COLD ABIOTIC CONDITIONS AND THE FORMATION OF PROTOMEMBRANES

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Greenhouse-effect calculations, Kuhn and Atreya (1979), Sagan and Mullen (1971), carried out on a presumed NH3/CH4/H20 early atmosphere suggest a low surface-temperature development on the abiotic Earth, Simionescu et al. (1986), Simionescu et al. (1987a). The surface-temperature follow up a cyclic route determined by the physico-chemical processes which take place in the atmosphere with a permanently changing composition. Cold surfaces determine low partial vapor-pressure values and consequently the extention of the cold plasma state (early Ionosphere) into the close vicinity of the ground level. It can be suggested, that the fourth state of the matter represented the main energy source on the abiotic Earth. Simulating these conditions in a cold plasma reactor prebiotic synthesises were carried out, Simionescu and Denes (1986, 1981), Simionescu et al. (1981, 1982, 1985a, 1985b), simionescu et al. (1987a, 1987b). Depending on the relative ratio of the feed composition polypeptide-, polysaccharide-, and lipid-like structures have been synthesized. The macromolecular structures are predominant in the raw reaction products. At the end of the reaction and during the melting up of the ice these polymeric structures selfassemble spontaneously in uniformly sized membraneous microspheres with protobiological properties.

This paper is concerned with the synthesis of functional protomembranes under simulated primeval Earth conditions, according to the Cold Theory. They are stable under thermal and radiant energy conditions, and also survive within pH 6-9 range. The membraneous microspheres arise through selfassemblance from the lipid-like structures. The electrical membrane potential of the microspheres was monitored within the raw reaction product

"environment". Dimensional distribution analysis carried out on the microsphere populations points for a narrow diameter range. The photoexcitability of the wall-membrane, under the action of UV light was demonstated.

These findings suggest that experiments carried out according to the "Cold Theory" can result in the formation of functional protomembranes.

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