YOKOTA RESEARCH GROUP
Skeletal Research

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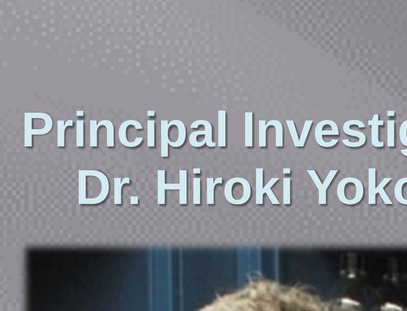
Principal Investigator
Dr. Hiroki Yokota

Strengthen bone.

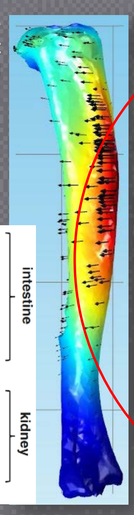
We investigate the mechanism of load-driven bone remodeling, using “knee loading” as a unique loading modality. We also develop mathematical models, conduct mechanical testing, and select synthetic agents that stimulate bone formation and promote healing of bone fracture.



Math model

Mechanical testing

Finite element model

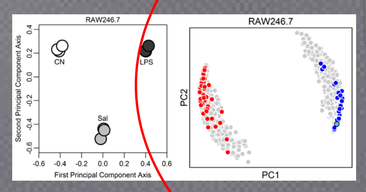


Stop inflammatory arthritis.

Using genome-wide mRNA expression profiles and principal component analysis, we determine genes that are involved in joint inflammation, and evaluate novel molecular targets for suppressing joint degradation. We also apply gentle mechanical loads to the knee for reducing activity of proteolytic enzymes.

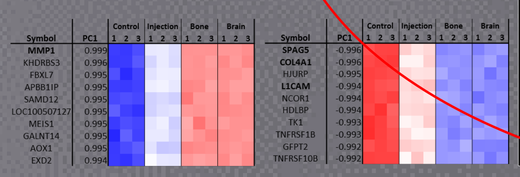
$$A = U \Sigma V^T$$

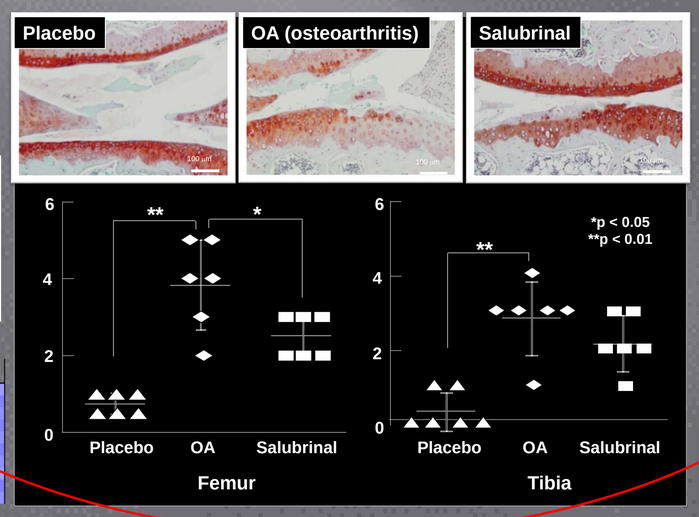
(singular value decomposition)

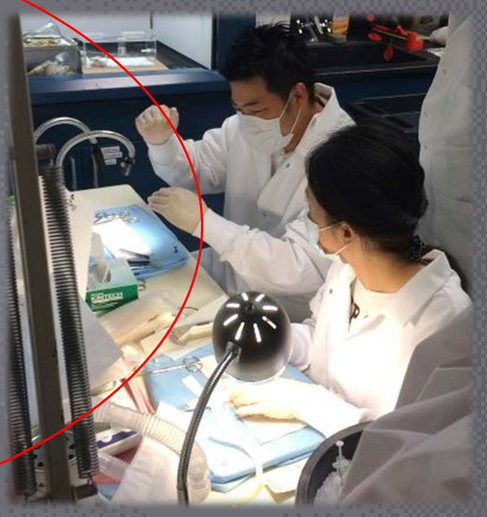


Placebo- RA (rheumatoid arthritis)

Salubrinal-treated



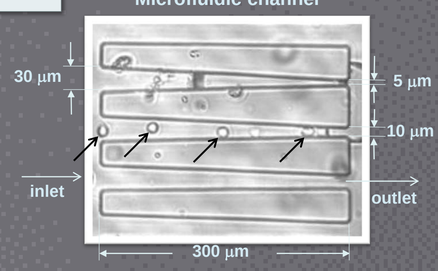




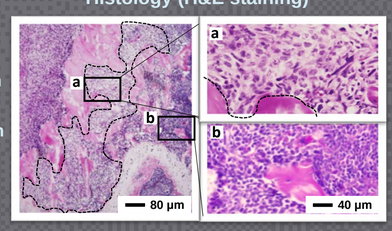
Prevent bone metastasis.

The goal in our lab is to develop a novel therapeutic strategy for suppressing tumor growth and protecting bone from metastasis associated with breast cancer. We employ DNA sequencing, RNA-seq, microfludics, mechanical testing, histology, and X-ray imaging, and evaluate efficacy of novel drug candidates.

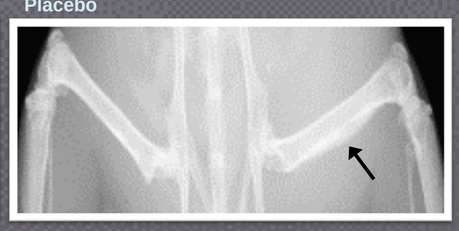
Microfluidic channel



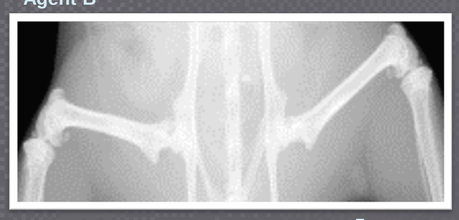
Histology (H&E staining)



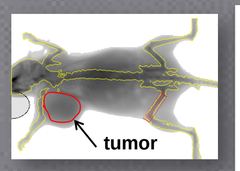
Placebo

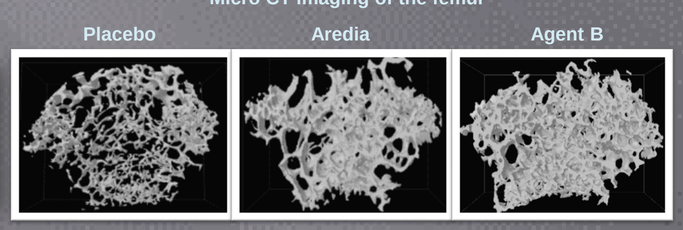


Agent B

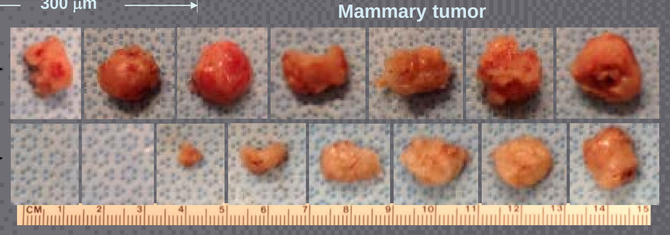


Micro CT imaging of the femur





Mammary tumor



International collaborations: Harbin Medical University
Mie University
Osaka University

Interested in research opportunities?

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