EMJ MS
EUROPEAN MULTIDISCIPLINARY JOURNAL OF MODERN SCIENCE
ISSN 2750-6274 https://emjms.academicjournal.io Volume: 9 | August-2022

Ontogeny - Laws of Individual Development of Living Organisms

Nazarova Dilfuza
Academic Lyceum of the Institute of Economy of Karshi Teacher of Biology

Annotation: The theory of filembriogenesis is only an introduction to the problem's development of ontogeny' and phylogeny' relation (hereinafter — «relation»). Discussions as to whether ontogeny creates phylogeny, or vice versa, are devoid of meaning. The opinion of O. Hertwig (Hertwig, 1906) that the ontogeny and phylogeny are two parallel and independent developmental processes is valid only in the first part; thesis about independence distorts the essence of «relation.» According to the authors, one of the essential characteristics of the «relation» is that ontogeny gives the material for phylogeny, and phylogeny renews ontogeny, leading away ontogeny from inbreeding; that ontogeny ensures the life continuity and phylogeny — its differentiation, that is, creates biodiversity; that ontogeny and phylogeny can exist and function only in conjunction or in parallel, changing places (in terms of priority) in the life evolution.

Keywords: Ontogeny, Phylogeny, Method, Relation, Evolution.

INTRODUCTION

One of the first, Karl von Baer (1828) was interested in connection between characteristics of developing embryo and adult animals that is known as von Baer's rules. The recapitulation rule was formulated by Fritz Müller (1864). A little later, Ernst Haeckel (1866) transformed the rule of recapitulation in the biogenetic rule, also known as the Haeckel-Müller's rule (cited by Severtsov, 1939). And the scientific foundation for the study of relationship between individual and historical development of organisms was established by Charles Darwin.

MATERIALS AND METHODS

Ernst Haeckel stated in the biogenetic rule that ontogeny recapitulates phylogeny, and phylogeny is a me- chanical cause of ontogeny. The biogenetic rule, as well as some Haeckel's definitions, was received by scientific community ambiguously: from complete acceptance to harsh criticism and denial. Nevertheless, according to A. N. Severtsov, the rule positively encouraged embryological studies and extensive discussions on Haeckel's generalizations. Debates about the extent of recapitulations, value of coenogeneses had escalated into a general biological problem of the relationship of individual and historical development of organisms, or the develop- ment of an individual and species evolution, or connection between ontogeny and phylogeny (surveys and review: Severtsov, 1921, 1939; Mirzoyan, 1963; Raff, Kofmen, 1986).

RESULTS AND DISCUSSION

According to Severtsov, phylembryogenesis are "changes (of organs — MK), related to this or that extent with evolution of adult animals and irrelevant to embryonic adaptations" (Severtsov, 1921, p. 169). In conclusions to that publication he specified: "...the phyloge- netic changes in course of embryonal development, that are formed in natural correlation with

changes in adult animals and at the same time are not embryonic adaptations directly,we have identified in a special category and designated by the term "phylembryogenesis"(Severtsov, 1921, p. 288). Severtsov contended that "ontogeny is a function of phylogeny". The theory of phylembryogenesis has been discussed by Russian scientists. The most comprehensive critical and historical analysis is presented, in my opinion, in the monograph of E. N. Mirzoyan (1963) that deals with the history of this issue.

Ontogeny and its evolution were the subjects of study, discussions and comprehen- sion of numerous authors. Here are referred only generalized publications and surveys (Mirzoyan, 1963; Kamshylov, 1970, 1979; Korotkova, 1979; Svetlov, 1972; Shishkin, 1981, 1988, 2012; Raff, Kofmen, 1986; Korochkin, 2002; Desnitsky, 2005; Krasilov, 2006). In gen- eral, according to cited authors, series of events on the stages of chemical and biochemical evolution of our planet had resulted in emergence of ontogeny. There are many questions and a few answers, and those are hypothetical, in discussion devoted to the evolution of ontogeny. It is likely an axiom only, that ontogeny had to evolve simultaneously with the origin and evolution of life, and to be formed with becoming of individuality.

