Pathways to play: Identification of the neural circuitry mediating social play behavior in rats.

Social dysfunction is a hallmark of mental disorders that manifest or originate in childhood and adolescence, such as autism spectrum disorder (ASD), attention-deficit/hyperactivity disorder (ADHD) and schizophrenia (SCZ). Importantly, social disabilities have a huge impact on everyday functioning, but as yet, they remain untreated. In the present proposal, I will study the neurobiology of social play behavior, a particular form of social behavior that is abundant in the young of many mammalian species, including humans. Social play behavior is known to facilitate social and cognitive development, and abnormal play has been associated with ADHD, SCZ and ASD. However, our knowledge about the neural mechanisms underlying social play is limited. Identifying the neural circuitry of social play will increase our understanding of adaptive behavioral development as well as of the pathophysiology of childhood and adolescent psychiatric disorders characterized by social impairments.

Certain neurotransmitters and brain structures have been implicated in social play, but the specific neural pathways contributing to social play behavior remain elusive. With the use of the designer receptor exclusively activated by designer drugs (DREADD) technique to specifically target the noradrenergic and dopaminergic innervation of the limbic forebrain in adolescent rats, the first aim of this proposal is to identify the monoaminergic mechanisms that modulate social play behavior in rats. The second aim is to apply this new knowledge in an animal model of social dysfunction. Thus, the research in this proposal will lead to 1. a precise mapping of the neural circuitry of social play behavior and 2. may provide new drugable targets for the treatment of social impairments in ASD, ADHD and SCZ.