

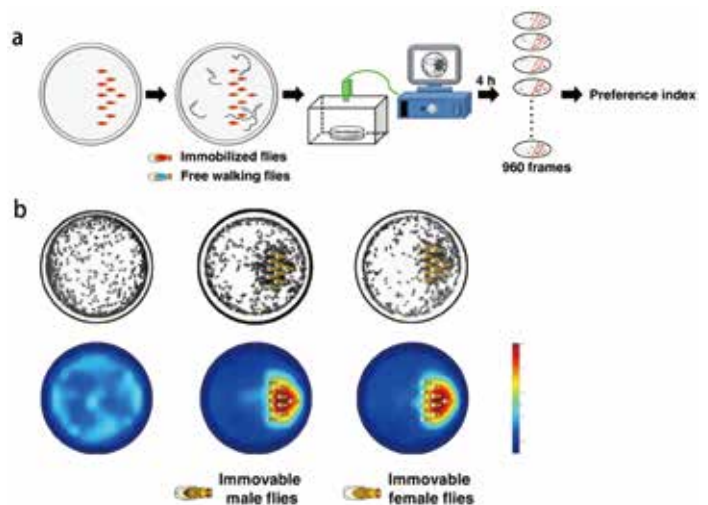
Researchers Uncover Neural Mechanisms Responsible for Animals' Social Interaction

Many animals exhibit a natural tendency to approach and investigate a stranger of the same species; the action is referred to as social approach behavior. The motivation behind such actions promotes individuals to associate in groups and form cooperative societies in the case of humans. Moreover, social motivation deficits are common phenomena in mental disorders, including autism, depression, and anxiety disorder. Understanding sociality and related disorders requires a clear understanding of the evolutionary roots and neural substrate of the desire for social affiliation.

Led by Prof. ZHU Yan, researchers from the State Key Laboratory of Brain and Cognitive Sciences at the Institute of Biophysics (IBP) of the Chinese Academy of Sciences developed a new way to analyze the social attraction between animals, which is a prerequisite for unraveling the neural basis of sociality.

With the newly-developed paradigm to study social approach behavior in fruit flies, the researchers revealed that social cues perceived through both vision and olfaction converge in a central brain region, the γ lobe of the mushroom body. Furthermore, social experience positively activates these γ neurons, while conversely, these neurons' activity controls the motivational drive for social interaction.

This study revealed a crucial neural circuit regulating social desire in insects. It provided a key



Procedure for quantifying social approach behavior. Immobilized attractor flies were tethered to the right side of a shallow dish while the left side was empty. The distribution of free-walking flies in the dish was tracked using a video camera, and the preference index was calculated (a). Free-walking flies were strongly attracted to immobilized flies. Top panels: the overlays of 960 frames from a 4-h test period. Bottom panels: accumulated distributions of free-walking flies (b). (Image by IBP)

breakthrough for the in-depth analysis of social desire's neural mechanism in animals, helping understand human social-related emotional disorders.

Their findings were published with a title of "Social attraction in *Drosophila* is regulated by the mushroom body and serotonergic system" in the journal *Nature Communications* on October 22, 2020.

Reference

Y. Sun, R. Qiu, X. Li, Y. Cheng, S. Gao, F. Kong, L. Liu, Y. Zhu, (2020) Social attraction in drosophila is regulated by the mushroom body and serotonergic system. *Nature Communications* 11, 5350. doi: 10.1038/s41467-020-19102-3.