Synaptic changes within the mesocortical circuit following early life adverse social experience

Miriam MELIS¹* and Marco BORTOLATO²

¹Department of Biomedical Sciences, University of Cagliari, Italy; ²Department of Pharmacology and Toxicology, University of Utah, Salt Lake City, UT, United States of America

Psychiatric disorders mirror affective imbalances within the brain. Affects are essential for well-being, and once primary physiological needs and safety are satisfied, interpersonal interaction and acceptance represent a need that has to be met, and drives motivation. In fact, these latter not only act as natural reinforces, but are also important for social and cognitive development. Derangements from these, hence, lead to discrete affective disorders including anxiety, depression, schizophrenia and addiction.

The mesocorticolimbic dopamine system, being a key component of the brain reward circuitry and processing value-related signals, is considered an important circuit for affective functioning. Modulation of this pathway is, therefore, key in regulating experience-dependent behavioral changes. In particular, the individual response to early life adverse social experience depends upon an organism’s innate biological make-up. How certain temperaments can be deregulated following early life adverse social experience, which independently lead to enduring changes in behavior in adulthood via perturbations of dopamine transmission during adolescence, will be discussed. In particular, synaptic changes of the mesocorticolimbic dopamine system following early life adverse experience will be presented to enable us to develop new pharmacological tools for the prevention and treatment of aberrant affective functioning.