

Induction of cytokine synthesis and fever suppresses REM sleep and improves mood in patients with major depression

Joachim Bauer, Fritz Hohagen, Evi Gimmel, Friederike Bruns, Stephanie Lis, Stephan Krieger, Wolfgang Ambach, Angela Guthmann, Heinz Grunze, Rosemarie Fritsch-Montero, Alexandra Weissbach, Ursula Ganter, Ulrich Frommberger, Dieter Riemann, Mathias Berger

Biological Psychiatry 38 (9), 611-631 (1995)

Abstract

Beneficial effects of inflammatory events on certain psychiatric disorders, including depression, were reported sporadically by ancient Greek physicians, but have been described also in our times by a few psychiatrists during the past decades. During febrile inflammatory events, mediators of the immune system such as interleukin-1 can be detected in the brain and may act on their respective receptors which have also been demonstrated in the brain. Since cytokines such as interleukin-1 have been shown in animal studies to exert sedative behavioral effects, to be somnogenic, and to induce slow-wave sleep (SWS), we performed a pilot study to evaluate scientifically the anecdotically reported beneficial effects of inflammatory states on depressive disorders. Mood and sleep parameters were monitored in seven drug-free, severely depressed patients before, during, and after the administration of a single dose of endotoxin. All patients responded with a short pulse of increased synthesis of the cytokines tumor necrosis factor, interleukin-1, and interleukin-6 and elevated body temperature for several hours. During the night following endotoxin administration, rapid eye movement (REM) sleep was significantly suppressed, while changes in slow wave sleep were not significant. During the next day, all patients were in a significantly improved mood; however a rebound of REM sleep was observed in the second night after endotoxin administration and mood worsened again during the next days, indicating an only transient beneficial effect of the treatment.

Key Words: Depression, cytokines, fever, sleep, interleukin-1, interleukin-6, tumor necrosis factor alpha, psychoneuroimmunology