“What’s the Problem with the Evolution of Amino Acids?”

Dr. Bohlin,

I have heard you describe on “Point of View” the probability of amino acids forming proteins on their own as being astronomical. Can you direct me to an article or will you briefly describe to me why covalence is not a possibility when considering the formation of amino acids and eventually proteins?

There are two primary problems for the origin of proteins on the early earth. The first is chemical and the second is informational.

The chemical problem arises from the nature of the peptide bond which links amino acids in proteins. In linking the carboxyl group of one amino acid to the amino group of the other, a molecule of water is released. Since almost all early earth scenarios take place in the presence of water, the high concentration of water will prevent the linkage from taking place. The high energy needed to cast off a molecule of water in an aqueous solution is very high. Cells overcome this barrier through the action of the ribosome, a combination of RNA and several proteins which allows the linkage reaction to take place in a protein fold devoid of water. But in the early earth there are no proteins or RNA.

The informational problem arises from the fact that not every sequence of amino acids is useful for life-giving processes. Current estimates suggest that as many as 200 different proteins are necessary for life. Each of these proteins requires a specific sequence of amino acids in order to function. One calculation that has been verified experimentally, shows that a 100 amino acid protein requires a

specificity of sequence that has only a 1 in 10 to the 65th power probability of occurring by chance alone. This even allowed for most amino acids to be substituted by similar amino acids in the sequence. So one not only has to manufacture one protein but hundreds, and then bring them together in a membrane like structure, in order for life to take hold. The odds are enormous.

One other problem is also chemical. Amino acids are among the many organic compounds (made of carbon, hydrogen, and oxygen) that exist in two different structural forms called stereoisomers. One form will rotate polarized light to the left (left-handed) and the other will rotate polarized light to the right (right-handed). When amino acids are formed chemically, that is apart from a living system, both forms are produced in equal numbers. However, the amino acids of proteins from living organisms are almost exclusively left-handed. No one knows of a chemical process to achieve this result.

A good technical summary of this and other problems can be found in Thaxton, Bradley and Olson's *The Mystery of Life's Origin*. Probe makes this book available on our website for $10.

Respectfully,

Ray Bohlin
Probe Ministries

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