Research Tools

Animal Model of Brittle Bone Disease

WARF: P160036US01

Inventors: Daniel Greenspan, Se-Jin Lee

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in BMP1 and TLL1 double-knockout mice for *in vivo* analysis and screening for potential treatments of osteogenesis imperfecta.

Overview

Osteogenesis imperfecta (OI) or brittle bone disease is an incurable genetic disorder that causes fragile bones and a lifetime of breaks and fractures. Recently, mutations in the gene for bone morphogenetic protein 1 (BMP1) were reported in two recessive OI families.

BMP1 and a closely related proteinase called mammalian tolloid-like 1 (TLL1) are coexpressed in various tissues including bone, and have overlapping activities related to collagen development. Studying the *in vivo* roles of theses genes in bones and other tissues could lead to greater understanding of OI and possible therapeutic interventions.

Until now, early lethality of BMP1- and TLL1-null mice has precluded the use of such models.

The Invention

A UW–Madison researcher and collaborator have developed a mouse strain that is conditionally null for BMP1 and mTLL1. The model exhibits the hallmark features of OI and provides a new means to screen drugs and study mechanism.

The mice exhibit dramatically weakened and brittle bone with spontaneous fractures – defining features of OI. Additional skeletal features include osteomalacia, thinned/porous cortical bone, reduced processing of procollagen and dentin matrix protein 1, remarkably high bone turnover and defective osteocyte maturation.

WARF also owns and can license one of the parental lines (a mouse strain with a floxed TLL1 allele).

Applications

- Animal model for mechanistic studies of OI and drug screening

Key Benefits

- First mouse model of its kind
- Provides exciting new opportunity to study and potentially treat OI
- Biomaterial is available for licensing.

Additional Information

For More Information About the Inventors

- Daniel Greenspan

Publications

- Muir A.M., Ren Y., Butz D.H., Blank R.D., Birk D.E., Lee S.J., Rowe D., Feng J.Q. and Greenspan D.S. 2014. Induced Ablation of BMP1 and TLL1 Produces Osteogenesis Imperfecta in Mice. Hum Mol Genet. 23, 3085-3101.

Tech Fields

- Drug Discovery & Development : Disease models
- Research Tools : Animal & disease models

For current licensing status, please contact Rafael Diaz at rdiaz@warf.org or 608-960-9847