Thalamocortical Interactions in Cognitive Control and Flexibility

December 17

Tuesday, 12:30 pm

Billings Building—Rosedale Room

SPEAKER:

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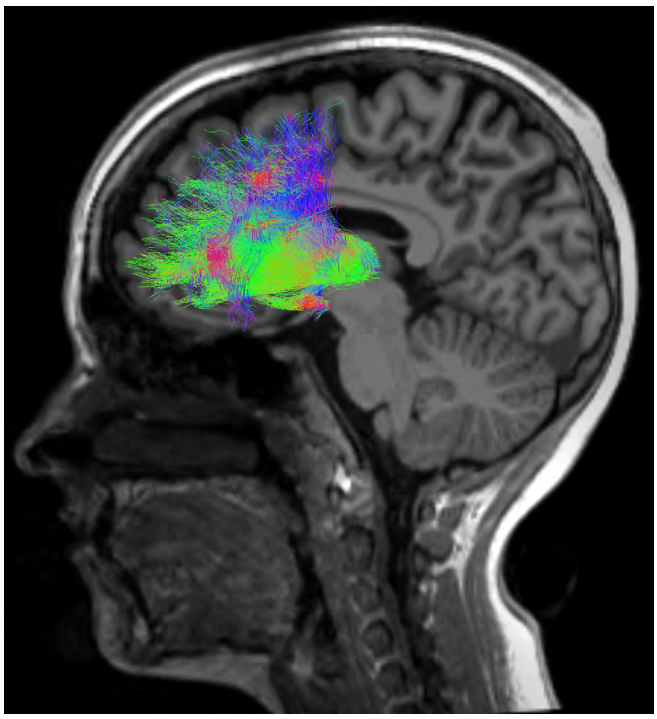
Abstract

Research abstract: Interactions between the thalamus and cortex are critical for cognition but the exact contribution of the thalamus has been unclear. Classical theories depict thalamic relay of signals to or between cortical areas, but recent studies have highlighted the existence of bona fide thalamic computation and a diversity of thalamic output patterns capable of non-relay functions. In this talk, I will discuss findings that highlight the role of the mediodorsal (MD) thalamus in generating unique task-relevant variables and regulating prefrontal excitatory/inhibitory balance and effective connectivity during decision making. These findings indicate a role for the MD thalamus in hierarchical reasoning by engaging computations relevant to credit assignment. In addition to being central to many higher-level cognitive processes, these computations are perturbed in schizophrenia. If time allows, I will present work that directly shows this link and our collaborative efforts to identify biomarkers and treatment targets.



Publications

1. Zhou, T., Ho, Y. Y., Lee, R. X., Fath, A. B., He, K., Scott, J., Bajwa, N., Hartley, N. D., Wilde, J., Gao, X., Li, C., Hong, E., Nassar, M. R., Wimmer, R. D., Singh, T., Halassa, M. M.*, & Feng, G. (2024). *Enhancement of mediodorsal thalamus rescues aberrant belief dynamics in a mouse model with schizophrenia-associated mutation.* (under 2nd revision at Nature) *co-senior, co-corrsponding.

2. Lam, N.H. Mukherjee A., Wimmer R.D., Nassar M.R., Chen Z., Halassa M.M. (2024). *Prefrontal transthalamic processing of uncertainty drives flexible switching.* Nature (in press).

3. Huang A.S., Wimmer R.D., Lam N.H., Wang B.A., Suresh S., Pleger B., Halassa M.M.* Woodward, N.D. (2024). *A Prefrontal thalamocortical readout for conflict-related executive dysfunction in schizophrenia*. Cell Reports Medicine (In press). [* Lead and corresponding].