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Immunocytochemical localization of carbonic anhydrase in the pseudobranch tissue of the rainbow trout *Oncorhynchus mykiss*

虹鳟假鳃组织中的碳酸酐酶免疫细胞化学定位

Key words: Pseudobranch, Carbonic anhydrase, Rainbow trout, Immunohistochemistry, Immunocytochemistry, Physiology

关键词：碳酸酐酶；假鳃；虹鳟；免疫组化；免疫细胞化学；生理学

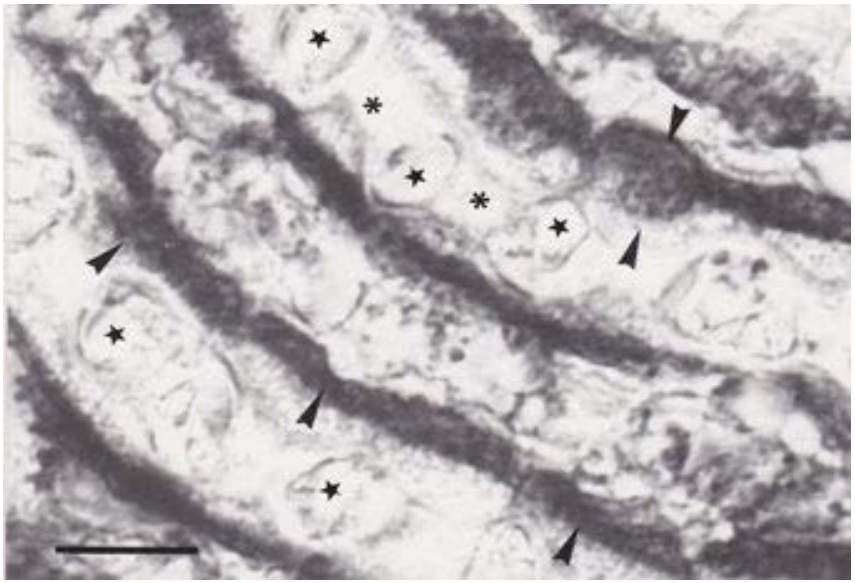
▪ Pseudobranch function has long interested scientists, but its role has yet to be elucidated. Several studies have suggested that pseudobranchs serve respiratory, osmoregulatory, and sensory functions. This work investigated the immunolocalization of pseudobranch carbonic anhydrase (CA) in the teleost fish species rainbow trout (*Oncorhynchus mykiss)* to clarify its physiological function.

• CA was purified from rainbow trout gills *O. mykiss* and specific antibodies were raised. Electrophoretic, immunoblotting, immunohistochemical and immunocytochemical techniques were used to perform actual research.

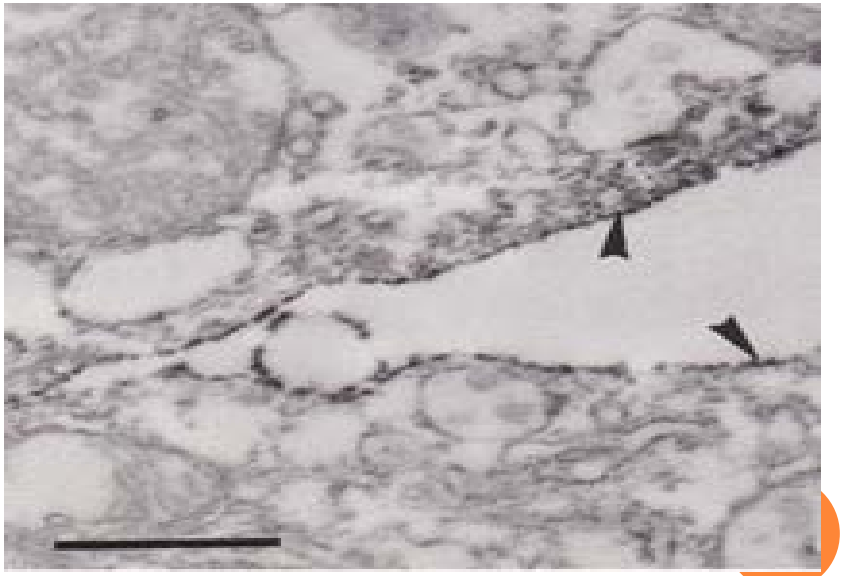


Results of immunohistochemical technique revealed that CA was distributed within pseudobranch cells and more precisely in the apical parts (anti-vascular) of cells. The basal (vascular) parts of cells, tubular system, blood capillaries, and pillar cells were not immunostained. Immunocytochemistry confirmed these results and showed that some CA enzyme was cytoplasmic and the remainder was linked to membranous structures. The results also showed that the lacunar tissue layers did not display immunoperoxidase activity

- Light micrscope immunohistochemistry revealed CA in pseudobranch tissue (arrow head)



- Electron micrograph of pseudobranch cells revealed CA in apical part (arrow heads)



- In conclusion, our results demonstrated that pseudobranch CA was immunolocalized in the apical (anti-vascular) part of cells, different from the finding of the histochemical method of Hansson (1967), and was indicated that pseudobranch CA may have a function related to the extracellular medium wherein CA intervenes with the mechanism of stimulation of afferent nerve fibers.