



EPIGENETIC REGULATION OF COGNITIVE FUNCTION: MOLECULAR MECHANISMS AND ENVIRONMENTAL INFLUENCES

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Abstract: Epigenetic mechanisms such as DNA methylation, histone modifications, and non-coding RNAs regulate gene expression and influence learning, memory, and neural plasticity. Environmental factors including stress and nutrition can alter these processes and affect cognitive function. This poster highlights the molecular basis of neuroepigenetics and its relevance to cognitive disorders.

• Introduction

- Epigenetics regulates gene expression without changing DNA sequence;
- Major epigenetic mechanisms include DNA methylation, histone modifications, and non-coding RNAs;
- Epigenetic mechanisms influence learning, memory, and neural plasticity;
- Environmental factors can modify cognitive function through epigenetic changes;
- Dysregulation of epigenetic pathways has been associated with cognitive disorders and neurodegenerative diseases.

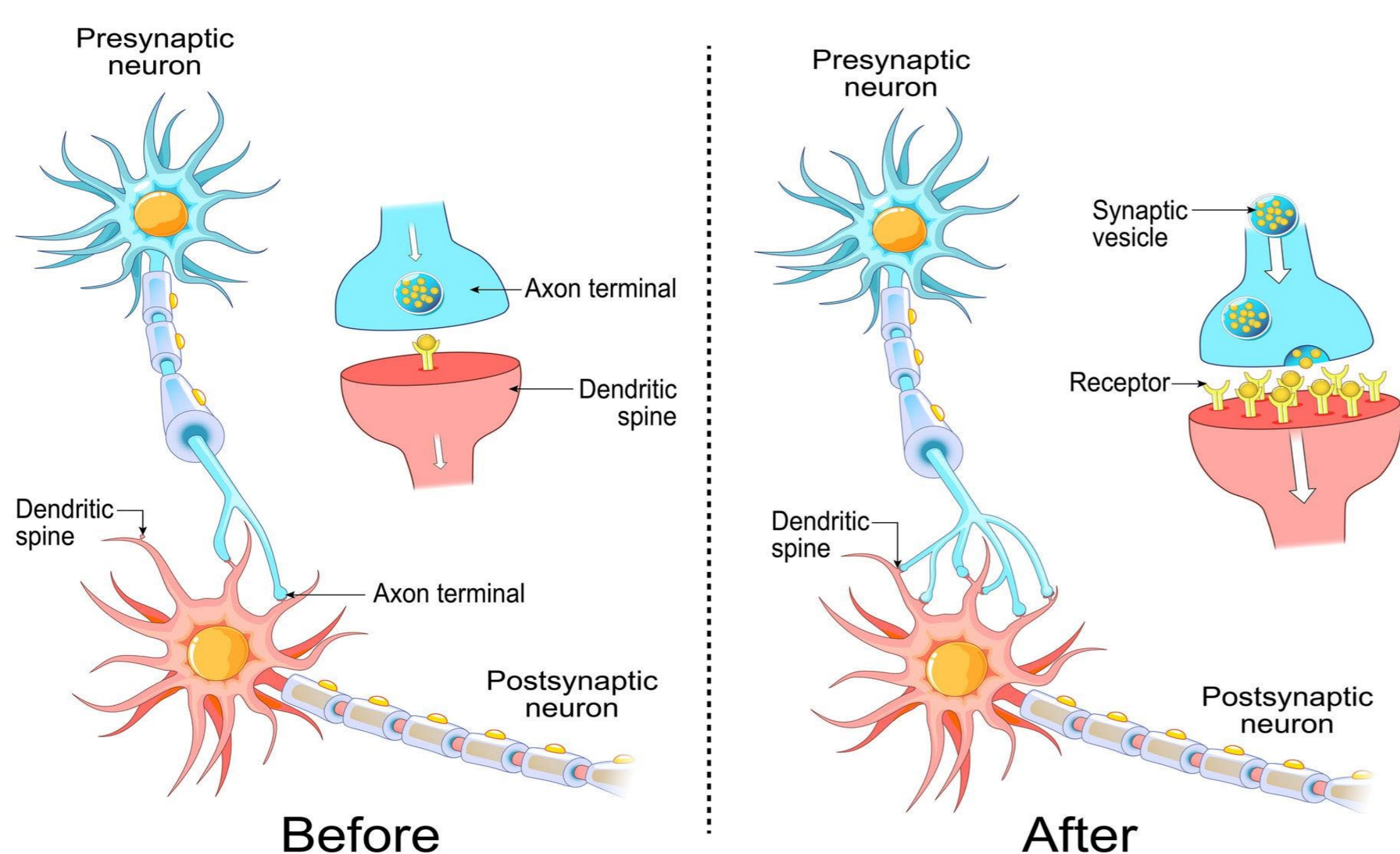
• Molecular mechanisms of epigenetic regulation

- DNA methylation;
- Histone modification;
- Non-coding RNAs.

