Experimental sequence of yaw torque/composite learning

Overexpressing aPKC improves motor learning

Silencing Kenyon cells improves motor learning

Silencing specific MBONs improves motor learning

How to improve motor learning in Drosophila

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Figure 1: Color coded sequence of the single periods throughout a learning experiment in the flight simulator. Different colors represent different combinations of Pavlovian (blue) or world learning (yellow). The first two periods show Pavlovian learning with red and blue light as aCS (left) and aUS (right). In the subsequent periods, Pavlovian and world learning are mixed in a pseudorandom order (middle). The first four periods represent the goal-directed training (right), which are followed by four additional test periods. Period 5 is an intermediate test period (left) between training sessions. During the final two periods, the red and blue light is removed and only aCS and aUS are presented (right).

Figure 5: Silencing a small group of mushroom-body Kenyon cells improves motor learning such that it can be detected after 8-minute composite training.

Figure 2: Both Pavlovian learning mutants show improved motor learning. A. Short yaw torque training. B. 4-minute Training. C. Composite training, goal-directed phase (test without colors).

Figure 3: Silencing specific MBONs improves motor learning. A. Scanning MBONs for premature habit formation. B. Rescreening candidate MBON lines.