

## **ORIGIN OF GENETIC MATERIAL: LOOKING FOR THE ANCESTRAL CRADLE**

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Beginning from the publication in 1938 of the famous book of A. I. Oparin [1], a large number of hypothesis have been proposed regarding the origin of life on Earth. In his book, Oparin suggested that the building blocks of complex macromolecules were readily obtained under aqueous conditions from simple compounds that likely existed on early Earth [2]. However, the fact that the right components were present in primeval habitats is not sufficient by itself to explain the appearance of complex bio-polymers (polypeptides, polynucleotides). The formation of these macromolecules required the polymerization of single components. As biological polymers are generally formed by dehydration it is difficult to conceive that these macromolecules could have originate by random collision in the presence of a high concentration of water. This is particularly cogent in the case of RNA molecule, which is supposed to have been the first genetic molecule to appear on Earth, in the era known as the “RNA World” [3]. It was J.D. Bernal who first suggested in 1951 that clay minerals could have played a key role in chemical evolution that culminated in the origin of life because of their capacity to take up, concentrate, protect, and catalyze the polymerization of molecules [4]. In this lecture, I will discuss the results obtained in different fields that strengthen the hypothesis of a clay-surface origin of genetic material.

### **References**

[1] A. I. Oparin, *The Origin of Life*, MacMillan, New York, 1938.

[2] S. L. Miller and L.E. Orgel, *The Origin of Life on the Earth*, Prentice-Hall, Englewood Cliffs, 1974.

[3] G.F. Joyce, *Nature*, 2002, **418**, 214.

[4] J.D. Bernal, *The Physical Basis of Life*, Routledge and Kegan Paul, London, 1951.