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TITLE: Implications of extraterrestrial material on the origin of life

ABSTRACT BODY:

Abstract Body: Stanley Miller's discovery of an abiotic organic synthesis relevant to the early earth provided a route to the scientific consideration of the origin of life. Since the 1950s, several thousands of experiments have shown that the precursor molecules to living biochemical systems could come about naturally. That these processes are active in the universe has been demonstrated by the detection of organic molecules in chondritic meteorites. Indeed, the very delivery of organics by extraterrestrial material may have been a viable source of important prebiotic molecules on the early earth. In this talk I will review the delivery of organics and other elements to the early earth, and will attempt to quantify the mass of material that might have been present from extraterrestrial sources on the early earth.

The flux of prebiotic material on the early earth was influenced by the increase in delivery in the early history of the solar system, and by the sources available in the early solar system. Carbonaceous asteroids, comets, stony chondritic bodies, and differentiated asteroids each would have provided different materials to the early earth. The atmosphere would have provided a filter for some of this material, and the amount that reached the earth's surface would have depended on material strength, angle of entry, and atmospheric composition.

Previously I reported that carbonaceous chondrites and micrometeorites would have provided a diffuse source of organic molecules on the early earth, whereas differentiated asteroids would have provided concentrated point sources for other materials, such as phosphorus (Pasek and Lauretta, *Origins of Life and Evolution of Biospheres* 2008). These results are reconsidered in the light of new ideas on the bombardment history of the early solar system, and with new considerations of the composition of source material that reached the earth.

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