



Mudskippers (*Boleophthalmus caeruleomaculatus*) in shallow waters at Mai Po Nature Reserve, Hong Kong. Image Credit: Daniel J. Fields (University of Cambridge, Cambridge, United Kingdom).

EVOLUTION

Origin of blinking in mudskippers and tetrapods

Most living tetrapods, or limbed vertebrates, can blink, but the evolutionary origins of blinking are unclear. Brett Aiello et al. analyzed the morphology and function of blinking in Indian mudskippers (*Periophthalmodon septemradiatus*) and African mudskippers (*Periophthalmus barbarus*)—amphibious fish that evolved the ability to blink independently from tetrapods. Analyzing the 3D blinking kinematics of *P. barbarus* in lab tanks, the authors found that blinking occurred primarily on land and involved retraction of the eye along with elevation of a membrane. Lab tests suggest that blinking in *P. barbarus* serves to wet, clean, and reflexively protect the eye, similar to the functions of blinking in tetrapods. The authors analyzed and compared the cranial morphology of *P. septemradiatus*, *P. barbarus*, and fully aquatic round gobies (*Neogobius melanostomus*), which lack the ability to blink. The comparison revealed that blinking in mudskippers is accomplished by a rearrangement of muscles common to jawed vertebrates, rather than newly evolved muscles or glands. The authors suggest that fossilized features associated with eye retraction may indicate blinking capabilities in early tetrapods. According to the authors, the evolution of blinking in both mudskippers and tetrapods was likely driven by the transition to life on land. — M.H.

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