Neural bases of inter-individual variability in reward-seeking strategy

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Résumé

Within a given population, the diverse responses to environmental stimuli, such as propensities for risk-taking, reward-seeking behaviors, and susceptibility to addiction, highlight the intricate web of inter-individual variability. This variability also appears in reward seeking context, leading to the emergence of distinct strategies. The underpinning neural mechanisms of such variability is still mainly understood. My research delves into the crucial role of the dopaminergic system in decision-making mechanisms and its influence on the cholinergic response to nicotine. Our hypothesis posits a close connection between dopaminergic activity variability and differences in reward-seeking strategies, including the exploration/exploitation balance, ultimately impacting nicotine sensitivity. To explore this hypothesis, I am currently engaged in a task designed to reveal inter-individual differences in reward-seeking strategies. My focus lies on analyzing the dopaminergic signal in the ventral tegmental area and its regions of connections using fiber photometry. I will explore modulations through nicotinic injection and circuit manipulation using optopharmacological methods. Additionally, I am applying a reinforcement learning model to interpret experimental data, aiming to study the latent variables of decision-making processes and explain the inter-individual differences.

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