



**Title: The arylabialis muscle of the túngara frog (*Engystomops pustulosus*)**  
**help**

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### **Introduction**

The current functional model of the anuran larynx includes four pairs of laryngeal muscles.

### **Purpose**

Their contractions do not account, however, for the behavioral control of call complexity observed in male túngara frogs (*Engystomops pustulosus*), which optionally add a secondary note with distinct harmonic structure to their advertisement call.

### **Method**

Examination of the túngara frog's laryngeal morphology through dissection and resin histology has revealed that the m. dilatator laryngis is divided into two separate bundles (superficial and deep).

### **Results**

The superficial bundle closely matches the typical description of the m. dilatator laryngis and is well positioned to open the glottis. The deep bundle is exclusively innervated by the short laryngeal nerve and has an attachment to the fibrous mass, an internal laryngeal structure necessary for complex call production. This attachment indicates a separate role for the deep bundle in controlling the complexity of the call. Based on physical separation, exclusive attachments, distinct fiber orientation, exclusive innervation, and potential action, we recognize the deep bundle of the m. dilatator laryngis as a separate muscle. We also revalidate the name m. arylabialis which had been previously used to describe it.

### **Significance**

The split of the m. dilatator laryngis into two muscles results in a laryngeal innervation pattern that closely matches that of mammals. This study identified a novel laryngeal muscle in túngara frogs, a potential mechanism for the control of call complexity, and revealed new evidence of homologies between the laryngeal structures of amphibians and mammals.