Role of the central complex in the visual learning of flies

Li Liu
State Key Laboratory of Brain and Cognitive Science, Institute of Biophysics,
Chinese Academy of Science, Beijing 100101, P. R. China

The central complex, which includes several substructures such as protocerebral bridge, fan-shaped body, ellipsoid body, is a prominent structure in the *Drosophila* brain. Visual learning experiments in the flight simulator with genetically altered brains in flies revealed that two groups of horizontal neurons in the fan-shaped body were required for *Drosophila* visual pattern memory. Further experimental results showed that a subset of ring-neurons in ellipsoid body was also involved in visual pattern memory. Differential roles of fan-shaped body and ellipsoid body in *Drosophila* visual pattern memory were revealed under several visual pattern parameters, such as size, contour orientation, and vertical compactness. Our study defines a complex neural circuit in the central complex for *Drosophila* visual pattern memory.