

## Update 15

### Acute activation of sympathetic nervous system can cause cytokine network imbalance

Many studies have demonstrated the interaction of psychological or physical stress and cytokine responses in animals, via the sympathetic nervous system (SNS). (1)

Proinflammatory cytokines, such as TNF- and IL-6, can basically be thought of as signalling proteins of immune cells.

These signalling proteins have a pivotal role in coordinating the body's response to inflammation. It is now well recognised that the highly complex interaction between the SNS and the cytokine network may become unbalanced. It has been conceptualised that the host might not be able to counterbalance what is, at times, an early excessive response of the SNS to stressors, thus enhancing the inflammatory mediators and increasing ones vulnerability to dis-ease.

The mechanisms that alter proinflammatory cytokine production, like autonomic nervous system imbalance, have been shown to be of clinical relevance in diseases such as sepsis, atherosclerosis, and chronic inflammatory diseases.

For some inflammatory diseases, a shift toward the proinflammatory Th1 cytokines has been reported (2).

There is also evidence of an accumulation of Th1 cytokines in atherosclerotic plaques and evidence that a balance of pro- and antiinflammatory cytokines is critical for the course of atherosclerosis (3).

Furthermore studies have revealed that immunological performance is continuously "trained" and can protect effectively against infections. (4)

A recent study in healthy humans found that acute SNS activation, by psychological stress and/or exercise, caused marked changes in proinflammatory cytokines, such as TNF- and IL-6, of immune cells.(5) The data from this study demonstrate for the first time that immunosuppression can be behaviorally conditioned in humans in an impressive display of brain-to-immune system interaction.

So what has all of that got to do with correcting vertebral subluxations in your office tomorrow morning and the research that our profession chooses to pursue in coming years?

Preliminary basic science, and case study research suggests that vertebral subluxation may be a contributing factor in some cases of abnormal SNS responsiveness. We should keep a watchful eye on whether further research supports the observation that health is compromised when a host is unable to counterbalance early excessive responses of the SNS to stressors. If it does, future studies, from a chiropractic perspective, might investigate the relationship between vertebral subluxation, the SNS and cytokine interaction.

For example, we might hypothesise that subluxation interferes with the ability of the SNS to appropriately respond to environmental stressors. We could test such a hypothesis by monitoring cytokine synthesis, subluxation indicators and levels of environmental stressors whilst relatively healthy subjects receive ongoing chiropractic care within the context of randomised and/or non-randomised prospective studies.

## References:

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