

Psychoneuroimmunologic Factors in Inflammatory Bowel Disease

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Background: Bidirectional relationships between the immune system, nervous system, and psychological processes likely exist in inflammatory bowel disease (IBD) because stress can affect IBD, and IBD is associated with an increased risk of psychological difficulty. The field of psychoneuroimmunology (PNI) sheds light on specific mechanisms that are involved in these relationships, and this research can be applied specifically to IBD. The purpose of this article is to review research on PNI processes in IBD and provide recommendations for future research.

Methods: A literature search was conducted using the PubMed and PsychInfo computerized databases and bibliographies of relevant articles.

Results: The hypothalamic–pituitary–adrenal axis, sympathetic-adrenomedullary system, proinflammatory cytokines, substance P, and mast cells play roles in inflammatory processes in IBD. These processes also respond to stress, and they have been implicated in psychological problems in otherwise healthy individuals. These overlapping processes in inflammation and psychological function have received limited attention in IBD, but preliminary evidence suggests that these mechanisms may play a role in the psychological difficulty experienced by those with IBD.

Conclusions: Several bidirectional PNI mechanisms overlap in IBD, suggesting ways that stress and psychological function can affect disease activity and, conversely, avenues by which the inflammation in IBD may contribute to psychological difficulty. More research on specific PNI processes is needed to fully understand these factors in IBD.

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Relationships between the immune system, nervous system, and psychological processes are well established, and there is mounting evidence that associations between these systems play an important role in inflammatory bowel disease (IBD). This three-way physiological interconnection is called psychoneuroimmunology (PNI). It has its roots in research on psychiatric patients who were found to have altered immune functioning^{1,2} and research demonstrating stress-related changes in immunity and health outcomes in animal models.³ The field has since evolved to investigating the specific mechanisms involved in these relationships. It has also been established that relationships between these systems are bidirectional, so PNI research investigates the effects of the nervous and immune systems on areas such as emotions, behaviors, and stress coping strategies, as well as the effects of psychological processes on health. There are multiple ways to investigate these relationships, and PNI research has utilized populations of healthy individuals, individuals with psychological symptoms, and, to a lesser extent, people with chronic inflammation to examine relationships between immune function and psychological symptoms.

There are likely multiple PNI-related mechanisms that operate in IBD. For example, stress has been related to disease severity in IBD,^{4,5} and IBD is associated with increased depression and anxiety.⁶ This suggests possible alterations in and interactions between immune functioning and psychological processes in IBD. Although the PNI factors involved in IBD is a relatively new area of research, there are now sufficient data to merit a conceptual review. Moreover, there are data from PNI research in other fields of medicine that can be brought to bear on IBD to inform future research efforts. The purpose of this article is to review the research on PNI mechanisms relevant to IBD and to provide recommendations for future research.

METHODS

A systematic search of the medical and psychological literature was conducted using the PubMed and PsychInfo computerized databases. Key words included combinations of stress response system, hypothalamic–pituitary–adrenal (HPA) axis, cortisol, sympathetic–adrenal–medullary (SAM) system, norepinephrine, epinephrine, sympathetic