Gastrointestinal Melatonin Secretion and Its Physiological Functions: Postprint

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Abstract

Melatonin (N-acetyl-5-methoxytryptamine) is a physiological hormone that regulates circadian rhythms, metabolism, and reproduction. Both gut microbiota and gastrointestinal endocrine cells can synthesize melatonin, which in the intestinal tract exerts regulatory effects on gastrointestinal motility and secretion, antioxidant, anti-apoptotic, and immunomodulatory functions, and has demonstrated beneficial roles in various animal models of intestinal inflammation and clinical studies. This article provides an overview of the synthesis and secretion of melatonin in the gastrointestinal tract, its physiological functions, and its applications in intestinal inflammatory diseases.

Full Text

Preamble

Title: Gastrointestinal Melatonin Secretion and Its Physiological Functions

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Abstract: Melatonin (N-acetyl-5-methoxytryptamine) is a physiological hormone that regulates biological rhythms, metabolism, and reproduction. Both intestinal microorganisms and gastrointestinal endocrine cells can synthesize melatonin, which in the gut functions to regulate gastrointestinal motility and secretion, exerts antioxidant and anti-apoptotic effects, and modulates immune function. Melatonin has demonstrated beneficial effects in various animal models of intestinal inflammation and in clinical studies. This article provides an

overview of melatonin synthesis and secretion in the gastrointestinal tract, its physiological functions, and its applications in intestinal inflammatory diseases.

Keywords: melatonin; melatonin receptor; physiological function; gastrointestinal tract; intestinal diseases

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Melatonin (N-acetyl-5-methoxytryptamine) is primarily produced in the pineal gland of the brain and is known as a regulator of the sleep-wake cycle, involved in physiological processes such as biological rhythms, metabolism, and reproduction [1]. Recent studies have confirmed that melatonin plays an even more important regulatory role in the digestive system. The gastrointestinal tract is the most important source of melatonin besides the pineal gland, with melatonin being produced by intestinal endocrine cells in the gastrointestinal tract. Melatonin possesses strong free radical scavenging and antioxidant capacities and is also an important regulator of gastrointestinal inflammation and motility, thus potentially playing a positive role in many gut-related diseases, particularly in the control of intestinal inflammation [2-4]. This review aims to summarize melatonin synthesis and secretion in the gastrointestinal tract and its physiological functions, providing a reference for its application in regulating intestinal health and disease control.

Note: Figure translations are in progress. See original paper for figures.