

Bone and Joint Disease Fusion Therapy Research



Major Research Goals

The goal of research center is to develop a new therapeutic technology and therapeutic agent, and to provide a total solution for osteoarthritis through basic and clinical collaborative research by bone and joint disease fusion therapy research.

Major research topics

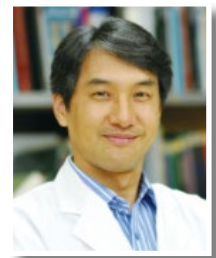
Bone regeneration, Bone metabolic disease, Rheumatoid arthritis, Degenerative arthritis, Osteoporosis, Gene regulation in bone cells.

Major achievements

1. Analysis of anatomy, biology of patients and construction of patient's library to develop total ankle arthroplasty.
2. Secure of joint fluid and osteolytic tissue of patients to analyze the molecular biology.
3. Research on pathophysiology in differentiation of osteoclast influenced by NK-T cell in rheumatoid arthritis.

Director

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4. Analysis of gene regulation in osteoclasts and osteoblasts.
5. Analysis of gene functions in bone homeostasis using knockout or transgenic mice.

Representative figures of major achievements



Figure 1. For identifying mechanism of osteolysis, human specimen were collected during primary surgery and revision surgery from patient that presented osteolysis.

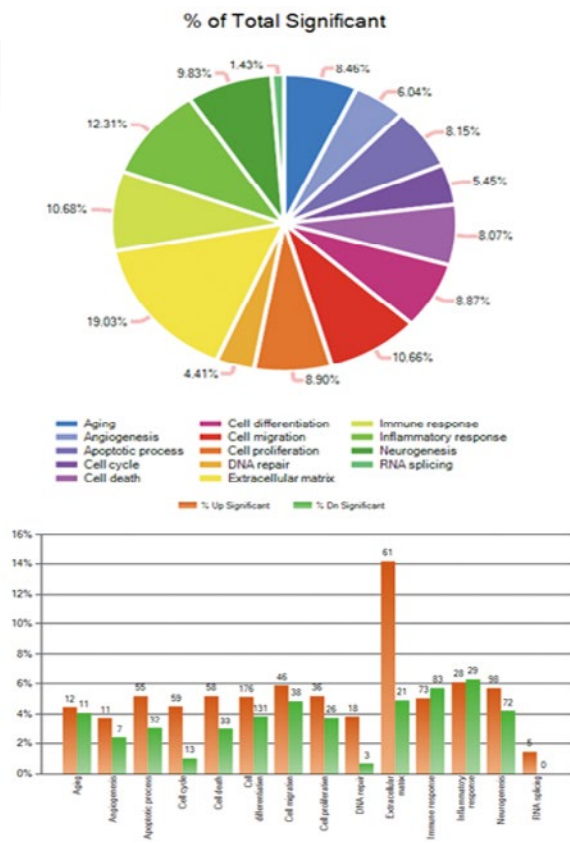


Figure 2. Analyze the change of manifestation of gene by analyzing RNA-seq of patients who have osteolysis and compare to that of control sample.

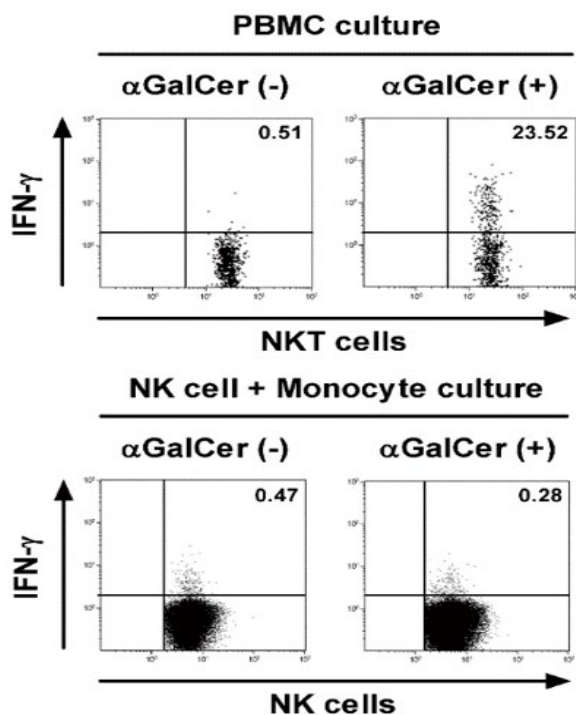


Figure 3. We identified that secretion of IFN- γ in NKT cell by α -GalCer increased, but secretion of that was absent in NK cell.

