



Social odor choice buffers drug craving

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Background

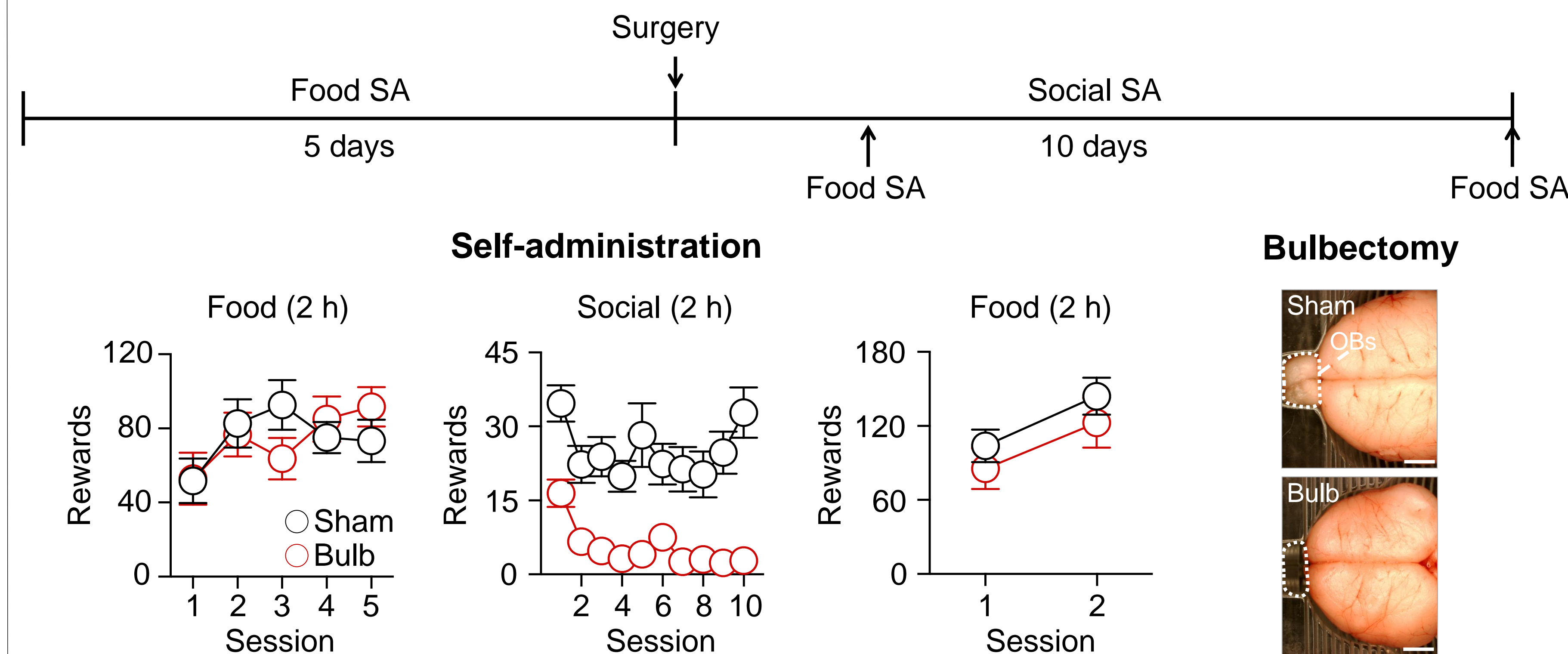
- We previously reported that rats strongly prefer social interaction over drugs^{1,2,3,4}.
- Both human and laboratory animals react to the affective state of others during social interactions, and these abilities are primarily mediated by sensory systems.
- Olfaction is critical for a range of behaviors, including social behavior⁵.
- Substance use disorders have been linked to taste and smell dysfunction⁶.
- Here, we examine a sensory mechanism mediating the protective effect of social reward on drug self-administration, choice, and craving⁷.

