



Talks by rising stars of neuroscience

**Remembering immunity: Neuronal representation of immune responses**

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*Accumulating data indicate that the brain can affect immunity, as evidenced, for example, by the effects of stress, stroke, and reward system activity on the peripheral immune system. However, our understanding of this neuroimmune interaction is still limited. Importantly, we do not know how the brain evaluates and represents the state of the immune system. In this talk, I will present our latest study from our lab, designed to test the existence of immune-related information in the brain and determine its relevance to immune regulation. We hypothesized that the InsCtx, specifically the posterior InsCtx (as a primary cortical site of interoception in the brain), is especially suited to contain such a representation of the immune system. Using activity-dependent cell labeling in mice (FosTRAP), we captured neuronal ensembles in the InsCtx that were active under two different inflammatory conditions (dextran sulfate sodium [DSS]-induced colitis and zymosan-induced peritonitis). Chemogenetic reactivation of these neuronal ensembles was sufficient to broadly retrieve the inflammatory state under which these neurons were captured. Moreover, using retrograde neuronal tracing, we found an anatomical efferent pathway linking these InsCtx neurons to the inflamed peripheral sites. Taken together, we show that the brain can store and retrieve specific immune responses, extending the classical concept of immunological memory to neuronal representations of inflammatory information.*

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