

BONES AND CARTILAGE

Developmental and Evolutionary Skeletal Biology

— Second Edition —

Brian K. Hall

Department of Biology, Dalhousie University, Halifax, NS, Canada

Bones and Cartilage: Developmental and Evolutionary Skeletal Biology provides the most in-depth review and synthesis assembled on the topic, across all vertebrates. This work examines the function, development and evolution of bone and cartilage as tissues, organs and skeletal systems. It also describes how bone and cartilage develop in embryos and are maintained in adults, how bone is repaired when we break a leg, or regenerates when a newt grows a new limb, or a lizard a new tail.

The second edition of **Bones and Cartilage** includes the most recent knowledge of molecular, cellular, developmental and evolutionary processes, which are integrated to outline a unified discipline of developmental and evolutionary skeletal biology. Additionally, coverage includes how the molecular and cellular aspects of bones and cartilage differ in different skeletal systems and across species, along with the latest studies and hypotheses of relationships between skeletal cells and the most recent information on coupling between osteocytes and osteoclasts. All chapters have been revised and updated to include the latest research.

KEY FEATURES

- Integrates development and evolution of the skeleton, and provides a synthesis of differentiation, growth and patterning
- Offers complete coverage of every aspect of bone and cartilage, with updated references and extensive illustrations
- Treats all levels from molecular to clinical, embryos to evolution, and covers all vertebrate as well as invertebrate cartilages
- Includes new chapters on evolutionary skeletal biology that highlight normal variation and variability, and variation outside the norm (neomorphs, atavisms)
- Updates hypotheses on the origination of cartilage using new phylogenetic, cellular and genetic data
- Covers stem cells in embryos and adults, including mesenchymal stem cells and their use in genetic engineering of cartilage, and the concept of the stem cell niche

Cover image: A sagittal section through the kype of a male grilse Atlantic salmon stained with Masson's trichrome to show the needle-like bone of the kype (red) and the prominent connective tissue (green) that forms the anterior portion of the kype. A tooth bud (pale green) is evident in the upper right. (Image also in text as Figure 5.9. From P. E. Witten and B. K. Hall, B. K. (2002). Differentiation and growth of the kype skeletal tissue in anadromous male Atlantic salmon (*Salmo salar*) (anterior to the left). *Int. J. Devel. Biol.* 46: 719–730. Histology prepared and image provided by Eckhard Witten.



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