing, reading, and expressing it, exhibit to a superlative degree all four of Sagan's criteria for identifying intelligence. For this reason the evidence for intelligence as the source of the genetic code is quite convincing.

On the other hand, claiming that the existence and functioning of the genetic code is attributable to the random reactions of natural processes is to disregard the criteria used in SETI to distinguish intelligence of a high level.

How will we interact with the codes? Sagan (1980. p. 311) suggested that we are not obliged to reply to a message received in the SETI program, particularly if the contents are offensive or frightening. As for the genetic code, there is no way to reply, yet it does elicit a response. One may respond by attributing the code to random natural processes because the incredible intelligence required to establish it is frightening, or because accountability to that Intelligence is considered offensive. Alternatively, one can logically attribute the genetic code to intelligent design by a Creator and seek Him.

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Book Review

The Universe in a Nutshell by Stephen Hawking
Bantam Books, New York. 2001, 216 pages, $25

This book follows the highly successful *A Brief History of Time* (Hawking, 1988). Once again, many copies will be sold but very few actually will be read. Hawking calls his approach to nature *the positivist view* (p. 31, 127). He describes this as the construction of models of nature and then extraction from them of assorted details and predictions. It doesn't matter if these evolving models exactly fit reality or not. Hawking optimistically believes that in this way, science approaches ever closer to the truth. This ultimate goal is sometimes called the "theory of everything."

Good descriptions are given of hypothetical black holes, higher dimensional "branes," and relativistic time travel. Almost every page includes color illustrations, although many are not explained very well. Much of the book concerns the quantum theory of gravity, Hawking's current interest, and he attempts to explain the underlying mathematical theory. I would give him a "C" for effort, but 99 percent of readers are unprepared for Hawking's brief mention of wave functions, Schroedinger Equation, singularities, and string theory.

One chapter concerns biological evolution which Hawking fully accepts. After reading all of Hawking's intense philosophical reasoning, I was amazed at his naïve answer to how our minds developed: "we don't know" (p. 161). There is no hint of suggestion that the Creator may have clearly explained the origin of life to us in the Bible. Also, in spite of Hawking's sharp mind, he fully accepts the computer-generated evolution nonsense promoted by Richard Dawkins (p. 162). In prewritten software called a *biomorph*, Dawkins produces an insect from raw atoms in just 29 generations. How Hawking can swallow this artificial non-evidence is incredible. I would suggest a challenge for Dawkins: Produce an insect from raw elements in the laboratory, given unlimited numbers of iterations. We will have a long wait.

In a further interaction with creation, Hawking shows an awareness of the young earth position. However, he denies this possibility because of the large size of the universe (p. 73). Apparently he is unaware of several creationist explanations for the distance-time paradox.

Hawking describes space as multidimensional. He sees the universe as "entirely self-contained; it wouldn't need anything outside to wind up the clockwork…This may sound presumptuous, but it is what I and many other scientists believe" (p. 85). There is clearly a great gulf between man's natural intellect and his wisdom concerning God.

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