

Programma definitivo



RIUNIONE CONGIUNTA

SOCIETÀ ITALIANA DI
BIOLOGIA SPERIMENTALE

SOCIETÀ ITALIANA DI
FISIOLOGIA

SOCIETÀ ITALIANA DI
NUTRIZIONE UMANA

PERUGIA - Palazzo dei Priori
18 - 20 settembre 1990

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 lose 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 $\mu\text{g}/\mu\text{l}$) or cytochrome 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.