OPEN ACCESS Freely available online

ISSN: 2329-6798
Modern Chemistry & Applications

Perspective

Amino Acids as Biomarkers of Extra-Terrestrial Life: Previous Approaches

Olivia William*

Department of Chemical Sciences, University of British Columbia, Vancouver, Canada

DESCRIPTION

Amino acids could have been inherited by extra-terrestrial life in this solar system under the second genesis hypothesis. If the additional α-amino acids were found in earth life which is evolved because they were essential for human life, and they have been necessary components of extra-terrestrial life biochemistry as well. This suggests that the first life on earth did not require all 20 biological amino acids. This can also have the number of the initially required nucleobases to three (codons), which are most probably known as adenine, guanine, and uracil. All these forms are found in meteorites. Cytosine, thymine, and uracil can be produced abiogenically by UV photo processing (pyrimidine in H_2O-rich ice mixtures that contain NH_4 or CH_4) Thymine poses lowest yield among the nucleobases which synthesized in prebiotic simulations to corroborates with absence in 11 different carbonaceous chondrites from the groups of CI, CM, and CR and also supports the hypothesis that RNA precedes the DNA in the origin of earth life. Selected set of amino acids would not determine the biochemical framework for extra-terrestrial life on earth, because macromolecules assume catalytic roles in biochemistry.

Several attempts have been done to use thermodynamics and its role of chance to guess the possible sets of amino acids. One approach is to consider where the natural selection would favor a certain sets of amino acids. Possibility can be evaluated by using the meteoritic amino acids for plausible alternative sets that could have been established randomly, by quantifying size and charge for these amino acids, by quantifying the coverage for a given amino acid set and by calculating the expectations of an random alphabets of the amino acids. It was concluded that the sets of 20 amino acids which was used by terrestrial life cannot be explained alone when viewed in the terms of size, charge, and hydrophobicity. Another type of analysis has been suggested a role of thermodynamics was to determine the order of amino acids entered in the standard alphabets. Meteoritic amino acids are the least cost to form. Thus, they were most abundant before lives arise. By justifying a randomly selected optimal set of amino acids for life, other type of analytical approach has been suggested for the involvement of factors such as rotational flexibility around the peptide bond and the cost of biosynthetic manufacture. After the latter argument amino acids would not have been selected by chance because amino acids require more biosynthetic energy than the meteoritic amino acids.

Another type of bio signature uses the relative rates of synthesis for the individual chemical species between the biotic and abiotic sources. Amino acids synthesized by abiotic processes are constrained under the laws of thermodynamics and kinetics which results in a distribution dominated by low formation energy, low molecular weight molecules. Formation of larger amino acids would require the formation of larger side chains, which ultimately produce the lower yields values due to their own kinetic barriers and the greater number of isomers. Biotic synthesis expending energy to synthesize isomers for amino acids which needed for survival and competition and an abiotic synthesis could produce smaller quantities of isomers of low molecular weight amino acids. By assuming the large sized amino acids can form abiotically but does not differentiate abiotic from biotic amino acids in both the terms of size and Gibbs free energy of synthesis.

CONCLUSION

Previous analyses on earth background pool of the 73 amino acid alternatives for life has also questioned by applied chemo informatics and structure generation studies in relation to isomer space which surrounding the encoded amino acids. When compared simultaneously in size, charge, and hydrophobicity with the standard amino acid alphabets. Only six sets will give better coverage out of the 10 possibilities were detected. When the six sets were compared with the coded sets of amino acids in terms of total heat of formation no alternative sets was less energetically costly. Based up on these criteria no functional criteria were explicitly considered as dimensions of chemistry space in their analysis. It was concluded that the encoded amino acids have to represent any of amino acids in aqueous biochemistry. However, most of the focus on the use of amino acids for extra-terrestrial life detection is mainly by simple amino acids.

Correspondence to: Olivia William, Department of Food Science, University of Toronto, Ontario, Canada, E-mail: isla123@gmil.com

Received: 28-Oct-2022, Manuscript No. MCA-22-19220; **Editor assigned:** 01-Nov-2022, PreQC No. MCA-22-19220 (PQ); **Reviewed:** 14-Nov-2022, QC No. MCA-22-19220; **Revised:** 21-Nov-2022, Manuscript No. MCA-22-19220 (R); **Published:** 29-Nov-2022, DOI: 10.35248/2329-6798.22.10.386

Citation: William O (2022) Amino Acids as Biomarkers of Extra-Terrestrial Life: Previous Approaches. Modern Chem Appl. 10:386.