Parsons, JW*[,1]; Jimenez, YE*[,1,2]; Camp, AL[3]; Brainerd, EL[1]; Brown University, Tufts University, University of Liverpool; *jake_parsons@brown.edu*

Epaxial muscle activity confirms isometric contraction during suction feeding in channel catfish, *Ictalurus punctatus*

Concentric (shortening) and isometric (constant-length) muscle contractions are well documented in in tetrapod species. However, less is known about how concentric and isometric contractions allow muscles to act as both motors and anchors in fish. Most fish species seem to use concentric epaxial and hypaxial contractions to power high-performance suction feeding, whereby active shortening of the epaxials and hypaxials rapidly expands the mouth's volume, creating strong subambient pressures that draw prey into the mouth. In channel catfish, however, the epaxial-powered neurocranial elevation found in many suction-feeding fishes is not observed and the epaxials have been shown to maintain a constant length during peak power production. With no cranial elevation and no epaxial shortening, the presence of epaxial muscle activation in the channel catfish would confirm the hypothesis that epaxial isometric contraction anchors the head during suction feeding. We used electromyography to determine the presence or absence of muscle activity during 118 feeding strikes from three channel catfish, and an intraoral pressure transducer to measure the timing of force production relative to muscle activation. We found that the epaxial muscles were active during all suction feeding trials. This activation shows that, while there is no cranial elevation, the epaxial muscles actively stabilize the cranium via isometric contraction. In contrast, concentric activation in the hypaxial muscles during feeding forcefully rotates the pectoral girdle to expand the oral cavity and generate suction. This simultaneous isometric anchoring in the epaxial muscles, and concentric power generation in the hypaxial muscles, presents an evolutionary separation of muscle function into both motors and anchors as has been recorded across tetrapod species.