References:

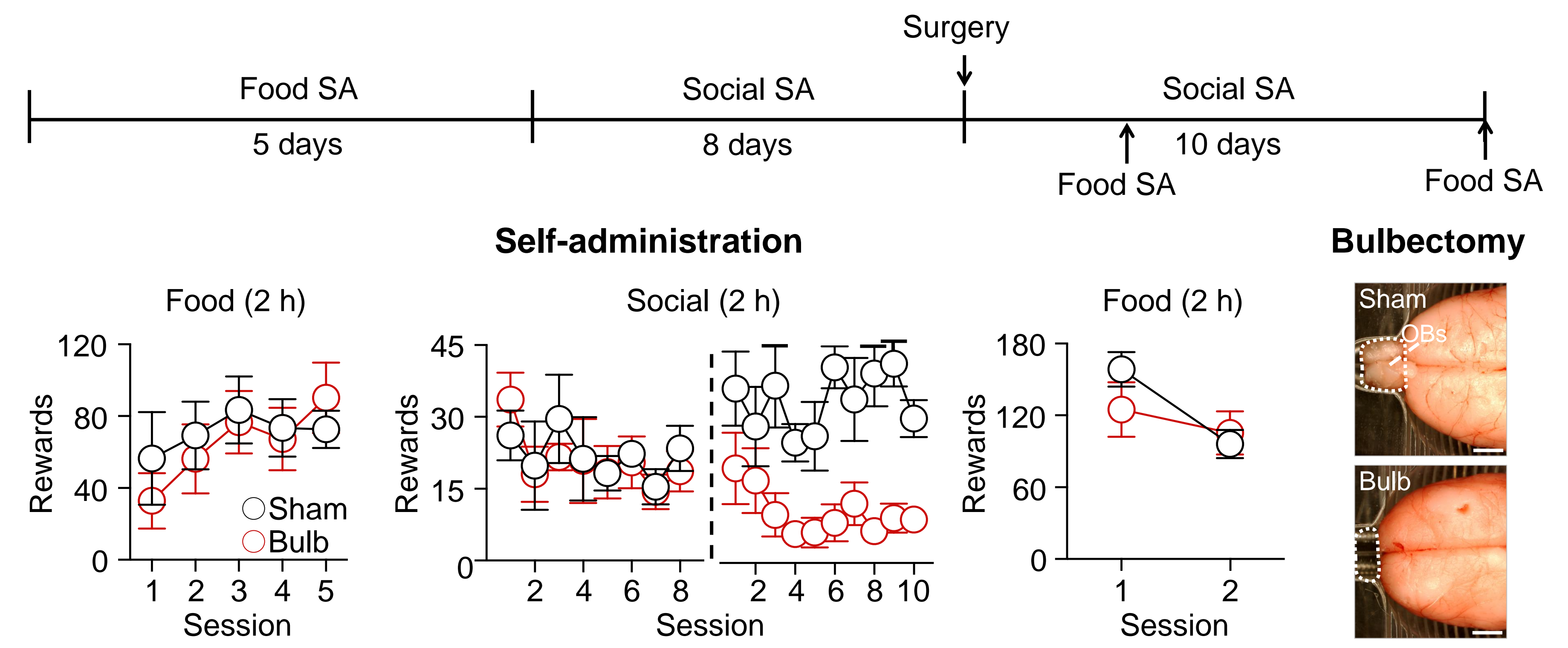
1. Venniro et al., 2018 *Nature Neuroscience*
2. Venniro et al., 2019 *Biological Psychiatry*
3. Venniro et al., 2020 *PNAS*
4. Venniro & Shaham, 2020 *Nature Protocols*
5. Shipley et al., 2003 *Neuroscience in Medicine*
6. Schafer et al., 2021 *Cell and Tissue Research*
7. Papastrat et al., 2024 *Neuropsychopharmacology*