• Epigenetics and cognitive function

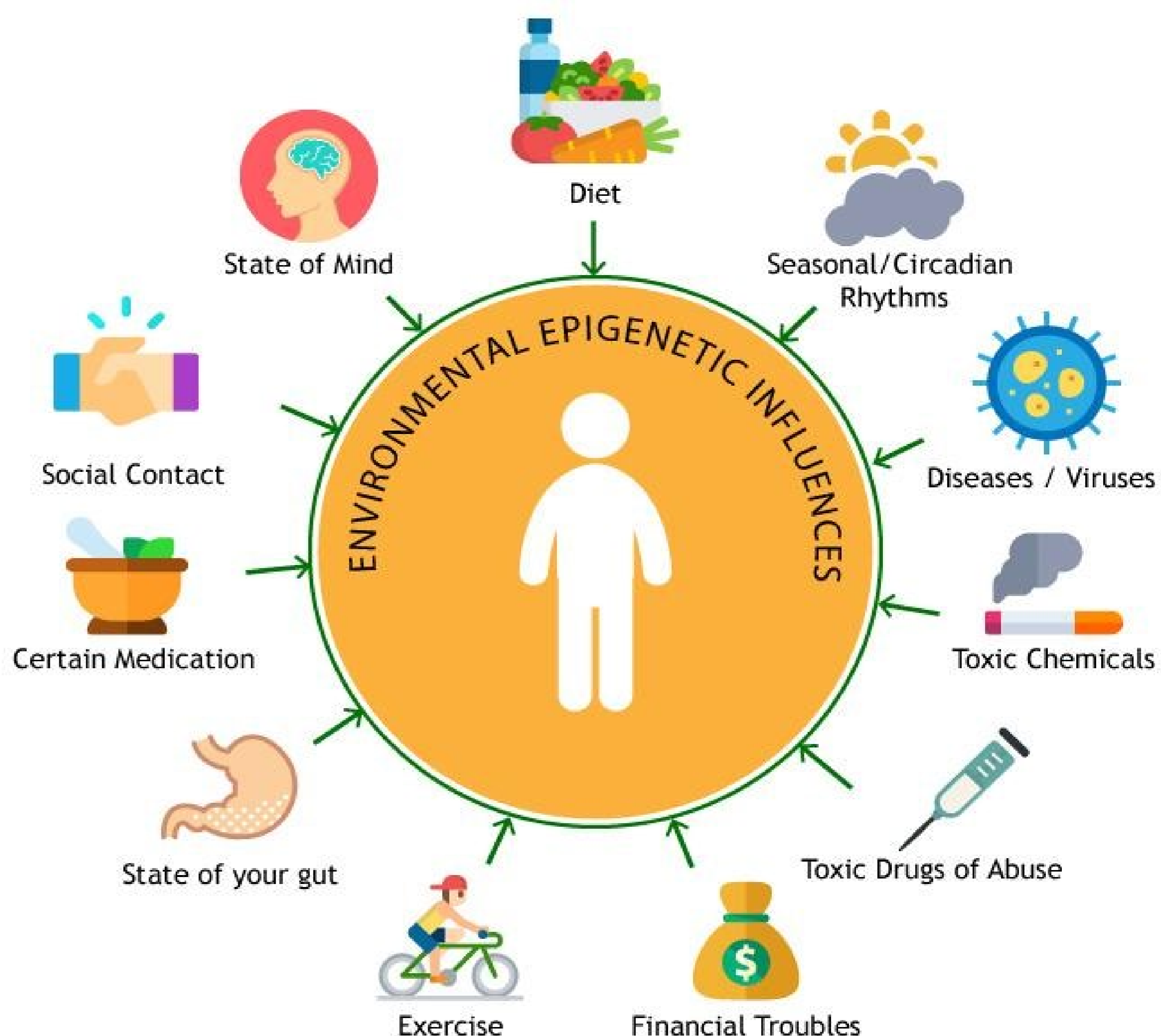
The most important cognitive functions are learning, memory, synaptic plasticity, and neuroplasticity.

LEARNING



• Environmental influences on the epigenome

Environmental factors that influence the cognitive function are: stress, nutrition, physical activity, early-life experiences.



Environmental stimuli can induce stable epigenetic modifications that affect neuronal function. Chronic stress has been associated with altered methylation patterns, while nutrition and exercise may positively influence cognitive resilience.

• Conclusions

- Epigenetic regulation is a bridge between genes and environment;
- Molecular modifications strongly influence cognition;
- Epigenetics may offer therapeutic targets for neurological disorder.