Sex differences in anxiety and depression: Role of Testosterone

Abstract
Compelling evidence exists for pervasive sex differences in pathological conditions, including anxiety and depressive disorders, with females more than twice as likely to be afflicted. Gonadal hormones may be a major factor in this disparity, given that women are more likely to experience mood disturbances during times of hormonal flux, and testosterone may have protective benefits against anxiety and depression. In this review we focus on the effects of testosterone in males and females, revealed in both human and animal studies. We also present possible neurobiological mechanisms underlying testosterone’s mostly protective benefits, including the brain regions, neural circuits, and cellular and molecular pathways involved. While the precise underlying mechanisms remain unclear, both activational and organizational effects of testosterone appear to contribute to these effects. Future clinical studies are necessary in order to better understand when and how testosterone therapy may be effective in both sexes.