Results

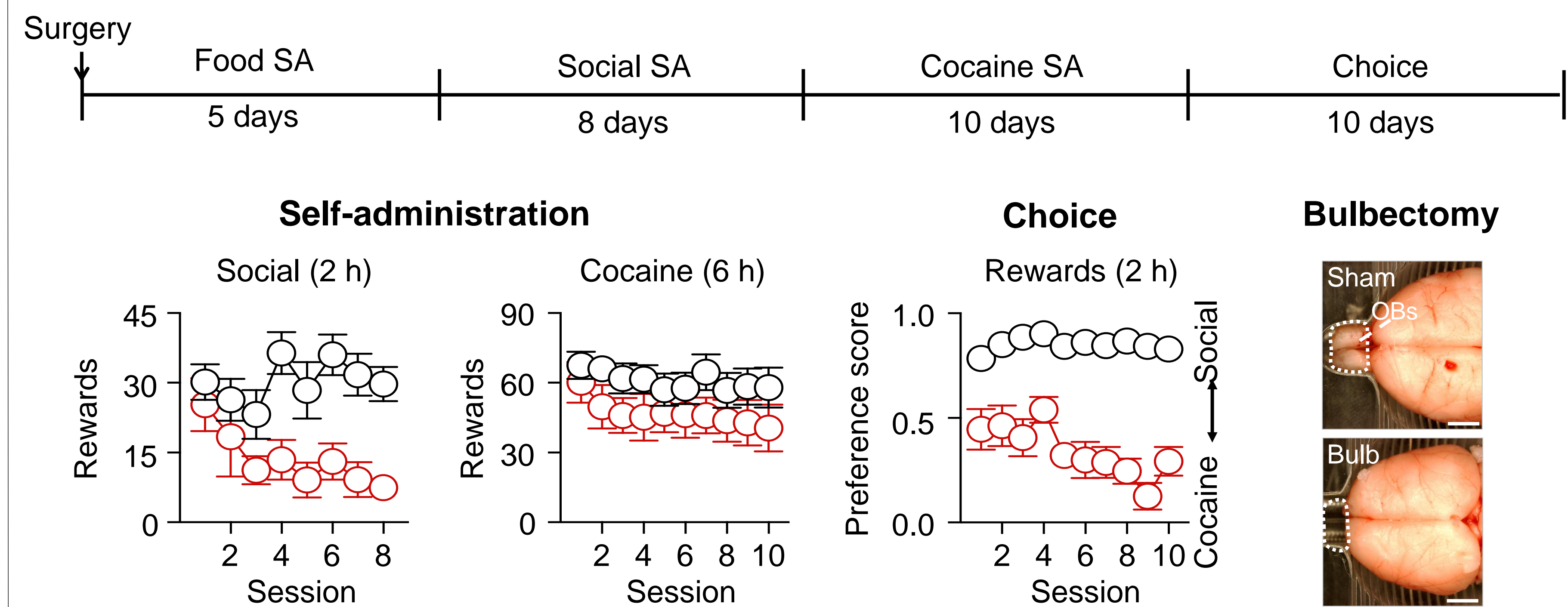
Olfactory system is critical for acquisition of operant social interaction



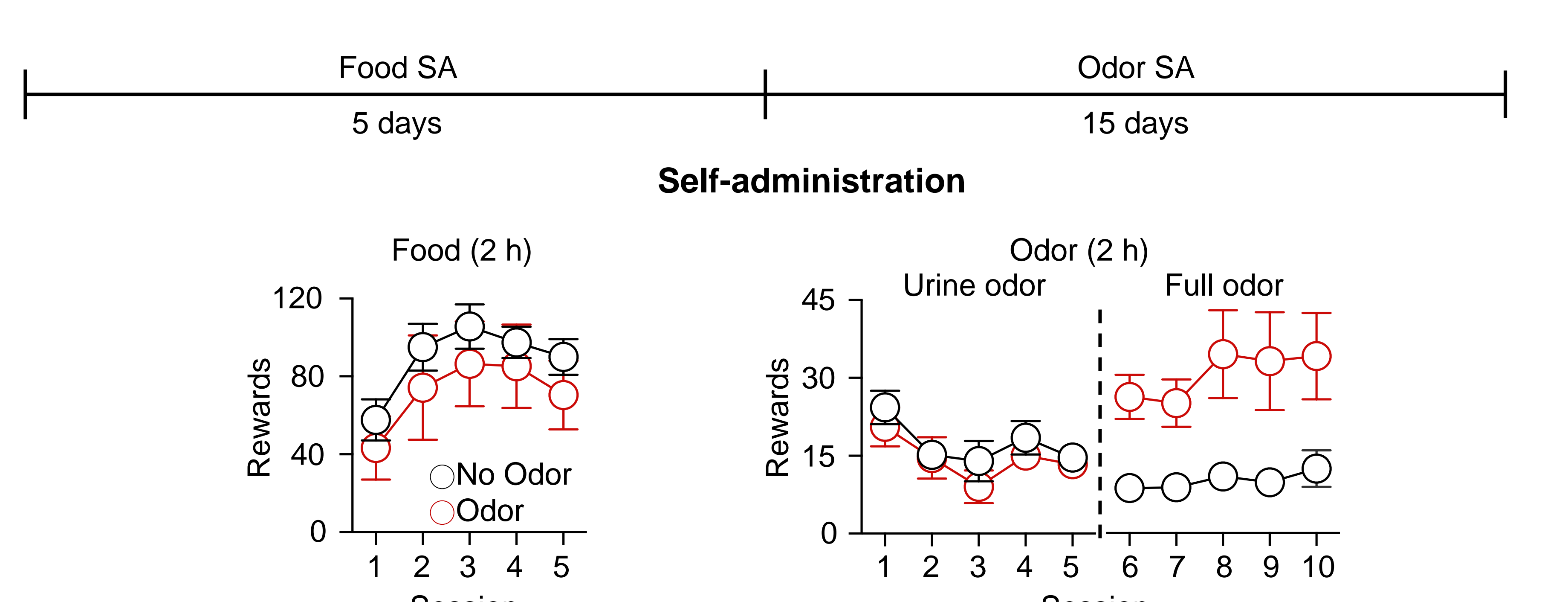
Olfactory system is critical for maintenance of operant social interaction



