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HYPOTHESIS OF THE MECHANISM OF BIOSYNTHESIS OF OLIGONUCLEOTIDES OUTSIDE THE GENOME. REVERSE TRANSLATION OF PROTEINS – RNA

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Aim. An unsolved and unexplored problem in molecular biology, genetics and biochemistry remains the possibility of transferring genetic information from the amino acid sequence of a protein to DNA or RNA. The well-known central dogma of molecular biology has been put forward: information in a living cell is transferred from DNA to RNA, and from RNA to protein. The question arises from information theory: is this transmission always one-way and can a protein become a matrix? In nature, there are examples of protein-DNA and protein-RNA reverse translation. Representatives demonstrating this process in nature are polioviruses, prions and macrophages with antibodies. It was experimentally shown that on the template of a primitive protein, from the C-terminus to the N-terminus, an RNA fragment is synthesized from the 3 ‘to the 5’ end of RNA (reverse translation) [1]. The works of A. M. Deichman in the field of physicochemical foundations of biology show the hypothesis of variable stepwise reverse translation. Variable epitomes transfer information from the amino acid sequence of a protein through the synthesis of nucleic equivalents to guide and small nuclear RNAs, then mRNA, tRNA, rRNA with genetic information transfer, the influence and formation of genetic and protein polymorphisms, revertase activity [2]. Many immunologists are of the opinion that the currently known mechanisms cannot provide either the required level of variability (about 10 16 antibodies and T-cell receptors and 10 18 for T-cell receptors), nor a reliable limitation in the choice

among many options, by several orders of magnitude. exceeding the total number of lymphocytes in the body [3, 4]. F.M. Burnett, the author of the clonal selection theory of antibodies, assumed that the antigen itself should be an important detail in the mechanism of a specific immune response. He admitted the possibility of reverse translation of antigen fragments and intercellular transmission of its genocopy and found it unlikely that absolutely all the information necessary for the immune response pre-existed [5]. We have put forward a hypothesis about the mechanism of oligonucleotide biosynthesis outside the genome (reverse translation of genetic information from the amino acid sequence to DNA by means of mRNA) with the participation of retransloma – a complex of cell enzymes where the process of reverse transfer of information from the amino acid sequence to DNA / RNA takes place. Materials and methods. To confirm the hypothesis of biosynthesis of oligonucleotides outside the genome (reverse translation of protein – DNA / RNA with the production of mRNA), we carried out the isolation of protein and peptides from the mitochondria of the yeast strain *Sacharomyces cerevisiae*. Extraction was performed using the ReadyPrep ™ Total Protein kit (manufactured in the USA). The isolated proteins were used for isoelectric focusing and 2D electrophoresis, followed by the isolation of the short type RNA-25 oligonucleotides. Subsequent processing of the obtained data of amino acid and nucleotide sequences was carried out with in silico study of the variability of immunoglobulin genes using the VectorNTI-11 bioinformatics program. Using the method of affinity chromatography (Profinity IMAC Media, Bio-Rad, USA), the enzymes T7RNA polymerase, T4RNA ligase and AC-tRNA-sintetasa were isolated and purified, which are included in the retranslom – a complex of cell mitochondrial enzymes, where the process of transfer of genetic information with amino acid sequence on DNA. Results. The data obtained by us during electrophoresis of yeast mitochondrial DNA revealed RNA-25-mer oligonucleotides. Were isolated enzymes T7RNA polymerase, T4RNA ligase and AC-tRNA-sintetasa, which are included in the retranslom – a complex of enzymes of the mitochondria of the cell, where the process of transferring genetic information from the amino acid sequence to DNA. The determination of the specific activity of enzymes has been carried out. Bioinformatic analysis of mtDNA gene sequences showed the presence of embedded nucleic acid equivalents in the mtDNA transposons, and most of the genes encoded by the mitochondrial genome have their copies in the nucleus. A third of the specific proteins of mitochondria in the nuclear genome are not encoded. Enzymes T7RNA polymerase, T4RNA ligase and AC-tRNA-sintetasa are involved in copying genetic

information, transferring it from protein (amino acid sequence) to mRNA, tRNA to DNA and RNA and vice versa. Conclusions. Our results are consistent with the works of M. Nashimoto and A. M. Deichman. We believe that it is in mtDNA, located separately in the mitochondria outside the main genome, that the process of reading the genetic information of the amino acid sequence on the mRNA and then on the cell DNA takes place. The reverse translation process we have studied is that it facilitates the amplification of information contained in the amino acid sequences (primary structure) of an unknown protein or peptide. Amplification is useful in particular and among other things for the identification and study of proteins. Broadcast research will open up new possibilities in molecular biology, biochemistry and genetics. In particular, it will be possible to obtain data on a previously unknown protein structure, the molecular processes of mutations, DNA repair, regulation of gene expression at different levels, the formation of the genetic material of the biosphere, the universal genetic – UGC – code, protein and nucleic acid types of polymorphism, the joint evolution of viral and host genomes, regulation of the immune response. The acceptance of this hypothesis by the scientific community and the study of the mechanism of biosynthesis of oligonucleotides outside the genome will allow the development of new methods of genetic therapy and engineering, new methods for identifying genes and amino acids, and will create a new class of drugs for the treatment of oncological, allergic, viral and genetic diseases in humans and animals. The mechanism of biosynthesis of oligonucleotides outside the genome (reverse translation of genetic information protein – DNA/RNA), which we have discovered, fully reveals the processes of biosynthesis of protein and nucleic acids.

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