A glimpse into the past - Functional morphology and evolutionary biology of vertebrates

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The EvoMoRG group (Evolutionary Morphology Group) at the University of Vienna, focuses on the interface between palaeobiology and evolutionary developmental biology of vertebrates, with the main task of the reconstruction of ancient life based on the anatomy of living species. In this talk, two main research subjects are presented.

One highly debated topic in recent years was the functionalmorphological signal of the vestibular system of vertebrates. This organ for spatial orientation is located in the bony labyrinth of the petrosal bone of the skull. In 1873, Joseph Hyrtl denied any locomotory evidence in the anatomy of the vestibular system. But since the benefits of non-invasive micro-CT scanning and 3D reconstruction software became quite popular in recent years, many different studies were proven the opposite. Even though an anatomical signal is detected in the vestibular system (e.g., diameter of the semicircular canals vs. radius of the semicircular canals), it differs between extant and extinct groups of interest.

Besides anatomical investigations of the ear, also the deep sea and its vertebrate creatures are under investigation in the EvoMoRG group. Every night the greatest migration on Earth starts in the deep-pelagic were organisms move up to the meso- and epipelagic to find food and descend to deeper waters during the day. However, characteristics and morphological features of the locomotory system in these fishes have never been investigated. This project focus on the extraordinary musculotendinous system of mesopelagic fishes based on microdissections of cleared and stained specimens in combination with iodine stained micro-CT scans.