

# The Antennal Circulatory Organ of the Blow-Fly *Calliphora vomitoria* L. 1758 (Diptera, Calliphoridae)

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Accessory circulatory organs supplying the antennae are widespread among pterygote insects and exhibit an unusual disparity in their functional morphology. In Diptera, so far only the antennal pulsatile organs of nematoceran species were studied in detail. In this study, these organs in the brachycheran *Calliphora vomitoria* are investigated using light and electron microscopy together with the 3D reconstruction software Amira. The organ of the blowfly is located in the head medially beneath the basal segments of the antennae, and consists of an unpaired ampulla, to which lateral vessels are connected supplying the antennae. Two strands of dilator muscles are attached to the anterior ampulla wall which extend horizontally to the back of the head. In front of the brain the muscle strands merge and a single strand extends below the brain to the second attachment site at the anterior end of the dorsal vessel. The thin ampulla wall is built up of flat overlapping epithelial cells interconnected by hemidesmosomes and septate junctions. The ampulla exhibits an extraordinary thick and filamentous external lamina giving the wall probably a certain elasticity. Within the ampulla lumen numerous of tiny strands of connective tissue extend from the anterior wall to the posterior wall. This meshwork accumulates in the posterior area of the ampulla forming a tendon-like structure to which the ampulla dilator muscles are attached. The contraction of these muscles widen the ampulla and hemolymph is sucked into the lumen via two lateral valve-like ostia. During systole, the ampulla is compressed, probably due to the elasticity of the external lamina, and hemolymph forced into the antennal vessels. In the posterior region of the head the dorsal vessel terminates slightly above the neck opening with a large excurrent opening. In the area where the dorsal vessel bends dorsally, two lateral openings are found. Accessory circulatory organs with dilator muscles attached to the dorsal vessel are already known from other dipteran species like *Culex pipines* and *Aedes aegyptii*. This functional model was also reported from other hexapod families like Orthoptera, Blattodea and Megaloptera.