Research Statement

Lina Nerio Morales Ph.D. Candidate

My research focuses on the neurobiological mechanisms underlying social behavior, with a particular emphasis on translational models of neurodevelopmental and psychiatric conditions. I specialize in developing and characterizing animal models that capture the complexity of social deficits relevant to stress-related psychopathologies.

Previous Research

During my master´s training, I used a social defeat paradigm in prairie voles (*Microtus ochrogaster*) to investigate sex-specific effects of chronic stress on social attachment. My master's work revealed that stress-induced deficiencies in the endogenous oxytocin system led to reduced sociability. Using CRISPR/Cas9-mediated gene knockdown, I demonstrated a mechanistic link between oxytocin receptor downregulation in limbic structures and stress-induced social avoidance. I further explored downstream signaling changes and screened candidate compounds for their potential to rescue these deficits, evaluating both behavioral outcomes and pharmacokinetic profiles. This work laid the foundation for using genetic tools in nontraditional but etiologically relevant models, especially where transgenic access is limited.

Current Investigations

My current research investigates how neuropeptides orchestrate stress-induced changes in social attachment through modulation of the limbic dopamine reward system. I showed that stress alters CRF receptor expression in the nucleus accumbens (NAc) and the ventral tegmental area (VTA), and that CRF signaling in the VTA drives sex-dependent changes in attachment behavior, promoting bonding in stress-naïve conditions but inhibiting it in stressed males. Fiber photometry studies revealed dynamic CRF and dopamine transients during social interactions, highlighting a bidirectional neuropeptide regulation of social behavior. These findings offer mechanistic insight into how stress reshapes social cognition and have broad implications for understanding psychiatric and neurodevelopmental disorders.

Methodological Expertise

I integrate molecular, circuit-level, and behavioral approaches to dissect the neurobiology of social behavior. My expertise includes protein quantification, PCR, Western blotting, receptor autoradiography, immunohistochemistry, enzyme immunoassays, pharmacokinetics, fiber photometry, gene editing, and neuronal circuit tracing. These techniques allow me to interrogate the molecular and circuit foundations of social deficits with precision and depth.

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Future Directions

My goal is to build a comprehensive framework for understanding the genomic and neurobiological factors driving hallmark social deficits in psychopathologies. I am particularly interested in exploring opportunities that expand my training into computational neuroscience and genomics to explore how genetic regulation and variation contribute to these phenotypes. By integrating behavioral, molecular, circuit, and genomic approaches, I seek to advance translational research that bridges mechanistic insights with targeted therapeutic strategies for specific psychiatric conditions.

Institutional Fit

I am particularly drawn to institutions that foster interdisciplinary collaboration and cultivate a supportive research culture. My background in behavioral neuroscience, molecular techniques, and genetic manipulation complements programs focused on exploring the biological basis of social behavior. I am eager to contribute to and grow within a team that integrates computational and genomic tools to further research in translational neuroscience. Just as I value scientific rigor and innovation, I also seek an environment that encourages intellectual curiosity and professional development, where researchers are empowered to thrive both personally and professionally.