



# UNIVERSITÀ DI PISA

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## ENVIRONMENTAL EXPERIENCE AND BRAIN PLASTICITY

**ALESSANDRO SALE**

Anno accademico 2023/24  
CdS NEUROSCIENCE  
Codice 425EE  
CFU 3

Moduli	Settore/i	Tipo	Ore	Docente/i
ENVIRONMENTAL EXPERIENCE AND BRAIN PLASTICITY	BIO/09	LEZIONI	24	ALESSANDRO SALE

### Obiettivi di apprendimento

#### Conoscenze

Definition of neural plasticity Structural and functional plasticity Synaptic plasticity Functional reprogramming: examples in animals models and humans Use-dependent plasticity Visual scotoma and filling-in Barrel cortex plasticity in the rat The concept of critical period Critical periods in humans Language learning, brain and bilingualism Serotonergic system and critical period for the emergence of an anxious phenotype Synchronous and asynchronous activity in the development of visual system Hebb's Hypothesis for Learning Retinal waves and ocular segregation Development of ocular dominance columns in primates Ocular dominance plasticity: heterosynaptic vs. homosynaptic model Hebb's rules and ocular dominance development The three-eyed frog experiment Critical periods for ocular dominance plasticity in animal models Development of visual acuity GABAergic interneurons in the primary visual cortex Specific GABA-A circuits for visual cortical plasticity BDNF and critical period plasticity Inhibitory threshold for critical-period activation in primary visual cortex Extracellular matrix: structure and function tPA and visual cortex plasticity Extracellular matrix components and adult brain plasticity Anatomical traces for plasticity in the visual cortex Myelin and visual cortex plasticity Otx2 in visual cortex development Epigenetic control of critical period plasticity Environmental enrichment: definition and main effects Impact of enrichment on brain development Maternal care and environmental enrichment effects Visual cortex plasticity in humans: effects of short-term monocular deprivation Effects of maternal massage in pre-term children Environmental enrichment and epigenetic control of critical period plasticity Environmental enrichment and adult brain plasticity: role of sensory, social and motor components Maternal deprivation and impact of maternal care on brain plasticity Neurobiology of neurodevelopmental disorders

Modalità d'esame  
Prova orale

#### Note

Commissione d'Esame

Membri effettivi:

Alessandro Sale (Presidente), Nicola Origlia, Enrica Strettoi

Membri supplenti:

Maria Concetta Morrone (Presidente), Guido Marco Cicchini, Paola Binda

Ultimo aggiornamento 13/09/2023 10:26