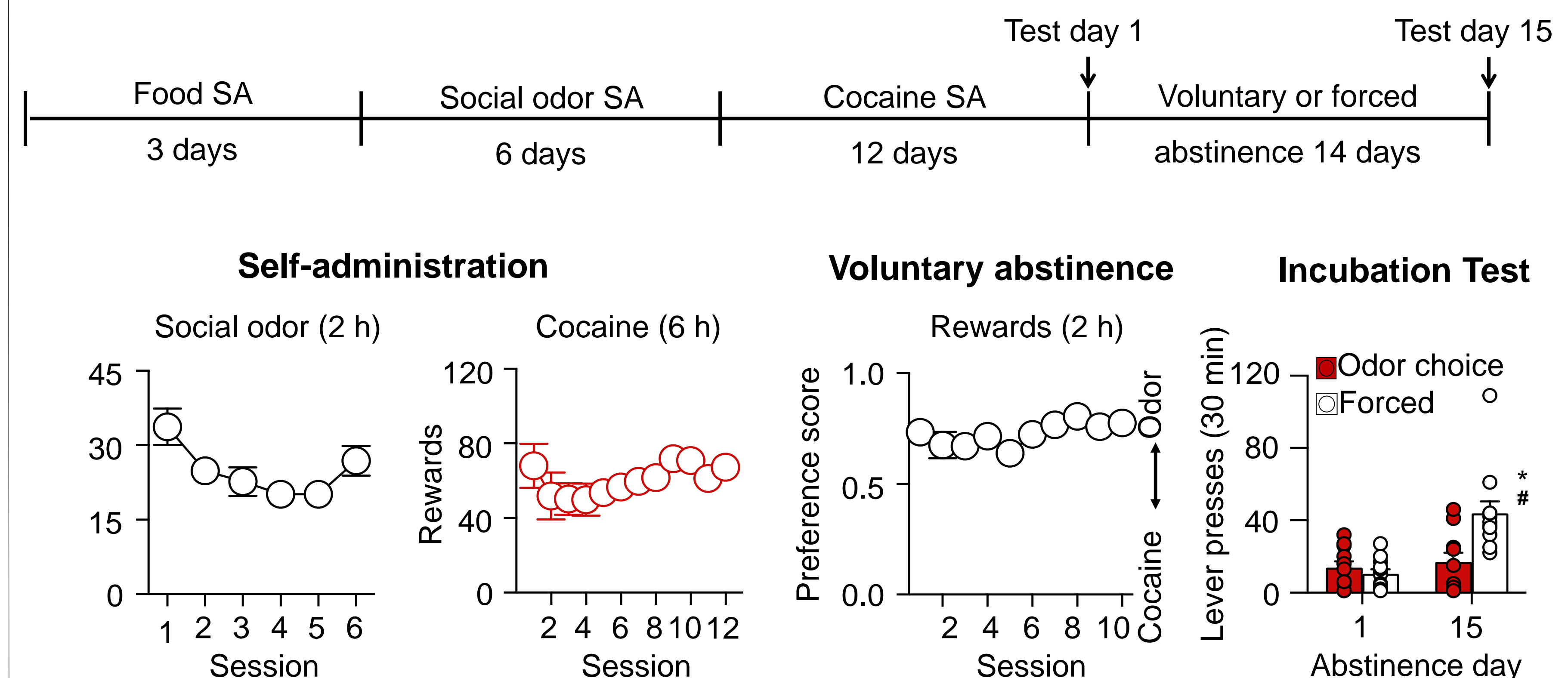
Olfactory system is critical for social versus cocaine preference