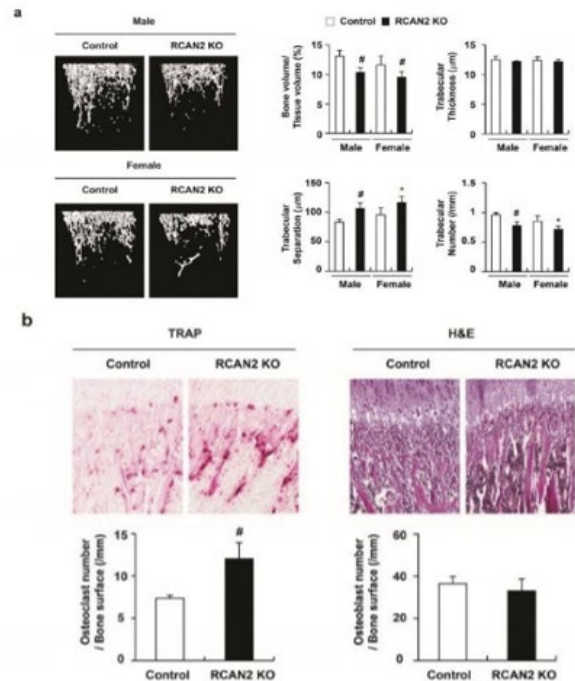


Figure 4. RCAN2 gene decreased the differentiation of osteoclast and promoted osteoblast. Bone density was decreased by the increase of osteoclast in knockout mice. Accordingly, control of differentiation of RCAN2 implies its possibility of the therapeutics of osteoporosis from now on.

Major relevant publications

1. Ahn HW, Lee KB : Comparison of the Modified Broström Procedure for Chronic Lateral Ankle Instability With and Without Subfibular Ossicle. *Am J Sports Med.* 2016 Dec;44(12):3158-3164.
2. Primadi A, Xu HX, Yoon TR, Ryu JH, Lee KB : Neurologic injuries after primary total ankle arthroplasty: prevalence and effect on outcomes. *J Foot Ankle Res.* 2015 Oct 2;8:55.
3. Lee KB, Cho YJ, Park JK, Song EK, Yoon TR, Seon JK : Heterotopic Ossification After Primary Total Ankle Arthroplasty. *J Bone Joint Surg Am.* 2011 Apr 20;93(8):751-8.

4. Park KJ, Jin HM, Cho YN, Kang JH, Jung HJ, Kang JH, Kim JE, Yim YR, Lee JW, Lee KE, Park DJ, Kim TJ, Lee SS, Kee SJ, and Park YW. Clinical and Hematological Effects of Tocilizumab on Serum Hepcidin, Anemia Response and Disease Activity in Patients with Active Rheumatoid Arthritis. *J Rheum Dis.* 2016 Feb;23(1):37-46.
5. Won EJ, Ju JK, Cho YN, Jin HM, Park KJ, Kim TJ, Kwon YS, Kee HJ, Kim JC, Kee SJ, Park YW. Clinical relevance of circulating mucosal-associated invariant T cell levels and their anti-cancer activity in patients with mucosal-associated cancer. *Oncotarget.* 2016 Nov 15;7(46):76274-76290.
6. Lee MN, Kim JW, Oh SH, Jeong BC, Hwang YC, Koh JT. FGF2 Stimulates COUP-TFII Expression via the MEK1/2 Pathway to Inhibit Osteoblast Differentiation in C3H10T1/2 Cells. *PLoS One.* 2016 Jul 12;11(7):e0159234.
7. Kim JH, Kim K, Kim I, Seong S, Jeong BC, Nam KI, Kim KK, Molkenstein JD, Kim N. RCANs regulate the convergent roles of NFATc1 in bone homeostasis. *Sci Rep.* 2016 Dec 5;6:38526.
8. Lee J, Seong S, Kim JH, Kim K, Kim I, Jeong BC, Nam KI, Kim KK, Hennighausen L, Kim N. STAT5 is a key transcription factor for IL-3-mediated inhibition of RANKL-induced osteoclastogenesis. *Sci Rep.* 2016 Aug 3;6:30977.
9. Han Y, Kim CY, Cheong H, Lee KY : Osterix represses adipogenesis by negatively regulating PPAR γ transcriptional activity. *Sci Rep.* 2016 Oct 18;6:35655.
10. Jin Y, Han Y, Khadka DB, Zhao C, Lee KY, Cho WJ : Discovery of Isoquinolino-quinazolinones as a Novel Class of Potent PPAR γ Antagonists with Anti-adipogenic Effects. *Sci Rep.* 2016 Oct 3;6:34661.
11. Kim M, Jung JY, Choi S, Lee H, Morales LD, Koh JT, Kim SH, Choi YD, Choi C, Slaga TJ, Kim WJ, Kim DJ : GFRA1 promotes cisplatin-induced chemoresistance in osteosarcoma by inducing

autophagy. *Autophagy.* 2017 Jan 2;13(1):149-168.

Research networks



We establish a network sharing technology and information. This organization is consist of College of Pharmacology and Pharmacy of Chonnam National University, Department of life science in GIST, Korea university Guro hospital, Chosun University Hospital, Gwangju Technopark and Corentec. Research meetings, seminars and symposiums have been regularly held.