Is PKC53e-activity in motorneurons involved in operant self-learning in Drosophila?

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Operant self-learning in Drosophila


Goal-directed learning in the world of behavior

In neurons

PKCAlso positive control

PKCDE

行为

Operant activity

Behavior

TARGET System:

Temporal and spatial control of expression

PKC

PKC

cAMP

Self

learning

Light guide & arena dependent MB "US"

"CS"

Operant activity

Fig 1. Putative mutants and RNAi experiments are inconclusive. Left: all flies with mutations inserted in the PKC genes show normal learning scores. Right: Inducing RNAi against PKCinac with a 2 days heat shock did not affect learning. The construct counteracting the RNAi against PKC53e induced a phenotype even when it is not induced by Gal4 expression. Technical problems cannot be ruled out, such that the experiment is not conclusive.

Putative mutants

Fig.2 Following the same protocol as in Fig. 1, we restricted spacially the expression of the PKC inhibitor A. expression in mushroom bodies or central complex does not affect learning. B. Expression in glutamatergic neurons (OK371) or Drosophila neurons are apparently sufficient to block learning. C. Expression in d42 or c380, two Gal4 lines known to show expression in motorneurons, prevents self learning. D. Restricting the expression in Drosophila positive, non-challegic neurons is sufficient to prevent self-learning formation Stars denote significant difference from 0 using a Wilcoxon test.

probably motorneurons

OK371Gal4

(glutamatergic)

Conclusions

The drosophila operant self-learning task seems to depend on PKC-dependent cellular changes in motorneurons. This is reminiscent on the results obtained in down-reflex conditioning in mammals (including humans), where learning induce changes in the intrinsic properties of motorneurons.