

MEMORY INHERITANCE: MECHANISMS OF TRANSGENERATIONAL MEMORY TRANSMISSION

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Memory is traditionally regarded as a property of the nervous system formed within personal experience. However, modern research in neurobiology focuses on how the life experiences of previous generations can influence the behavioral and cognitive characteristics of their descendants, described as the transgenerational transmission of experience [1, c. 377].

The purpose of this work is to theoretically analyze modern ideas about the mechanisms of formation of neural memory engrams and their possible intergenerational transmission.

One of the key mechanisms of intergenerational memory transmission is considered to be epigenetic changes. According to the “epigenetic engrams” hypothesis, neuronal ensembles can exist not only in the form of changes in synaptic connections, but also in the form of stable epigenetic modifications in neurons' DNA that regulate genetic information (expression and repression of genes) without changing the nucleotide sequence of the DNA itself. Such mechanisms include DNA methylation, histone modifications, and changes in chromatin structure [2, c. 1117]. In other words, these processes are related to the establishment of peculiar “tags” on the genome, which indicate to cells which parts of it should be active and which should not. me, which indicate to cells which parts of it should be active and which should not.

DNA methylation is the addition of methyl groups to cytosines at CpG sites in the genome, involving DNA methyltransferase enzymes in hippocampal neurons. It promotes dendritic spine formation, synaptogenesis, and long-term potentiation mechanisms that underlie memory consolidation.

A second important level of regulation is histone modifications – proteins around which DNA is organized. During learning in hippocampal neurons, there is an increase

in histone acetylation, which causes loosening of the chromatin structure, facilitates the access of transcription factors to DNA, and activates the expression of genes necessary for neural plasticity.

Chromatin remodeling plays an important role in changing the interaction of DNA regulatory regions and contributes to the rapid restructuring of gene expression programs in response to neuronal activity. As a result of this process, molecular patterns are formed that support functional neural ensembles – memory engram cells [3, c. 30].

Stress, learning, emotions, or environmental factors can affect these mechanisms, and already formed epigenetic changes are capable of transmission to the offspring and can impact neuronal development and behavioral reactions [4, c. 145].

Experimental research showed that the offspring of animals that suffered conditionally formed specific sensory learning (for example, to certain smells) or stress demonstrated heightened sensitivity to the corresponding stimuli even without direct contact with them. This is related to epigenetic changes in genes involved in the functioning of the olfactory system, neuronal plasticity, and regulation of stress reactions [5, c. 92].

Epigenetic signals can influence hippocampal development, regulation of the hypothalamic-pituitary-adrenal axis, sensitivity to stress, and the efficiency of learning mechanisms. Therefore, offspring can inherit a biological predisposition to fear, stress responses, cognitive plasticity features, and adaptive behaviors associated with their ancestors' experiences [1, c. 373; 4, c. 145].

Modern studies in the field of epigenetics have demonstrated that epigenetic events underlie the development of diseases and can be used as biomarkers for prognostic purposes [1, c. 385].

Small RNAs (microRNAs, tRNA-derived RNAs) contained in spermatozoa play a large role in communicating the transgenerational transmission of information. The results show that the father's life experience can change the RNA profile, and these molecules can modulate gene expression in early embryogenesis and affect the formation of neural networks of the brain and specific memory patterns in future generations [6, c. 5889].

Therefore, the suitability of a neuron to participate in the formation of a memory trace is a multilevel process that is modulated by its epigenetic state, regulation of gene expression, and social and behavioral factors. The study of these processes is a particularly promising area of modern neurophysiology and medicine, as it fosters a deeper understanding of the mechanisms of memory, body adaptation, and psychoneurological conditions and diseases.

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STUDY OF NONSPECIFIC IMMUNITY IN THE ORAL CAVITY OF PATIENTS AFTER SURGICAL INTERVENTIONS ON THE ORAL MUCOSA

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Rationale.

Modern needs and requirements of patients for full restoration of aesthetics and function of the dentition system encourage doctors to use not only conservative methods, but also a whole range of surgical interventions during preparation for orthodontic and orthopedic treatment [4, 6]. It is precisely the control of regeneration processes that allows for predictable, high-quality treatment results and reduces the risk of possible early and late complications thanks to the desired course of the wound healing process and scar formation [6, 8]. A high percentage of patients with affected periodontal complex receive combined treatment, where surgical interventions are the mainstay. Operations performed in the areas of the mucogingival junction and fixed gums have a large postoperative wound surface that requires careful antiseptic care throughout the entire wound healing process until complete healing and control over scar tissue formation [8].