

SVPCA Papers

- Coombs, W. P., Jr., and Deméré, T. A. 1996. A Late Cretaceous nodosaurid ankylosaur (Dinosauria: Ornithischia) from marine sediments of coastal California. *Journal of Paleontology* 70: 311-326.
- Horner, J. R. 1979. Upper Cretaceous dinosaurs from the Bearpaw Shale (marine) of south-central Montana with a checklist of Upper Cretaceous dinosaur remains from marine sediments in North America. *Journal of Paleontology* 53: 566-578.

The contribution of placoderms to our understanding of the ontogeny and evolution of early gnathostomes

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Placoderms, as the outgroup to remaining gnathostomes, are critical to our understanding of the polarity of character state transitions within basal chondrichthyans and osteichthyans. For example, they document the polarity of pectoral fin characters, thus the plesiomorphic state consists of a single proximal element with a narrow attachment to the girdle. The evolution of extant conditions represents the breakup and/or variable loss within this proximal element.

Development of the gnathostome neurocranium includes the origin and fusion of the occiput and trabeculae to the primitive vertebrate braincase, evidenced by the anterior fissure among placoderms and the otic-occipital fissure in chondrichthyans and teleostomes. Placoderms retain plesiomorphic short trabeculae with the palatoquadrate articulating with the parachordals.

Fusion among anterior vertebrae to form a synarcual in placoderms mimics the anatomical transformations associated with misexpression of segment-related genes in mice and humans. Thus, one group's maladaptive misexpression may be the source of an adaptive change in other taxa where a synarcual is found.

Goodrich suggested a paired and neural crest origin for basibranchial elements of the visceral skeleton. This is confirmed in *Cowralepis mclachlani* (Phyllolepida, Placodermi) where these elements are paired throughout ontogeny and possess significant attachment sites for hypobranchial musculature (documenting their neural crest origin).

Renewed interest in placoderms is providing important evidence to establish character polarity for a number of anatomical systems. It also documents the presence in adults of characters that are now only glimpsed as transitory features in ontogeny thus a peramorphic shift among extant taxa relative to the gnathostome primitive condition.

New discoveries from Bearsden: reassessing the early record of post-Devonian fishes

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The Mississippian (Serpukhovian) Bearsden fauna (Glasgow, Scotland) is known for the exceptional preservation of its fossil sharks. The equivalent horizon was known from sites in