

Euro Structural Biology 2019: Genetic mechanisms of development an organism from its birth to death - Ponizovskiy M.R - Kiev Regional Hospital, Germany

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Abstract

The mechanism forming and development a human eukaryotic organism from single pluripotent cell was described from the point of view of thermodynamics, biophysics and biochemistry. The metabolic mechanisms of an organism during its life are subjected as to outer influences from surroundings as well as to inner influences. An organism expends some energy from Basic Internal Energy which is stored energy in Basic [stem cells](#) (neurons of Central Nervous System) which share energy via sequentially Basic stem cells → Totipotent stem cells → Pluripotent stem cells → Multipotent stem cells → Oligopotent stem cells and then distributing between cells various types leading to cells' proliferations. However this expenditure Basic Internal Energy results in senescence of an organism. Just mechanisms of [genomic](#) processes activity are the links of mechanisms stem cells operations which cause advance an organism during its life determining duration life of an organism. In a developing embryo, stem cells generate differentiation into all the specialized cells forming corresponding tissues (ectoderm, endoderm, mesoderm etc.). These transformations of stem cells maintain stability each tissue of an organism, such as blood, skin, intestinal tissues etc. These transformations of stem cells are the potency of obtained energy which specifies differentiation into different cell types of the stem cell. Also there were described mechanism Gametogenesis, impregnation ovum by sperms and foetus growth from single cell considering flows energy from stem cells to cells types which cause transition diploid cellular division through mitosis into haploid cellular division through meiosis and back into diploid cellular division through mitosis which are subjected to Boltzmann theory of transition microstates into macrostate as increased Entropy into decreased Entropy for saving energy. The genesis and development of an organism was explained using famous Prigogine theorem and Glansdorff and Prigogine theory sharing into such stages of human life development: born of an organism, babyhood, childhood, young age, juvenile

age, middle age, full age, elderly age, old age. There was estimated levels metabolic activity of each stage of human life. Also all stages of human life development were considered via energy flow which generates cells developments through stem cells into cells types. The mechanisms of these transformations cells were described from point of views of thermodynamics, biophysics and biochemistry. In a development babyhood and childhood, stem cells exert expression metabolic processes operations stimulating hormonal processes and immune defensive processes. In a development young age years and juvenile age years, stem cells continue exertion metabolic processes operations stimulating hormonal processes and [immune defensive processes](#) as well as forming sex organs, sex characters and Gametogenesis with possible generating foetus cells which receive energy from mother's stem cells. In a development middle age years and full age years, stem cells continue maintenance stability Internal Energy an organism, its hormonal and immune functions. In elderly age years, stem cells have less energy than in middle age and full age for continue maintenance stability Internal Energy an organism, its hormonal and immune functions. In aging organisms, stem cells have insufficient energy for continue maintenance stability Internal Energy an organism, its hormonal and immune functions.

This work is partly presented at Joint Event on Euro Structural Biology & Clinical Trials and NanoPharma on March 18-19, 2019 held in Paris, France