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16:00-17:00 A7F Conference Room

Increased adult *Drosophila* female aggression and larval neuromuscular hyperexcitability by isolated rearing: Alteration by two mutations affecting redox

Summary:

Social isolation is known to trigger a variety of behavioral and physiological changes in many animals, but the effects of isolation have not been well documented in *Drosophila*. Here we report that isolated rearing can modify the behavior and physiology of *Drosophila*. Adult female flies isolated after eclosion showed higher frequency of aggressive behaviors than flies reared in a group. We also found that activity-dependent facilitation of larval neuromuscular transmission was enhanced by isolated rearing. Upon repetitive stimulation, neuromuscular junction of isolation-reared larvae displayed striking enhancement of transmitter release, supported by supernumerary firing of motor neurons, while many of group-reared larvae displayed only gradual increase in transmitter release. Interestingly, *Hyperkinetic* (*Hk*, b subunit of a voltage-gated K⁺ channel) and *glutathione S-transferase S1* (*gsts1*, a gene involved in detoxification of reactive oxygen species, ROS) mutants displayed aggression and hyperexcitability regardless of the rearing condition. Although these genes seem unrelated to each other, *Hk* gene in fact has a homology to aldo-ketoreductase. Examination of cellular oxidation status of the neuromuscular junction revealed increased ROS levels in *Hk* and *gsts1* mutants. Our data indicate an interesting possibility that ROS may be involved in the modulation of behavior and physiology by isolation rearing during development.

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