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Aspects in Microbial Endocrinology

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ABSTRACT

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Microbial Neuroendocrine Hormones

Microbial endocrinology is a recent branch involves intersection of microbiology, endocrinology and neurophysiology. endocrinology deals with interaction between the microorganisms and their host in case of health and disease. Recently, there are many literatures have been published in the field of endocrinology. Most investigations worked on interaction between the bacteria and the stress hormones such as catecholamine, adrenaline, noradrenaline and dopamine. The stress increases the release of adrenaline and noradrenaline and these both hormones suppress the immune system and its function. This could increase the risk of infections. According to this fact, endocrinology provides a tool to understand the nature of the interaction between the microorganisms and the host (animal or human) during the stress. Some published literatures deal with special kind of interaction of the microorganisms and the host. For example, types of bacteria recognize and synthesize nuroendocrine hormones like the hormones of the eukaryotes. These neuroendocrine hormones can interact with the enteric nervous system of enter the circulatory system taking its way to the CNS and the brain hence affect the behavior, food preference and even the appetite.

The human gut microbiota is a wide diverse of approximately 100 trillion microbes in the body which can serve as a metabolic, nutrition, absorption and immune function against pathogens. Dinan et al. [1] have proposed a new term "psychobiotics", that probiotics that possess the capacity to deliver therapeutic levels of neurochemicals that could be potentially used to treat psychiatric illness should be termed "psychobiotics" [1]. Bravo et al. [2,3] studied the way by which probiotics may influence host behavior and inflammation. They found that the probiotic could alter emotional behavior of mice. Interestingly, both live and dead probiotics have been shown to be equally efficacious [3]. The microbial endocrinology is not restricted to probiotic microbes but extended to many bacterial species residing in the gut and possess biochemical machinery to synthize neuro endocrorine hormones [4]. Moreover, Lannitti and Patmier [3] reported that not only live microbial cells having probiotics have shown equal effect [5] found that probiotics can show antidepressant effect. More studied are required to determine the appropriate environmental conditions to achieve the neuroactive influences [6].

Neurotransmitters in Microbes

In addition of the effect of the neurotransmitters on the hot the microbial cells are also affected. For example, serotonin stimulated the cellular aggregation and the cellular growth of the bacterial cells of Streptococcus faecalis, Candida guilliermondii [7] and Saccharomyces cervisea [8], E. coli K-12 and Rhodospirillium ruhrum [9]. The cell aggregation and microbial growth stimulation serotonin in micromolar and millimolar quantities has been proven. This was applied to both gram positive and Gram-negative bacteria. Interestingly, Oleskin, [10] described what is called "Supermicroorganisms" which are thought to have become multicellular organisms over the course of evaluation. These neurotransmitters may serve as inhibitors for the microbial aggregation and can be used as protector against the microbial growth [11].

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