V. I. Vernadsky (1967, 1991) supposed that life had existed originally not in the form of organisms, and as a substance of the biosphere. Amongst the trends in biosphere evolution Vernadsky specified: energy accumulation; initiation of new forms of chemical elements migration; that biogenic migration of atoms is tending to maximum; substantial increase of significance of **the living matter** in formation and regulation of the Earth surface layers. Important role he attributed to existing system of the turnover of matter and energy in the biosphere. That turnover, running away from entropy, constantly requires intensification in biogenic migration of atoms that respectively requires new forms of migration and ex- pansion of resources used in the biosphere.

It seems that "new forms of atoms migration" could be realized by the life forms, main-ly, that only able to intensify the biogenic migration of atoms (Kovtun, 2006). Of course, the stability of the turnovers (cycles) could be provided by the stable operation of their components. Stability could have components that were able to realize their unique func- tion in the cycles during long time, persistently upgrading it in dynamic environment and the growing requirements of cycles and the biosphere as a whole.

The ontogeny evolution is considered in numerous publications and by different authors, while the phylogeny on the contrary is out of attention of evolutionists. (V. A. Krasilov (2006) supposes that such area of investigations is monopolized by molecular phylogeny at present). Paleontologists have formulated over a hundred of so-called laws of evolution in the last half a century (Rautian, 2006). A. S. Rautian (2006; p. 21) observes: "It is difficult to adduce more uncertain area of the theory of evolution than the doctrine of the laws of phylogeny".

CONCLUSION

Concepts of the succession in development, induction, ontogenetic equifinality... call for restraint in assessing the phylogenetic potential and prospects of deviations in the de- velopment of organs in embryogenesis (but not denial!), as well as possibilities of large- scale change of the process of embryogenesis.

If the main objective or function of ontogeny is reproduction (propagation), the main objective of phylogeny is an establishment of biodiversity by means of adaptive radiation of the products of ontogeny.

All stated above adduce to the main conclusion that one of the essential characteris- tics of the relationship between individual and historical development (development of individuals and species evolution; ontogeny and phylogeny) is that ontogeny provides the continuity of life, and phylogeny supports its differentiation or diversity (biodiversity) and renewal of

ontogeny. Both phenomena could not exist one without the other, as life and its evolution would have been impossible.

REFERENCES

1. Anokhin, P. K. 1970. The theory of functional systems. Advancements of Physiological Science, 1 (1), 19–54 [In Russian].
2. Anokhin, P. K. 1973. Fundamental issues of the general theory of functional systems. Principles of the system organization functions. Nauka, Moscow, 5–61 [In Russian].
3. Desnitsky, A. G. 2005. Evolutionary transformations of sea urchins ontogeny. Ontogeny, 36 (3), 182–189 [In Russian].
4. Es'kov, K. Yu. 2000. History of the Earth and life on it. MIROS, Moscow, 1–351 [In Russian]. Kamshylov, M. M. 1970. Biotic cycle. Nauka, Moscow, 1–160 [In Russian].
5. Kamshylov, M. M. 1979.Evolution of Biosphere. Nauka, Moscow, 1–256 [In Russian].
6. Korotkova, G. P. 1979. Origin and evolution of ontogeny. Izdatelstvo Leningradskogo universiteta, Leningrad, 1–282 [In Russian].
7. Korochkin, L. I. 2002. Ontogeny, evolution and genes. Nature, 7, 1–12 [In Russian].
8. Kovtun, M. F. 2006. Causes and Factors of Evolution from the Positions of the System Approach (Biosphere as an Arena of Evolutionary Processes). Vestnik Zoologii, 40 (6), 483–495 [In Russian].
9. Kovtun, M. F. 2013. Ontogeny: the phenomenon and the process (to the problem of ontogeny evolution). Vest- nik Zoologii, 47 (3), 195–204.
10. Krasilov, V. A. 2006. Paleontology and paradigms of modern natural history. In: Evolution of Biosphere and Biodiversity. KMK, Moscow, 7–19 [In Russian].