

## Stress and Immunity: Reproductive Health-Related Consequences

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Stress and its relation to the immune system have always been of interest for the scientific community. In relation to the “Stress and Immunity” we see that the body has a tenacious ability to adapt to the changes in the environment thus adjusting itself accordingly. But the interplay between different stressors and the ever-elusive immune system has made this research increasingly fascinating.

Stress weakens the immune system by diverting the energy required for its functioning to deal with stress. When we’re stressed, the immune system’s ability to fight off antigens is reduced. That is why we are more susceptible to infections. The stress hormone corticosteroid can suppress the effectiveness of the immune system (e.g. lowers the number of lymphocytes) [1]. Cortisol released during stressful situations affects the immune system by preventing the production of cytokines. During chronic stress, cortisol is overproduced causing few receptors to be produced on immune cells so that inflammation cannot be ended.

Psychological stress has been implicated in altered immune functioning in many diseases [2]. Stress induces chronic immune activation and altered health outcomes that resemble those seen in chronic inflammatory diseases [3]. Altered immune function can lead to exacerbated symptoms of not only physical and psychological illnesses but reproductive health too. Infertility is a complicated problem with physiological, psychological and economic aspects. About 15 percent of couples worldwide suffer from infertility. One in six couples is involved with infertility during their reproductive age. If stress continues for a long time its decreases testosterone levels. This can interfere with sperm production and cause erectile dysfunction or impotence. In reproductive health, steroids hormones as progesterone, testosterone, estrogen etc. have crucial function to maintain the fertility of animals. Studies have shown the inferred effects of reproduction on immunosuppression and oxidative damage [4].

Reproduction is the most energetically demanding period of a mammal’s life [5-7]. Two processes that might be compromised during reproduction are defense against oxidative damage and maintenance of the immune system. Several studies of birds and *Drosophila melanogaster* have found that an increase in reproductive effort is associated with a decrease in activity of antioxidants or resistance to oxidative stress [8-11]. Fertility has always been associated with a feeling of optimism towards new life, hope, joy, pride and strength. A balance between innate and adaptive immune cells is a prerequisite for sustained and healthy pregnancy. A favorable anti-inflammatory state is maintained at feto-maternal interface via crosstalk between different immune cells. Factors reported till date for the initiation of pre mature labor following trigger like infection, inflammation or stress involves infiltration and recruitment of activated cells at fetal maternal interface and eliciting a shift from anti-inflammatory to pro-inflammatory state eventually leading to pre-term birth [12,13]. A timely disruption of the balanced immune crosstalk initiates physiological labor but untimely disruption leads to pregnancy related complication like pre-term birth. A better understanding of the relationships between reproduction, stress and immune function is needed to address questions of clinical relevance for reproductive health. Then only one can envisage proper assessment of stress and immune response with the ultimate goal of making reproductively healthy.

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