Functional Role of Flight Muscle in Male Courtship Song of *Drosophila melanogaster*.

Wajda M, Chakravorty S and Vigoreaux JO

Department of Biology

Many animals engage in elaborate courtship rituals that are characteristic of their species mating behavior. In Drosophila (fruit flies), males produce a mating song by beating their wings. Wing movements are generated by contraction of the flight thoracic musculature, the primary machinery for generating flight, itself an important and distinct behavior necessary for survival. The flight musculature has two main components, the indirect flight muscles (IFM), required for generating flight power, and the direct flight muscles (DFM), whose function is to maneuver the wings and control flight. Previous studies have shown that the IFM and DFM are neurally activated during male courtship song but the precise role of these muscles in courtship has not been investigated. The overall goal of this study is to investigate the role of the IFM in male courtship song production and to determine if mutations in muscle proteins that affect flight performance also affect courtship song production. Our focus here is on flightin, a hyperphosphorylated myosin binding protein that in *Drosophila melanogaster* is expressed exclusively in the IFM. In this species, flightin is essential for IFM structural integrity and for the stretch activation response that produces the fast wing beats for flight. We show that mutant male flies lacking flightin (fln^0) cannot produce the courtship song and are outcompeted by wild type males in a mating competition assay. Our preliminary results suggest that the IFM is required for producing male courtship song and that flightin is important for this function.