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CELL THEORY AT THE PRESENT STAGE

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ANNOTATION
The article deals with the cellular theory at the present stage. The cell is a unit of structure, physiology and biological organization, maintains a dual existence as a separate entity and a building block in the construction of organisms.
KEY WORDS: ***structure, organization, cell, theory, crystal, organism, genetic code.***

It is now perhaps generally accepted that cell theory (GT) is one of the fundamental ideas of modern biology. Modern formulations of GT (cell theory) are characterized by a certain liberty, which is largely due to its already historical nature, the loss of relevance to a certain extent, and the metaphysical interpretation of a number of issues.

T. Schwann in 1839 summarized his own and M. Schleiden's observations in three positions of GT:

1. The cell is a unit of structure, physiology and biological organization.

2. The cell maintains a dual existence as a separate entity and a building block in the construction of organisms.

3. Cells are formed by the formation of free cells, similar to the formation of crystals.

Schwann's main mistake was his opinion after Schleiden about the possibility of the emergence of cells from the structural non-cellular substance de novo. The value of cell division, mitosis was not yet completely represented. It was firmly established in the 1870s so that the third postulate of the original GT appears to be incorrect.

The first postulate of GT ("The cell is a unit of structure, physiology and biological organization") is usually interpreted as the fact that there is no life outside the cell. But viruses are unconditional biological objects - they are "related" to all cellular objects because they use the same standard genetic code, they need proteins. Not a cell, but rather a standard genetic code - evidence of the unity of life. This makes it possible to extend the "unity of life" to viruses as well.

It is usually said that viruses are not living organisms, if metabolism (and energy) is taken as a necessary and sufficient property of organisms. But, in truth, they have a metabolism - when they are activated in the cell! Everything is like everyone else. And what we see on supermicrographs or reconstructions is their resting stages. Like plant seeds, worm eggs or ciliate cysts. They also say that viruses are not capable of too much on their own (replication there, metabolism and energy, etc.). But they are obligate primary parasites. They don't have to do anything on their own. All at someone else's expense. Viruses are both the object and the subject of biological evolution. Actually, viruses are the most numerous biological objects on this planet. Probably, we can talk about the "cellular minority". This, by the way, is about you and me. "There is no life outside the cell".

From the first postulate of GT, it is usually concluded that a cell is homologous to a cell. But prokaryotic and eukaryotic cells are structurally different. Eukaryotic cells are relatively prokaryotic in the light of endosymbiotic theory, they are multicellular constructs, and in this sense, they are not completely homologous to prokaryotic cells. Prokaryotic cells

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correspond ("homologous") to mitochondria and chloroplasts, and apparently also to a protoeukaryotic cell derived from Asgardarchaeobacteria. The direct phylogenetic connection of eukaryotes with one of the groups of archaebacteria destroys the concept of three domains of cellular organisms. There are only two domains: archaebacteria and eubacteria [3].

The second postulate of GT is aptly formulated as all known living beings consist of one or more cells. A simple observation, as we see it now. In addition, it is relevant only to the "multicellular minorities" (to which we ourselves belong), since there are much more unicellular organisms than multicellular ones. Just like there are more viruses than cellular organisms.

The third postulate of GT ("the cell is only from the cell") is due to the genetic continuity of the three main components of the cell - the genetic apparatus, membranes and cytoplasm (cytosol). "Chromosomes only from chromosomes", "membranes only from membranes", "cytoplasm only from cytoplasm".

These components are not formed in the cell de novo, by self-assembly. Other components of the cell (cytoskeleton, prokaryotic and eukaryotic flagella, ribosomes, cell walls, etc.) do not have such continuity and continuity in time.

There are 3 main (initial) components of the cell: membranes, cytoplasm and genetic apparatus. The membranes are responsible for the delimitation of the intracellular space, more precisely, the substance (protoplasm) from the extracellular and its derivatives (ER lumen, vacuole cavities, mitochondrial intermembrane space, etc.) of their interaction. The cytoplasm is responsible for metabolism, energy, protein biosynthesis. The genetic apparatus (DNA) is responsible for the information support of life and its evolution.

The continuity of the genetic apparatus is obviously based on the copying of hereditary information - DNA nucleic acid molecules ("each molecule from a molecule"). All elements of the cell's genetic apparatus (chromosomes, nucleoids, viroids, plasmids, etc.) are ultimately apparently homologous, homophyletic, since they originate from the archa-ancient genetic program. The "guarantor" of this conclusion is the universality of the standard genetic code.

Protoplasm (~hyaloplasm, ~cytosol) is the initial and indispensable component of the cell. Here, protoplasm means "living slurry or glue, gel" minus membranes and the genetic apparatus (DNA). It "opposes" (logically, topographically), delimited from the external environment of the cell and its derivatives - the contents of the endomembrane system. The protoplasm dies with the cell and comes only from the living protoplasm.

The nucleoplasm is a specialized part of the eukaryotic protoplasm. It specializes in replication, transcription, splicing (and mRNA processing in general), and ribosome assembly. It is believed that the spread of splicing in protoeukaryotes required the need to uncouple translation and transcription, and, as a result, the formation of the nuclear envelope [2].

Unlike the cytoplasm, the nucleoplasm, like the protoplasm of prokaryotes, is immobile and lacks actin-myosin mobility. Perhaps, the mobility of the cytoplasm required that DNA strands be protected from it with the help of the nuclear envelope [1].

The cytoplasm of a eukaryotic cell corresponds to the stroma of chloroplasts and the matrix of mitochondria as originating from the cytoplasm of endosymbiont prokaryotes. All protoplasms are homologous to each other, in the sense they have the same origin. Nothing indicates that eukaryotic cytoplasm can fuse with mitochondrial matrix, plastid stroma, or endosymbiont cytoplasm. The periplasm of gram-negative bacteria (the space enclosed between the plasma and outer membranes) is obviously not homologous to their protoplasm, but rather corresponds to the external environment.

With the formation of membranes, it became possible to speak of a primary living cell, the contents of which were separated from the external environment by a fairly reliable barrier. Primary, apparently the plasma membrane. This is probably the first "organ" of the cell, providing its isolation, protection of its protoplasm, its metabolism, its genetic apparatus from dissolution in the environment. Creating "individuality", "corpuscularity" as the conditions for the operation of Darwinian selection. It should be emphasized that membranes are

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not flat layers, they are always closed on themselves, forming hollow vacuoles, vesicles, vesicles, etc. Biomembranes always separate protoplasm and the external environment or its derivatives (spaces of the endomembrane system).

The endomembrane system is secondary. The endoplasmic reticulum (ER) is the main and possibly the primary part of the endomembrane system of the eukaryotic cell. But this is not just a membrane system. It makes no sense to consider it in isolation from the actin-myosin and microtubular mobility of the cytoplasm. It is thanks to her that the transport of vesicles exists. And this is the essence of the activity for the most part of the endomembrane system of eukaryotes.

The endomembrane probably formed as an invagination of the plasmalemma. It appears that "the outer membrane of the chloroplast envelope appears to be homologous to the outer membrane of mitochondria and Gram-negative bacteria. It is these membranes that never connect with membranes derived from the ER. The origin of the outer membrane of Gram-negative bacteria is unclear. It is probably not homologous to the cell membrane system.

After the formulation of GT, our knowledge of the cell has dramatically expanded and deepened and requires further understanding. In general, it should be recognized that CT has an outstanding, but for the most part already historical significance.

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