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EFFECTS OF N.G.F. ON THE PLASTICITY OF THE
VISUAL SYSTEM

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Monocular deprivation (MD) performed early during postnatal
development (critical period) produces dramatic changes in the functional
organization of mammalian visual cortex. Most visual cortical neurons loose
their input from the deprived eye which also presents a severe loss of
visual acuity and contrast sensitivity. It is suggested that these changes
are due to competition between the inputs from the two eyes for the
binocular cortical neurons. We tested the hypothesis that this competition
is for a neurotrophic factor by investigating the effects of MD performed
under treatment with NGF. Twenty hooded rats were monocularly deprived
before eye opening. In nine rats the deprivation was combined with
repeated intraventricular injections of either NGF (1-1.6 µg/µl) or
cytocrome c. The effects of MD were assessed electrophysiologically by
recording the visual evoked potentials and the single units. We found that
in all untreated rats the visual acuity of the deprived eye was reduced
by a factor of three. By contrast there was virtually no loss of visual
acuity for the deprived eye of the animals treated with NGF. In addition,
single unit recordings showed that visual cortical neurons retain their
input from the deprived eye.