

From Pecking Order to Ketamine – Neural Mechanisms Connecting the Social and Emotional Brain

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Dominance hierarchy has a great impact on societal function and individuals' life quality. The social economic status has been identified as the single strongest predictor of health. Getting to the top of the social hierarchy is not simply determined by brute strength, but by personality traits such as grit, as well as social experience such as history of winning or losing. The overarching goal of my lab is to understand the neural mechanisms underlying these intrinsic and extrinsic factors determining social dominance.

In a recent work, we characterized the effects of losing, and its impact on emotion. We found that unexpected loss, but not natural loss, during social competition leads to reduced competitiveness and depression-like behaviors. The status-loss-induced depression can be reversed by regaining social status or by the antidepressant drug ketamine. The reinforcement between status decline and reduced motivation to compete is mediated by an intertwined neural signaling controlling the dmPFC and the brain's "anti-reward" center, the lateral habenula. Such crosstalk between the social brain and emotional brain may provide a conceptual ground for treatment of emotional disorders through social behavioral intervention.

In this talk, I will also discuss our ongoing efforts in understanding the sexual dimorphic mechanisms in dominance regulation, and a search for the molecular genetic determinants of dominance through selective breeding.