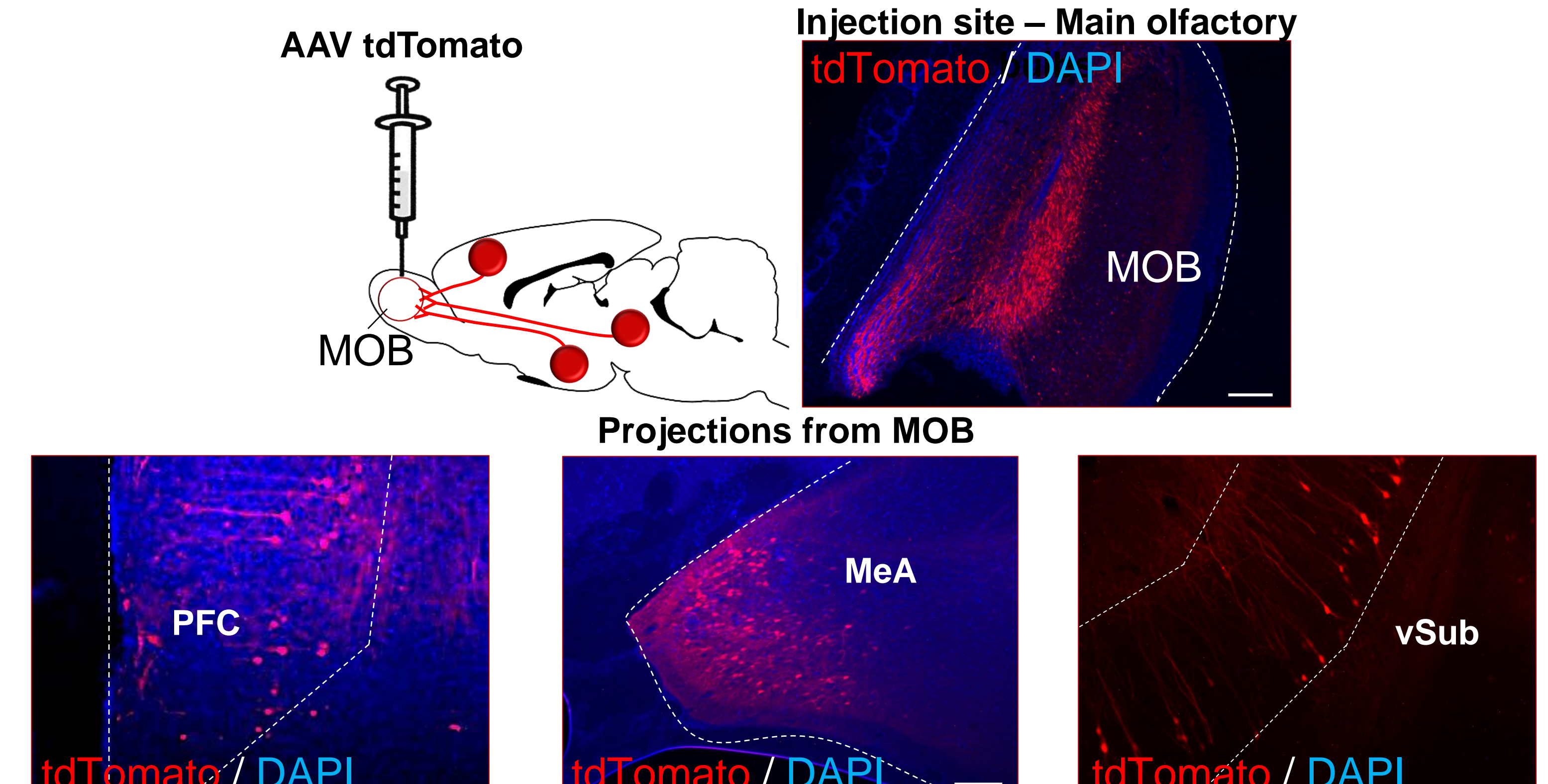
Social odors are critical for operant social reward



Social odors are critical for buffering incubation of cocaine craving



Retrograde tracing projections to olfactory bulbs



Conclusion

- ❖ We identified the olfaction as a socio-sensory system mediating volitional social interaction and of the protective effect of social reward on drug choice.
- ❖ Removal of the olfactory bulbs inhibits the acquisition and maintenance of operant social interactions, and it is critical for social versus drug choice.
- ❖ Social odors, in the absence of physical interaction, buffer incubation of drug craving after odor-induced voluntary abstinence.
- ❖ Olfaction is both necessary and sufficient to elicit the social preference over self-administration effect independent of physical social interaction with another rat.