

Abstract

Gymnotiform fishes are a diverse and widely distributed order of Neotropical fish frequently studied for their ability to generate and detect electric fields. These fish use electrolocation as a means of navigating and foraging at night and in dark, turbid waters. The waveforms and frequencies of their electric organ discharges (EODs) are species-specific, allowing them to use electrocommunication for identifying and signaling conspecifics during social interactions. The current study focuses on the evolution of signaling adaptations and how they might be related to the ecology of these fish. Specifically, we examined one mechanism regulated by adrenocorticotrophic hormone (ACTH) through which some species show circadian increases in EOD amplitude, as well as rapid amplitude increases during social encounters. Preliminary results suggest that not all gymnotiforms are able to increase the amplitude of their EOD and that ACTH might play different roles between species. This is particularly interesting because amplitude changes involve the regulation of sodium channels in the membranes of electrocytes (electric cells). These ion channels are crucial for many biological functions and despite being highly conserved throughout the evolutionary history of vertebrates, may have developed interesting adaptations in electric fishes.