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Stochastic kinetics of formation of mutational protein nanoparticles and mesoobjects

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The commonly accepted scheme of proteins construction is presented in such a manner that a volumetric-packed nanoparticle is formed from nanochains as a result of the twisting and the mutual arrangement of various polypeptides in the presence of nucleic acid molecules. At the same time there is another scheme of arrangement of biological nanoparticles, in which as a result of rotational-vibrational interaction of amino acid molecules, their direct volumetric polycondensation can occur. In the proposed in way of considering the stochastic mechanism of protein nanoparticle synthesis, the principle of uncertainty assumes the possibility of mutation of biological objects at a molecular level. Based on typical sizes and masses of seeds (molecules of glycine, alanine, valine and tryptophan), there have been determined the most probable sizes of nanoparticles, corresponding to proteins, as well as the maximum sizes of mesoobjects, corresponding to some cells and organelles. The calculated results testify to the fact that at the "instant" excitation of a biological system, e.g., under absorption of the radiation energy of various natures, it is possible that nanoparticle and mesoobject significantly increase in sizes, and low density lipoproteins and leucocytes are formed. This fact does not contradict to the known medical facts of formation of mutations and tumors or development of atherosclerosis and leukemia under the effect of ray penetration into an organism. Characteristic sizes of continuous protein nanofibres were calculated. These values approximately correspond to the thicknesses of collagen, myosin, and human neurofilament. Recently, the characteristic diameter of hollow neurofibre has been calculated too. The obtained results are indicative of the fact that in the system of amino acid molecules, accidental formation of quasi-crystalline nanoparticles and mesoobjects corresponding in their sizes to essential proteins and cells is possible. These "incorrect" (mutational) objects can grow on these or those crystallization centers without formation of polypeptide bonds, i.e., without formation of "correct" biological code. All this is in compliance with the generally known concepts concerning mutations of biological structures at a molecular level.

Biography

Emil Edipovich Lin is the Principal Research Associate of the Institute of Physics of Explosion in Russian Federal Nuclear Center – VNIIEF, Russia.

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