SALUBRINAL FOR TREATMENT OF OSTEOPOROSIS AND BONE FRACTURE HEALING

Dr. Hiroki Yokota, Professor of Biomedical Engineering, and Professor of Mechanical Engineering Purdue School of Engineering and Technology, IUPUI

Dr. Ping Zhang, Assistant Research Professor of Biomedical Engineering, Purdue School of Engineering and Technology, IUPUI

Contact Information:
Email: hyokota@iupui.edu
Phone: (317) 278-5177
Department Website: http://www.engr.iupui.edu/bme/hyokota.shtml

Address: 723 W. Michigan St. (SL 220C), Indianapolis, IN 46202

Industry Sector(s): Pharmaceutical
Product Category: Bone Growth Therapeutics (Bone Diseases/Fracture)

Opportunity Overview

Osteoporosis, which is most common in women after menopause but may also develop in elderly men, is a bone disease that reduces bone mass and strength. Because of its risk of fracture in the femoral neck and long bones, it significantly affects quality of life. It is known that diverse environmental stresses including hypoxia, oxidative stress, viral infection, nutrient limitation, and stress to the ER harm the efficient functioning of protein folding and cellular activities. However, triggering an induced stress response has been shown to bone remodeling transcription factors. Dr. Yokota’s research has shown that salubrinal, a phosphatase inhibitor of e-IF2alpha, works to serve as this trigger.

Markets & Applications

With a growing elderly population in the United States and around the world, the demand for safe and effective osteoporosis treatments and bone fracture healing agents will rise. This establishes a universal need and potentially growing underserved market. Currently, salubrinal is being tested in osteoporosis and bone fracture models. Theoretically, any bone fracture, resulting from traumatic injury or metabolic origin could be treated with salubrinal.

Competitive Advantage/Value Propositions

Osteoporosis and Bone Fracture Healing are major national health concerns contributing to a significant increase in morbidity and mortality in the elderly. Competitive advantages for salubrinal include:

- Salubrinal is a small synthesis agent, which can be easily manufactured and stored.
- Salubrinal has a dual beneficial role in treating osteoporosis – not only stimulating new bone formation but also inhibiting bone resorption. No existing drugs are able to provide this dual role.
- Proprietary reformulation allows for localized bone healing when treating bone fractures and other defects.
Researcher Biography

**Hiroki Yokota, Ph.D.** Dr. Yokota is a Professor of Biomedical Engineering at IUPUI, and an Adjunct Professor of Anatomy and Cell Biology at IU School of Medicine. He received his Ph.D. in Astronautics from the University of Tokyo in 1983, and in Molecular, Cellular and Developmental Biology from IU Bloomington in 1993. Before joining IUPUI, Dr. Yokota worked for 5 years at Japan’s Institute of Space and Astronautical Sciences for designing interplanetary orbits and 5 years in Department of Biomolecular Technology at the University of Washington, School of Medicine for studying human genome. Dr. Yokota’s research is in the areas of biomechanics, bone biology, and medical devices.

Development Plans/Needs

1. Preclinical studies are actively conducted using cultured cells and animal models with funds from Department of Defense (Development of a novel synthetic drug for osteoporosis and fracture healing) and IUPUI FORCES program (Application of salubrinal for orthopedic prosthesis).

2. Future plans include larger scale animal models with bone growth characterization, toxicology, and pharmacokinetics analysis.