Title: A basal laryngeal cartilage is present in neotropical túngara frogs (Engystomops pustulosus)

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Introduction

Amphibians produce sounds within the larynx, a hollow organ that forms a passageway between the lungs and the oral cavity. The larynx contains a cartilaginous framework consisting of a paired arytenoid cartilage and a single cricoid cartilage that together enclose the vocal cords. In the genus of the túngara frog the cartilaginous framework of the larynx is highly specialized, having a greatly expanded cricoid cartilage and vertical asymmetry. Preliminary observations in our lab indicate that the larynx of the túngara frog may also contain a previously unknown cartilaginous structure.

Purpose

The purpose of this project is to characterize the novel laryngeal cartilage in the context of the cartilaginous framework of the anuran larynx and examine its possible impact on the túngara frog's call structure.

Method

The larynges of 20 adult males were analyzed via dissection, resin histology, microtomography and three-dimensional modeling.

Results

The presence of an undescribed laryngeal cartilage was confirmed in the túngara frog. This cartilage lies embedded within a thickened portion of the vocal folds. It is a round, paired cartilage positioned inside the laryngeal cavity near the posterior surface of the arytenoid cartilages. The cartilage is connected not only with the vocal folds, but with the laryngeal musculature and the laryngeal fibrous mass. These structural features raise testable hypotheses about the role laryngeal anatomy plays in call complexity.

Significance

Unveiling the structures used by túngara frogs to add complexity to their calls will help to shed new light on the origins of complexity in natural communication systems.