

## CURRICULUM VITAE

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### Education:

2005 B.S. School of Pharmacy, Kanazawa University, Kanazawa, Japan  
2007 M.S. Division of Pharmaceutical Sciences, Graduate School of Natural  
Science and Technology, Kanazawa University, Kanazawa, Japan  
2011 Ph.D. Graduate School of Medicine, the University of Tokyo, Tokyo, Japan

### Training:

2005-2007 Graduate student (Master course), Division of Pharmaceutical Sciences,  
Graduate School of Natural Science and Technology, Kanazawa University,  
Japan (Laboratory of Prof. Yukio Yoneda)  
2007-2011 Graduate student (PhD course), Center for Disease Biology and Integrative  
Medicine, the University of Tokyo, Japan (Laboratory of Prof. Ung-il Chung)  
2011-2012 Postdoctoral Fellow, Department of Oral and Maxillofacial Surgery, the  
University of Tokyo Hospital, Japan (Laboratory of Prof. Tsuyoshi Takato)  
2012-2016 Postdoctoral Fellow, Eli and Edythe Broad Center for Regenerative Medicine  
and Stem Cell Research, University of Southern California, USA  
(Laboratory of Prof. Andrew P. McMahon)  
2016-2017 Project Researcher, Department of Bioengineering, Graduate School of  
Engineering, the University of Tokyo, Japan (Laboratory of Prof. Ung-il  
Chung)

### Academic Appointments

2016-2017 Project Assistant Professor, Department of Bioengineering, Graduate School  
of Engineering, the University of Tokyo  
2017-2019 Assistant Professor, Center for Disease Biology and Integrative Medicine, the  
University of Tokyo  
2019- Associate Professor, Center for Disease Biology and Integrative Medicine,  
the University of Tokyo

### Awards:

2008-2011 Research Fellowship, Japan Society for Promotion of Science (DC1)  
2011-2014 Postdoctoral Fellowship, Japan Society for Promotion of Science (PD)  
2012 The American Society for Bone and Mineral Research (ASBMR) Young  
Investigator Travel Grant  
2014-2016 Postdoctoral Fellowship for Research Abroad, Japan Society for Promotion of  
Science  
2015 ASBMR Young Investigator Award  
2016 Nakatomi Foundation Research Grant  
2017 Kato Memorial Bioscience Foundation Research Grant  
2018 Kurata Foundation Research Grant  
2018 Mochida Memorial Medical Pharmaceutical Foundation Research Grant  
2018 Takeda Science Foundation Research Grant

2018	Uehara Memorial Life Science Foundation Research Grant
2019	ASBMR Rising Star Award
2020	Research Grant for Public Health Science
2021	Takeda Science Foundation Research Grant
2021	Uehara Memorial Life Science Foundation Research Grant
2021	Kurata Foundation Research Grant

## Publications:

\*corresponding author

1. Tani S\*, Okada H, Onodera S, Chijimatsu R, Seki M, Suzuki Y, Xin X, Rowe DW, Saito T, Tanaka S, Chung UI, Ohba S\*, **Hojo H\***. Stem cell-based modeling and single-cell multiomics reveal gene-regulatory mechanisms underlying human skeletal development. *Cell Rep.* 2023 Mar 20;112276.
2. **Hojo H\***. Emerging RUNX2-Mediated Gene Regulatory Mechanisms Consisting of Multi-Layered Regulatory Networks in Skeletal Development. *Int J Mol Sci.* 2023 Feb 3;24(3):2979.
3. Kitaura Y, Nakamura U, Awada C, Yamaguchi M, Kim M, Ikeda Y, Matsuo Y, Moriishi T, Sawase T, Chung UI, **Hojo H\***, Ohba S\*. Orally administrable peptides derived from egg yolk promote skeletal repair and ameliorate degenerative skeletal disorders in mouse models. *Regen Ther.* 2022 Nov 24;21:584-595.
4. Nagata K, **Hojo H**, Chang SH, Okada H, Yano F, Chijimatsu R, Omata Y, Mori D, Makii Y, Kawata M, Kaneko T, Iwanaga Y, Nakamoto H, Maenohara Y, Tachibana N, Ishikura H, Higuchi J, Taniguchi Y, Ohba S, Chung UI, Tanaka S, Saito T. Runx2 and Runx3 differentially regulate articular chondrocytes during surgically induced osteoarthritis development. *Nat Commun.* 2022 Oct 19;13(1):6187.
5. Iwahashi S, Lyu J, Tokumura K, Osumi R, Hiraiwa M, Kubo T, Horie T, Demura S, Kawakami N, Saito T, Park G, Fukasawa K, Iezaki T, Suzuki A, Tomizawa A, Ochi H, **Hojo H**, Ohba S, Hinoi E. Conditional inactivation of the L-type amino acid transporter LAT1 in chondrocytes models idiopathic scoliosis in mice *J Cell Physiol.* 2022 Sep 26. doi: 10.1002/jcp.30883.
6. **Hojo H\***, Saito T, He X, Guo Q, Onodera S, Azuma T, Koebis M, Nakao K, Aiba A, Seki M, Suzuki Y, Okada H, Tanaka S, Chung UI, McMahon AP, Ohba S\*. Runx2 regulates chromatin accessibility to direct the osteoblast program at neonatal stages. *Cell Reports.* 40(10), 2022
7. **Hojo H**, Ohba S\*. Sp7 Action in the Skeleton: Its Mode of Action, Functions, and Relevance to Skeletal Diseases. *Int J Mol Sci* 23(10):5647, 2022
8. Nakayama M, Okada H, Seki M, Suzuki Y, Chung UI, Ohba S, **Hojo H\***. Single-cell RNA sequencing unravels heterogeneity of skeletal progenitors and cell-cell interactions underlying the bone repair process. *Regen Ther.* 18;21:9-18, 2022
9. Doi T\*, **Hojo H**, Ohba S, Obayashi K, Endo M, Ishizaki T, Katoh A, Kouji H. Involvement of activator protein-1 family members in  $\beta$ -catenin and p300 association on the genome of PANC-1 cells. *Heliyon.* 8(2):e08890, 2022
10. Lui J, Raimann A, **Hojo H**, Dong L, Roschger P, Kikani B, Wintergerst U, Fratzl-Zelman N, Jee YH, Haeusler G, and Baron J\*. A Neomorphic Variant in SP7 Alters Sequence Specificity and Causes a High-Turnover Bone Disorder. *Nat Commun.* 2022 Feb 4;13(1):700.

