ORIGIN OF LIFE ON EARTH: CURRENT MODELS

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Origin of life remains one of the most difficult and intriguing problems in life sciences. Ever since Louis Pasteur disproved spontaneous generation, scientists have been struggling to find plausible scenarios of gradual prebiotic evolution. Over the last few decades, major advances have been achieved in understanding how the gap between inanimate matter and the first life forms could have been filled. Important insights are coming from inorganic chemistry (e.g., plausible ways of abiogenic synthesis of key organic compounds have been found), biochemistry, molecular biology and comparative genomics (e.g., theory of RNA world; models of evolution of protein synthesis and ribosomes; reconstructions of gene content of LUCA, etc.) and other disciplines. In line with A.I.Oparin's ideas, artificial 'protocells' with lipid membranes have been designed, capable of growth, division, and even, to a limited extent, non-enzymatic DNA and RNA replication. Overall, most major gaps are being gradually filled, so that estimates of probability of origin of life on an Earth-type planet tend to grow, thus increasing our chances to find life elsewhere in the Universe.