

FOREWORD

Special Issue on

*“Biology of Skeletal Tissues:
Basic Science, Molecular Medicine, and Tissue Engineering”*

The skeleton functions both as a structural scaffolding as well as a biologically active organ system (i.e. form and function) for the vertebrate animal. Mechanisms that operate to ensure proper development and growth of the skeleton must therefore be in place during the embryonic and postnatal developmental phase of the organism. Regulation of these mechanisms depends on the intimate interplay among the skeletal progenitor cells, the extracellular matrix, and bioactive factors. These processes are often profoundly affected by mutations in specific genes that encode important biological molecules that make up the matrix, or members of various growth factor and signaling pathways.

The mature skeletal system constantly undergoes remodeling, in part to deal with the mechanical stress induced wear-and-tear of the tissues, as well as to act as a calcium reserve for the organism. While such remodeling activities appear to be adequate for the healing process in minor skeletal injuries, there is genuine need for the application of the emerging principles of tissue engineering in the case of large skeletal defects. It is the goal of tissue engineers that, with optimal combination of appropriate cells, matrix, and bioactive factors, the repair of skeletal tissue defects may be enhanced.

To address these contemporary issues of skeletal biology, a symposium entitled. “Biology of Skeletal Tissues: Basic Sciences, Molecular Medicine, and Tissue Engineering”, was held on May 13-15, 1997, as part of the 1997 Scanning Microscopy and Cells and Materials Meeting at Chicago, Illinois. The symposium was co-chaired by Rocky S. Tuan (Department of Orthopaedic Surgery, Thomas Jefferson University, Philadelphia) and Hisashi Iwata (Department of Orthopaedic Surgery, Nagoya University School of Medicine, Japan), and was divided into six sessions: 1) Skeletal Development and Growth, 2) Growth Factors, 3) Extracellular Matrix and Molecular Biology, 4) Tissue Engineering 5) Design and Application of Biomaterials, and 6) Cell/Tissue and Biomaterials Interface. Twenty-eight papers were presented at the meetings, and fifteen papers were subsequently submitted and accepted for publication in this Special Issue. The authors of the papers presented here are acknowledged experts in the field and have provided excellent overviews of the various topics covered in the Symposium. It is hoped that this Special Issue will further stimulate research in these exciting areas of skeletal biology.

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