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Cognition and Behavior

The formation of free-riders from mouse groups in a reward-thr conflict situation is related to their mPFC-BLA-NAc activity

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Despite the well-known notion that mice are social animals, whether or not a group of a mouse living together establishes a clear divisi and if so, how the division temporally evolves, is largely unknown. Here, we developed a naturalistic foraging paradigm that balances th reward with the risk involved. In this setup, mice with limited food should approach a threatening spider robot to get food. In this expe used the CBRAIN telemetry system (Kim et al., Sci Adv, 2020) to monitor brain activities in the BLA, NAc, and mPFC of individual mice. D fact that all mice had the ability to forage throughout the training process, we observed a division in the behavior under the group conc actors were the individuals that actively engaged in the foraging (actor behavior), while the free-riders were the individuals who did no food, but rather took it from the others (free-rider behavior). Notably, as we repeated experiments there was an increase in individuals as free-rider, which was accompanied by a strengthening of a behavior of specific individuals among the actors to fetch food more frequ Analysis of neural oscillation has found that the rate of oscillatory bursts in the beta (24 – 32 Hz) frequency bands in mPFC, BLA and NA significantly elevated in the actors compared to the free-riders during the foraging period. Also, free-riders showed a decreased rate of over time while that of actors was maintained or increased. Moreover, our results show that the beta-to-gamma (72 – 92 Hz) burst ratio the actors compared to the free-riders in the foraging period. These findings suggest the possibility that oscillatory neural activity could different behavior in group conditions. Taken together, our findings provide evidence that mPFC-BLA-NAc regulation is related to the so labor within a mouse society.

Keywords: Social behavior, Group behavior, Worker, Free-rider, Workload imbalance, naturalistic behavior