

# Chronic stress induces upregulation of brain-derived neurotrophic factor (BDNF) mRNA and integrin $\alpha 5$ expression in the rat pineal gland

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Chronic stress affects brain areas involved in learning and emotional responses. These alterations have been related with the development of cognitive deficits in major depression. Moreover, stress induces deleterious actions on the epithalamic pineal organ, a gland involved in a wide range of physiological functions. The aim of this study was to investigate whether the stress effects on the pineal gland are related with changes in the expression of neurotrophic factors and cell adhesion molecules. Using reverse transcription-polymerase chain reaction (RT-PCR) and Western blot, we analyzed the effect of chronic immobilization stress on the BDNF mRNA and integrin  $\alpha 5$  expression in the rat pineal gland. We found that BDNF is produced in situ in the pineal gland. Chronic immobilization stress induced upregulation of BDNF mRNA and integrin  $\alpha 5$  expression in the rat pineal gland but did not produce changes in  $\beta$ -actin mRNA or in GAPDH expression. Stressed animals also evidenced an increase in