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Screening for inhibitor of recombinant Drosophila melanogaster tyramine-β-hydroxylase

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B iogenic amines are common biologically active substances extended within the whole animal kingdom where they play vital roles as signal transducer as well as regulator of cell functions. One of these biogenic amines called octopamine (OA) originated in the insect nervous system is synthesized from tyramine (TA) by the catalysis of tyramine-β-hydroxylase (TβH). Both tyramine and octopamine act as neurotransmitters, neurohormones and neuromodulators in the arthropod nervous system. Herein, inhibitory activity of 1-arylimidazole-2(3H)-thiones (AITs) were tested on *Drosophila* tyramine-β-hydroxylase (DmTβH) purified from recombinant Bombyx mori strain. Radiolabelled ³H-TA was used to analyze the activity of inhibitors and the radioactivity was measured by liquid scintillation counter. Different concentrations of AITs exhibited inhibitory effects on DmTβH which was ID₅₀ values ranging from 0.020 nM to 2.511 μM. The most effective compounds for DmTβH inhibition were 2-Me AIT; 2-Et AIT; 4-CF3 AIT; 2,4-Me₂ AIT; 2,6-Me₂ AIT; 2,3,4-Cl₃ AIT; 3,5-(MeO)₂ AIT; 2-Me,4-Cl AIT; 2-Cl,5-Me AIT; 2-MeO,4-NO₂ AIT; unsubstituted AIT; 4-MeO AIT; 4-MeS AIT; 2,5-(MeO)₂ AIT and 2-Me,6-Cl AIT with ID₅₀ values 5.820, 1.887, 0.235, 1.246, 0.020, 0.301, 3.175, 0.154, 0.796, 1.201 nM and 0.004, 0.009, 0.008, 0.009, 0.003 μM respectively. DmTβH was inhibited as a dose dependent manner at pH 7.6 and 25°C during a 30 min of incubation. The inhibitory activity of AITs on DmTβH may be considered as lead compounds to control insect population after further extensive studies.

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Habitat selection of desiccation resistance and body pigmentation along geographical gradients in *D. melanogaster*

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Nature collected and laboratory reared nine Indian geographical populations of cosmopolitan species, *D. melanogaster*, from low to high altitude locality (219 m to 2202 m) were investigated for abdominal pigmentation, desiccation resistance and water loss rate. All the three traits evidenced significant high repeatability across generations. Genetic correlations, based on family means, were significantly high among abdominal melanization and desiccation resistance, as a function of altitude, are quite similar. However, both the traits were negatively correlated with rate of water loss. In view of limited data on desiccation resistance in a dark phenotypic single gene mutant strain of *D. melanogaster* and two laboratory strains of *D. polymorpha*, present studies suggest correlated effects of abdominal melanization on desiccation resistance and reduced water loss in montane populations of *D. melanogaster*. Present investigation suggests role of body melanziation in maintaining thermo-balance as well as water balance in montane populations of *D. melanogaster*.

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