

## THE "CORPORA PEDUNCULATA" OF THE MOSQUITO BRAIN

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The brain of the mosquito, despite its small size, is a remarkably well organized structure. The association centers within the brain, or cephalic ganglia, are many and complex. Rogoff (1) has described the appearance of the most prominent of these centers, the **corpus centrale**. The **corpora pedunculata**, or mushroom bodies, while more weakly developed than the **corpus centrale** of the mosquito, are nonetheless rather complex and important association centers of the cephalic ganglia. Bretschneider (2) considers that the mushroom bodies are not well developed among the Diptera.

Adults and fourth instar larvae of *Culex pipiens* L. and *C. restuans* Theobald were fixed in Petrunkevitch's paranitrophenol-formol fluid. Staining was accomplished by the Bodian activated protargol technic,

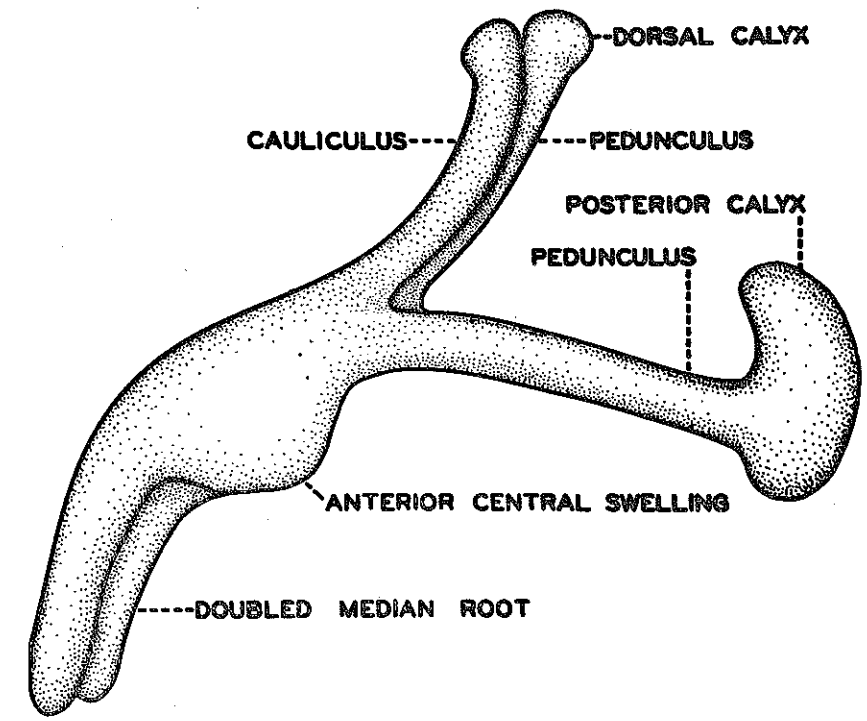


Figure 1. "Corpus pedunculatum" of adult mosquito (medical aspect)

followed by gold toning with subsequent oxalic acid reduction. The details of this procedure were described by Rogoff (3).

In the mosquitoes studied, the *corpora pedunculata* were not too clearly differentiated from the surrounding neuropile. The configuration of the mushroom body of the right side of a mosquito is shown in Figure 1.

The posterior swelling corresponds to what is generally known as the calyx. This posterior calyx is not cup-shaped as in many other insects. The posterior calyx of the mosquito is similar to that of *Nymphomyia*, as described by Tokunaga (4). From the anero-ventral portion of this calyx, a stalk (the pedunculus) extends anteriorly, laterally, and dorsally to enter an anterior central swelling. From the central swelling a double stalk proceeds posteriorly, laterally, and dorsally. The more ventral of these stalks ends in a slight swelling, and probably corresponds to the second calyx and pedunculus of other insects. The more dorsal member of this double stalk would then correspond to the posterior root or cauliculus. Running medially and ventrally from the central swelling is another double stalk, the median root or *balken* of German authors. These stalks approach the corresponding member from the other side of the brain and end just in front of the core of the central body.

The *corpora pedunculata* of the larval mosquitoes studied were similar in general outline to those of the adult. A posterior swelling gives rise, ventrally, to a stalk which passes anteriorly, dorsally, and laterally to enter an anterior central swelling. From this central swelling another stalk proceeds dorsally, posteriorly, and laterally to end in a dorsally located swelling. As was mentioned in the description of the mushroom bodies of the adult, it is assumed that the posterior and dorsal swellings correspond to the calyces of this body in other insects. Running medially and ventrally from the anterior swelling is the median root which ends in a large swelling in front of the central body, and extends toward the corresponding member of the mushroom body of the other half of the brain.

The connecting stalks are relatively smaller in the larva than in the imago; this tends to make the calyces, the anterior swelling, and the swelling on the medial root more prominent, relatively, than the corresponding structures of the adult. The median root appears single, rather than double as in the adult, and the stalk to the dorsal calyx is also single, rather than double. Thus it appears that the cauliculus is lacking, at least as an independent structure, in the larval mosquito.

#### SUMMARY

1. The *corpora pedunculata* of the larval mosquito are complex association centers, not always easy to distinguish from the surrounding neuropile.
2. The *corpora pedunculata* undergo significant changes during metamorphosis.

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