

## Joseph M. Lane

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1999 -

### Connective tissue regeneration

Dr. Lane's laboratory effort is primarily directed toward regenerating bone and other connective tissues following injury. The laboratory utilizes animal models to simulate osseous defects both in the spine and long bones. Methods employed by the group include microsurgery, molecular biology, tissue culture, biochemical assays of bone formation, histology (undecalcified, in situ hybridization, immunohistology), quantitative radiography, biomechanical testing, and blood flow analysis.

The study of osteogenesis includes the evaluation of bone marrow and ex vivo explanted mesenchymal stem cells. Osteoconductive experiments center on biodegradable polymers, native biosynthetic and composite ceramics, and collagen based matrices. Osteoinduction uses the family of BMP growth factors as well as BFGF and TGF- $\beta$ . Bone morphogenetic protein has been studied during fracture healing by in situ hybridization and immunohistology. We have employed the use of exogenous rhBMP to heal critical defects, promote spine fusion and generate bone ossicles. In association with Dr. Weiland we are currently generating "bones to order" in silastic molds containing mesenchymal stem cells, BMP, and a vascularized pedicle. These neo-bones can be moved on their vascular leash or through micro-vascular transfer to replace or heal appendicular bone defects. Through viral vectors BMP and other growth factor genes have been infected into stem cells to be used regionally to repair connective tissue. The laboratory, in collaboration with Dr. Bostrom and Dr. Sandhu, is actively using BMP, osteoprogenitor cells, and a variety of osteoconductive matrices in animal and human clinical trials.

The laboratory is examining the process of injury and repair of connective tissues. By utilizing Y-chromosome and transfected cells, we are determining the origin of the specific stem cells that contribute to the various stages of tissue regeneration and differentiation. The osseous matrix of normal and metabolically altered bone is studied in collaboration with Dr. Boskey and Dr. Paschalis principally by FTIR micro-spectroscopy and collagen analysis. We are evaluating how estrogen and other gender specific hormones control the quality and amount of collagen in tendons and ligaments.

Working in collaboration with Dr. Bostrom and Dr. Nestor, the laboratory is establishing the role of various cytokines in the pathway of prosthetic loosening. We are utilizing specific bone anti-resorptive agents to inhibit the osteolytic process.

## PUBLICATIONS

### [Co-Author Network](#)

#### Selected publications

- [Surgery for a fracture of the hip within 24 hours of admission is independently associated with reduced short-term post-operative complications.](#) The bone & joint journal. 2017 Academic Article
- [Atypical fracture with long-term bisphosphonate therapy is associated with altered cortical composition and reduced fracture resistance.](#) Proceedings of the National Academy of Sciences of the United States of America. 2017 In Process [GET IT](#)
- [The Hip Fracture Patient on Warfarin: Evaluating Blood Loss and Time to Surgery.](#) Journal of orthopaedic trauma. 2017 In Process [GET IT](#)
- [The Frank Stinchfield Award : Total Hip Arthroplasty for Femoral Neck Fracture Is Not a Typical DRG 470: A Propensity-matched Cohort Study.](#) Clinical orthopaedics and related research. 2017 Academic Article [GET IT](#)
- [Comparison of sagittal balance between radiofrequency targeted vertebral augmentation and balloon kyphoplasty in treatment of vertebral compression fracture: A retrospective study.](#) Journal of the Medical Association of Thailand = Chotmaihet thangphaet. 2016 Academic Article

- [The Efficacy of Bisphosphonates with Core Decompression and Mesenchymal Stem Cells Compared with Bisphosphonates Alone in the Treatment of Osteonecrosis of the Hip: a Retrospective Study.](#) HSS journal : the musculoskeletal journal of Hospital for Special Surgery. 2016 Academic Article [GET IT](#)

## BACKGROUND

### Education and Training

- M.D., [Harvard Medical School](#) 1965
- A.B., [Columbia University](#) 1961