Origins of life on Earth


How did the first cells on Earth arise? In a minimal cell, a membrane separates proteins and RNA from the surrounding aqueous environment. Cell-like membranes spontaneously assemble from simple prebiotic surfactants called fatty acids. However, fatty acid membranes are unstable in solutions containing salts that are likely present in environments of the early Earth. In this paper, we reported that amino acids, the building blocks of proteins, bind to fatty acid membranes and stabilize them against salts. Moreover, enhanced stabilization persists after dilution as would occur when a dehydrated pool refills with water – a likely setting for the emergence of cells. In addition to providing a plausible explanation of how the first membranes were stabilized, our findings answer the question of how key components of the first cells could have colocalized. This paper was covered by several science communicators, including Ed Yong for The Atlantic, and by Hank Green for The SciShow.