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Life Origination and Development Hydrate theory (LOH-Theory): new approaches to the problems of the optimal nutrition and life prolongation

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Abstract

Life Origination Hydrate Theory (LOH-Theory) and Mitosis and Replication Hydrate Theory (MRH-Theory), both grounded on the notion of honeycomb gas-hydrate structures formation/destruction as the physicochemical phenomenon governing the DNA origination and replication, allow new approaches to the optimal nutrition and life prolongation problems.

1. Introduction

We believe that just the DNAs transformations represent proper life and the protein production is the result of side processes that accompany them; the protein accumulation within cells and on DNAs leads to deceleration in the cellular replication and senescence [1]. For example, according to [2], "both *in vivo and in vitro* in human as well as in rodent cell populations, the rates of cellular replication are significantly decreased with cellular aging". There are some hypotheses that are intended for understanding this effect; however, no scientifically grounded explanation exists.

Optimal nutrition and life prolongation

We assume that, if nothing hampers replication of DNAs, they increase in number by the law $N_1 = 2^n$, where N_1 is the number of the DNA mono-strands produced from any one DNA mono-strand as a result of n replication events, and that two most harmful phenomena decrease the rate of DNA replication under favorable ambient conditions with no agitation: the fatal mutations (N_2), including the mistakes in the replication process, and covering DNA with protein (N_3). Apparently, just the latter phenomenon has a determining harmful effect on the replication process intensity and on the life duration; the DNA strands are overgrowing continuously with protein and thus become centers of protein condensation and log out life development. It is sufficient to specify the realistic laws of N_2 and N_3 increase with the number of the DNA replications and to calculate the n value at which $N_1 - N_2 - N_3 = 0$. Just this n value responds to the cell-death state. One more phenomenon influencing (*ceteris paribus*) the rate of DNA replication is filling the cells with excessive proteins retarding the diffusion processes and, thus, is capable of influencing the intracellular exchange processes. The intracellular content of proteins increases from one generation to another. Two last effects are of diffusion nature and can be summarized, to a first approximation, in N_3. For a multicellular organism, the realistic number of the effective DNA replications for any cell from its birth to its death is available; it is about 50 [3]. The data on the frequency of fatal mutations are also available. It is possible, that either the N_2 or N_3 term could be regulated; regulation of N_3 is most prospective.

The LOH-Theory allows new approaches to the problem of food and energy necessary for living organisms. They follow from the relations between the living matter, as a multitude of DNAs, and the proteins, as side products of the DNAs extended reproduction, and between the living matter and the food, as the source of such a reproduction. Such substances as hydrocarbons with −4-valence C, NO_3^-, and PO_4^{3-} are sufficient (in the presence of hydrate matrix) for the life maintenance and protein production [1]. After our thermodynamic calculations, there is no doubt that these processes require no energy and, furthermore, they evolve much energy [1, 4]. The processes of the primary living matter formation had no difficulties in dissipation of this energy because of their slowness. As biota expanded, some living organisms began to "feed on" other organisms from the immediate environment. The "organisms-killers" decomposed the bodies of the "organisms-victims" to nucleosides and phosphate

groups and used this material for their own extended reproduction. They were the first animals. Other organisms, i.e. plants, continued to use the mineral food. Possibly, origination of the animals and plants was dependent on the DNA concentration in the parental hydrate matrixes before their liquation and in the semi-liquid super-cytoplasm soup resulted from the matrix liquation. This "food revolution" increased the rate of the extended reproduction of the "animals", because the necessity for the DNAs syntheses from minerals disappeared. At that, the heat evolution decreased as a consequence of the necessity for the endothermic food destruction. After this "heat revolution", the process of the DNA replication became almost autothermal, because the chemical states of the food and newly formed organisms were closely related in their composition and structure. To perform an external work, an additional energy became necessary. This led to the consumption of additional amounts of food and to the exothermal synthesis of additional protein. This protein was unnecessary for the life development process. Moreover, it retarded this process; however, the heat of protein synthesis was necessary for living organisms to do external work. In the course of subsequent species evolution, living organisms could realize new means to do external work.

According to our concept, just DNAs (and RNAs) or, more precisely, the original −4-valence C and PO_4^{3-}- and NO_3^--ions, which are the primary sources of the food substances, rather than the proteins, fats, and carbohydrates as such satisfy the biological requirements of the animal organisms in the energy necessary for the functioning of the organisms and for the production of the external work by them.

Thermodynamic calculations support this concept. The necessary energy could be produced as a result of formation of proteins and other organic products rather than as a result of their oxidation in the bodies of living organisms. Factually, the −4-valence C and PO_4^{3-}- and NO_3^--ions can be introduced into the animal organisms as such or in the form of DNAs and RNAs and the necessary amounts of this "food" can be estimated from the real rates of DNA replication. Of course, each present-day animal organism may include not only nucleic acids but also proteins, lipids, monosaccharides, polysaccharides, and different other organic substances, tissues, and fluids (all produced by the source triad of substances) and each of the organisms is in need of some food for reproduction or extended reproduction of these components and for the intra-organism circulations and production of an external work. The amount of energy that is necessary for these processes and for the production of any external work can also be estimated. According to the conclusion from the LOH-Theory, the calorie content in the food does not determine its quality. Apparently, new notions should be used as the basis for optimal nutrition calculations.

In our opinion, the way to the life prolongation for animals runs through regulation of the composition and quantity of the food in the context of the principles given above. At a definite and carefully checked stage of life, when further increasing in the body mass is not necessary, the food amounts should be minimized and the preference should be given to the food with a maximum content of DNAs as such and minimum content of the input protein. Apparently, the closer the chemical composition of the food to that of DNAs and the lower the excessive protein content in it, the less the probability of protein accumulation in cells and the greater the chance of life prolongation. These conclusions on the food effect on the life duration are not far from some empirical recommendations, such as the cereal diet or Bragg's feed system [5].

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