

THE ROLE OF PIGMENTS OF THE MELANIN-MELANOIDIN TYPE
IN THE SUCCESSION OF THE PREBIOLOGICAL AND BIOLOGICAL
EVOLUTIONS

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The principle of selection based on "kinetic perfection" when the most intensive formation and accumulation of substances were more advantageous, was likely to be used in the course of the prebiological evolution. Since metabolic processes are catalytic one can assume that the direction and intensity of the processes of the chemical evolution, leading to the origin of life, were determined by the presence of appropriate catalysts as well.

Taking into account the important role of the quinone and imidazole structures in the catalytic function of many enzymes we can suggest that the abiotically formed pigments of the melanin and melanoidin types, containing heterocyclic nitrogen bases in their structures, might have been the catalysts of prebiotic processes.

We found that UV irradiation of aqueous solutions of acetaldehyde and ammonium nitrate resulted in the production of pigments of the melanin-melanoidin type, along with amino acids, peptides, pyruvic acid, indoles and imidazoles. The pigments obtained catalyse the peptide formation in the dilute solution of amino acids, as well as the oxidation-reduction processes that usually are catalysed by peroxidase, alcohol dehydrogenase and lactate dehydrogenase.

On the other hand, the pigments of the melanin and melanoidin types function in living organisms being at different evolutionary levels, and they are more efficient under extreme conditions (UV irradiation, etc).

The pigments of the melanin-melanoidin type that had been formed and had functioned during the prebiotic evolution continued to function during the biological evolution and this we consider as an aspect of the succession of the prebiological and biological evolutions.