Stress mediated stirring up of the immune system

The immune system is generally activated by two kinds of signal: due to the recognition of pathogen and the release of ‘damage signals’ from the host cell. There is a growing body of evidence showing a third class of activating signal, in the form of stress that alters the status of the immune system.

A recently published research outlines the mechanisms of psychological stress influencing bowel inflammation (1). The group has shown the response of enteric nervous system (ENS) in modulating the brain derived psychological stress and triggering intestinal inflammation. Chronic stress causes the release of glucocorticoids from the adrenal gland that acts on glucocorticoid receptor expressed on enteric glial cells. The powered up glial cells then secrete molecules, including Csf1that results in recruitment and priming of TNF-producing monocytes to exacerbate gut inflammation. Thus, a cascade of events connects psychological stress to flaring up of intestinal inflammation, the elements of which may extend to other inflammatory diseases. This work emphasizes the importance of stress management in enhancing the efficacy of treating inflammatory diseases.

Earlier studies have shown that chronic stress can enhance the risk of developing autoimmune diseases such as rheumatoid arthritis and multiple schlerosis (2, 3). Importantly, childhood bullying have been associated with low-grade systemic inflammation in adulthood; and children exposed to

high psychological stress have been reported to have increased spontaneous secretion of IFN-γ and low IL10 (4, 5). In middle-aged men, stressful events have been found to be associated with shorter leukocyte telomere length, a biomarker of cellular aging and this relation is explained by depression and low grade chronic inflammation (6).

Activities like aerobic exercise and meditation have shown to reduce the level of inflammatory markers in a few months time (7, 8). These findings highlight the importance of adopting behavioral interventions to modulate stress and inflammation.

Summary by Dr. Dimpu Gogoi

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