

## Immunity: Vagal stimulation

Vertebrates achieve internal homeostasis during infection or injury by balancing the activities of proinflammatory and anti-inflammatory pathways. Endotoxin (lipopolysaccharide), produced by all gram-negative bacteria, activates macrophages to release cytokines that are potentially lethal. The central nervous system regulates systemic inflammatory responses to endotoxin through humoral mechanisms. Activation of afferent vagus nerve fibers by endotoxin or cytokines stimulates hypothalamic–pituitary–adrenal anti-inflammatory responses. Direct electrical stimulation of the peripheral vagus nerve *in vivo* during lethal endotoxemia in rats inhibited TNF synthesis in liver, attenuated peak serum TNF amounts, and prevented the development of shock.

**\*\*\*Therefore, the afferent vagus nerve may play an important role in transmitting peripheral signals to the brain in the infection and inflammation.**