Early Vertebrate History: After the Rise of Bone and Before

by

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Living vertebrates fall into two major groups: the jawless cyclostomes (hagfish and lampreys) and the jawed gnathostomes (including all jawed fishes and land vertebrates), which have diverged about 500 Million years (Myr) ago. These two groups differ considerably by both their anatomy and physiology but how their respective specializations arose and what their common ancestor may have looked like remain difficult to figure out, unless by appealing to developmental biology. A number of early, 470-360 Myr-old fossil armoured fishes now document the stepwise assembly of the gnathostome body plan, such as the rise of a bony skeleton, paired fins and finally jaws. However, the cyclostomes, which never or rarely produce mineralized tissues, remains poorly known as fossils, and their deep past history is only documented thanks to soft-bodied fossils whose soft tissues may be exceptionally preserved through microbially induced post-mortem mineralization under particular environmental conditions.