Introduction:

Cortisol suppresses inflammation by preventing the release of histamine. This causes the body to be more susceptible to diseases. Immunity relies in part on T-lymphocyte cells, which respond to interleukins—a type of cytokine molecules expressed by white blood cells—via a pathway of signals. In other words, interleukins are proteins that mediate the transfer of messages between cells. The T-lymphocyte cells are part of the component system that regulates immunity. Under normal circumstances, a stimulus such as an infectious agent causes interleukins to be secreted. When the interleukin reaches the target cell, a receptor molecule on the surface of the cell binds to the interleukin. This binding starts a series of signals in the target cell that cause the cell to react to the infection. Over time, cortisol interferes in this cascade of signaling events, by preventing T-cells from recognizing these signals, which in turn stops T-cells from multiplying. The result is that the cortisol released abates the immune response.

PTSD and the Complement System:

The study showed that among PTSD patients, the complement classical pathway experiences hyperactivity. In addition, among PTSD patients, the complement alternative pathway is hypoactive, while the terminal pathway is overactive. The study showed that PTSD is related to the dysfunction of the complement system. In addition, the study supported the results previously obtained by other researchers, regarding the relationship between the inflammatory components in pathogenesis of PTSD. The complement system affects the inflammatory response by causing a chronic low grade activation of systemic vascular inflammation. PTSD patients had increased white blood cell count, circulating levels of C-reactive protein and interleukin. Moreover, PTSD patients had decreased levels of anti-inflammatory cytokine.

Inflammatory Response and the Brain:

Inflammatory responses lead to cognitive and emotional effects. These effects are produced by the central nervous system, which includes only the brain and the spinal cord. Effects such as memory, mood, activity and pain are caused by activity in the central nervous system, and hence, the brain. The inflammatory response has long-lasting effects on the brain, such as changing our cognitive ability and mood, and even our behavior. The microglial cells, which are one of the non-neuronal cell types found in the brain, are the resident immune cells of the brain, and comprise the component of the central nervous system that reacts to an infection. If the inflammatory response is prolonged, mood and behavior can become more extreme. For example, a short-term reduced mood can turn into depression. A short-term loss of memory can become more pronounced, and the person behaves in a cognitively impaired manner. Instead of inactivity, the body behaves in a fatigued manner. Acute pain turns into chronic pain. The inflammatory response may primarily become prolonged or exaggerated due to continual peripheral inflammatory events that in turn result in continued signals being sent from the immune system to the central nervous system. Examples of such occurrences include surgery, cancer chemotherapy, peripheral nerve damage, and myocardial infarction, all of which result in exaggerated peripheral inflammation for an extended time. A secondary way in which the inflammatory response may become prolonged or exaggerated is when the central nervous system repeatedly over-responds when the peripheral immune system sends a signal. This causes microglia to respond in an exaggerated manner, hence causing the inflammatory response to become prolonged or exaggerated.

Conclusions:

When a person experiences stress, his/her immune system is less able to fight diseases. This is because stress causes cortisol to be released; cortisol in turn causes a chain of events that lead to the body’s T cells (which are responsible for fighting infection) to stop multiplying. A person under stress can also be more careless about his/her health, and attempt to cope with the stress through increased alcohol intake, smoking, or drugs. These behaviors can lead to an adverse effect on the immune system as well. PTSD can cause the inflammatory response to become exaggerated or prolonged. As signals are being repeatedly sent from the immune system to the central nervous system, the person may experience changes in mood and behavior. Instead of mild mood swings, the person may experience depression. In addition, the person may be impaired cognitively, be continually tired, and experience chronic pain.

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