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Name of the faculty: Dr. G Selvi

Article title:

EXPLORING THE COMPLEXITY OF THE ENDOCANNABINOID SYSTEM FOR POTENTIAL FUTURISTIC TREATMENTS

Author's name: Dr. G Selvi

Abstract:

The endocannabinoid system (ECS) is a complex cell-signaling network essential for maintaining homeostasis in various physiological domains, including mood regulation, pain perception, appetite control, memory, and immune function. Composed of endogenous cannabinoids (e.g., anandamide and 2-AG), cannabinoid receptors (CB1 and CB2), and metabolic enzymes (FAAH and MAGL), the ECS influences a wide array of biological processes. Genetic variations in ECS components may predispose individuals to conditions such as anxiety, depression, chronic pain, autoimmune diseases, and neurodegenerative disorders including Alzheimer's and Parkinson's. This genetic diversity opens avenues for personalized cannabinoid-based therapies, tailored to individual ECS profiles. Advancements in biotechnology and artificial intelligence (AI) are driving the development of programmed and smart drug delivery systems, enabling precise targeting of ECS receptors in specific tissues. These ECS-driven delivery systems aim to maximize therapeutic efficacy while minimizing side effects. In parallel, AI-driven cannabinoid dosing technologies are emerging as a cornerstone of future personalized medicine, offering optimized treatment plans based on individual genetic, metabolic, and ECS-related biomarkers. The integration of AI into cannabinoid therapeutics not only enhances dosage precision but also predicts therapeutic outcomes and potential interactions. As research deepens, the ECS presents a promising

frontier for next-generation, personalized, and AI-augmented medical interventions, potentially transforming the landscape of treatment for complex and chronic disorders.

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