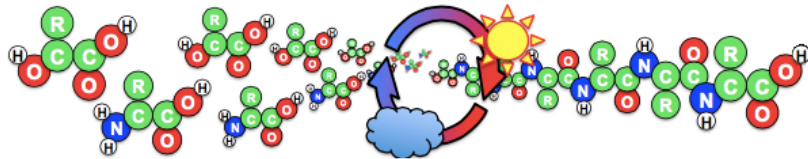


Stepping Toward the Origin of Life

A new study uncovers clues about an important step in the formation of molecules essential for the origin of life on the early Earth.

- Amino acids were present on the early Earth, but how they first became linked into chains, called polypeptides, has been a mystery. Modern cells use enzymes to speed up polypeptide production, but these were not available on early Earth.
- New research has identified a reaction that could have produced polypeptides using α -hydroxy acids, molecules that were likely present on the early Earth alongside amino acids.



Amino acids form peptide bonds when subjected to wet-dry cycles in the presence of hydroxy acids, a reaction that could have occurred on the prebiotic Earth.

Forsythe, Jay G. (2015) *Angewandte Chemie*.

Artist concept of the early Earth. Molecules like amino acids would have been delivered by asteroids and meteorites.



- During wet and dry cycles, similar to those that may result from tides in shallow environments, hydroxy acids enable amino acids to link together. Although the linkages they create are a mixture of different types of bonds, repetition of the process enriches the type of bonds seen in modern polypeptides
- The study identifies an easy, robust, and plausible route to peptide synthesis – an essential step in the origin of life – and has implications for these processes in environments, such as early Mars, which were very similar to the early Earth.