Neurotalks

Camerino Thursday, **July 16, 2026**, 5:00 PM

Polo Medicina Sperimentale e Sanità Pubblica 'Stefania Scuri' - via Madonna delle Carceri 9

Advancing Precision Medicine for Opioid Use Disorder: Behavioral and Electrophysiological Insights from Genetically Diverse Rat Models

Marsida Kallupi
PharmD, PhD, Assistant Professor, Department of Psychiatry, University of California, San Diego

speaker invited by laura.soverchia@unicam.it

This talk will explore how genetically diverse rat models can advance precision medicine for opioid use disorder. By combining large-scale behavioral phenotyping, polygenic prediction, and electrophysiological recordings is specific brain regions, these studies identify biological factors associated with addiction vulnerability and individual differences in treatment response. The findings demonstrate how genetic background, addiction severity, sex, and pre-existing neural-circuit differences may influence both the development of addiction-like behaviors and responsiveness to medications, providing a translational framework for more individualized treatment strategies.

Dissecting individual vulnerability to alcohol use disorder in heterogeneous stock rats

Giordano de Guglielmo
PharmD, PhD, Associate Professor, Department of Psychiatry, University of California, San Diego

speaker invited by roberto.ciccocioppo@unicam.it

Why do some individuals develop alcohol use disorder (AUD) while others do not? This is hard to study in humans, where pre-morbid baselines and longitudinal follow-up are unavailable. We address it in heterogeneous stock (HS) rats, which capture human-like genetic and behavioral diversity. We phenotyped over 900 rats before and after chronic intermittent ethanol (CIE) vapor across multiple addiction-related domains and combined them into an addiction index and a DSM-5-based criteria count that separated animals into four groups (resilient, mild, moderate, severe). Baseline behavior did not predict vulnerability, which emerged only after dependence. A GWAS identified a chromosome 12 locus containing *Aldh2*, *Camkk2*, and *P2rx4* (P2X4 receptor). In an independent cohort, rats with higher predicted P2rx4 expression showed greater post-vapor intake and escalation, and the P2X4 modulator ivermectin reduced dependence-driven drinking while enhancing central amygdala GABAergic inhibition. These results link individual AUD vulnerability to a chromosome 12 locus and a druggable target.

info: laura.soverchia@unicam.it