

PROBING OSTEOCALCIN IN FISH

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Osteocalcin (OC), an extra cellular mineral binding protein, has been identified in all vertebrates' classes except Agnatha and Chondrichthyes. The OC protein, 45-51 amino acid residue in length (depending on species) has been partially or completely sequenced from 20 species to date, including two Perciformes, swordfish (*Xiphias gladius*) and bluegill (*Lepomis macrochirus*). To learn more about the evolutionary relationship, origin, and function of this abundant bone protein, we have begun to probe for the gene in 18 species of fish representing several groups of Actinopterygians that will include Acipenseriformes, Anguilliformes, Clupeiformes, Cypriniformes, Salmoniformes, and Perciformes as well as Elasmobranchs. The fact that the latter have cartilaginous rather than fully mineralized bone found in Actinopterygians plus the fact that Osteocalcin inhibits hydroxy-apatite crystallization and crystal growth led us to examine if Osteocalcin originated with bone mineralization.

To identify this evolutionary relationship a small quantity of genomic DNA was extracted from several species of non-cartilaginous and cartilaginous fishes. This genomic DNA was then probed using a small segment of Mouse OC genomic DNA. Relative concentrations for each species of fish were then identified using colorimetric methods. The results suggested that the OC gene was present in cartilaginous fish species. The conservation of the OC gene in organism which do not need it for bone formation leads to a hypothesis that OC may have another unspecified function.