

Linking serotonergic signaling to social-mediated learning

Animals continuously learn from their social environment, assigning value to conspecifics through associative processes that guide adaptive behavior. Previous studies have shown that pairing a conspecific with an aversive reinforcer, such as a footshock, is sufficient to induce robust social avoidance, establishing social fear conditioning as a model to study socially acquired threat. However, in natural environments, social information is rarely learned in isolation, but rather embedded within networks of interconnected individuals. How the value assigned to one individual may extend to others through prior social interactions remains largely unexplored.

This project aims to elucidate how socially learned value propagates across conspecifics by combining social interactions and conditioning phases. Focal mice are first allowed to interact with two unfamiliar demonstrators. Subsequently, the focal mouse is exposed to an aversive outcome specifically during interactions with one of the two demonstrators. We then assess how this experience influence approach-avoidance behavior not only toward the directly conditioned individual, but also toward the indirectly associated conspecific. This design dissociates direct from mediated social learning, enabling the study of how value assigned to one conspecific may extend to others. We hypothesize that, beyond direct avoidance of the conditioned conspecific, previously observed in fear conditioning paradigms, mice may also exhibit altered behavior toward indirectly associated individuals, reflecting a propagation of social value.

In parallel, preliminary fiber photometry recordings target the median raphe, one of the principal serotonergic nuclei implicated in social behavior and hippocampal network dynamics, to explore the neural correlates of this process. Future work will extend this framework to appetitive reinforcers and employ causal manipulations to dissect the underlying circuitry.

Together, this approach aims to bridge associative learning and social cognition by modeling how value spreads across social relationships.