11. Wang JS, Kamath T, Mazur CM, Mirzamohammadi F, Rotter D, **Hojo H**, Castro CD, Tokavanich N, Patel R, Govea N, Enishi T, Wu Y, da Silva Martins J, Bruce M, Brooks DJ, Bouxsein ML, Tokarz D, Lin CP, Abdul A, Macosko EZ, Fiscoletti M, Munns CF, Ryder P, Kost-Alimova M, Byrne P, Cimini B, Fujiwara M, Kronenberg HM, Wein MN. Control of osteocyte dendrite formation by Sp7 and its target gene osteocrin. *Nat Commun.* 12(1):6271, 2021
12. Yamada D, Nakamura M, Takao T, Takihira S, Yoshida A, Kawai S, Miura A, Ming L, Yoshitomi H, Gozu M, Okamoto K, **Hojo H**, Kusaka N, Iwai R, Nakata E, Ozaki T, Toguchida J, Takarada T. Induction and expansion of human PRRX1 + limb-bud-like mesenchymal cells from pluripotent stem cells. *Nat Biomed Eng.* 5(8):926-940, 2021
13. Kanazawa S, Okada H, **Hojo H**, Ohba S, Iwata J, Komura M, Hikita A, Hoshi K. Mesenchymal stromal cells in the bone marrow niche consist of multi-populations with distinct transcriptional and epigenetic properties. *Sci Rep.* 11(1):15811, 2021
14. Tani S, Okada H, Chung UI, Ohba S, **Hojo H\***. The Progress of Stem Cell Technology for Skeletal Regeneration. *Int J Mol Sci.* 2021 Jan 30;22(3):1404.
15. Yamakawa A, **Hojo H**, Ohba S\*. ChIP-Seq Assays from Mammalian Cartilage and Chondrocytes. *Methods Mol Biol.* 2021;2245:167-178.
16. Tani S, Chung UI, Ohba S, **Hojo H\***. Understanding paraxial mesoderm development and sclerotome specification for skeletal repair. *Exp Mol Med.* 2020 Aug;52(8):1166-1177
17. Onodera S, Saito A, **Hojo H**, Nakamura T, Zujur D, Watanabe K, Morita N, Hasegawa D, Masaki H, Nakauchi H, Nomura T, Shibahara T, Yamaguchi A, Chung UI, Azuma T, Ohba S. Hedgehog Activation Regulates Human Osteoblastogenesis. *Stem Cell Reports.* 2020 Jul 14;15(1):125-139.
18. **Hojo H**, Ohba S. Gene regulatory landscape in osteoblast differentiation. *Bone* 28;137:115458, 2020
19. Jiang Q, Qin X, Yoshida CA, Komori H, Yamana K, Ohba S, **Hojo H**, Croix BS, Kawata-Matsuura VKS, Komori T. Antxr1, Which Is a Target of Runx2, Regulates Chondrocyte Proliferation and Apoptosis. *Int J Mol Sci.* 21(7):2425, 2020
20. Zujur D, Kanke K, Onodera S, Tani S, Lai J, Azuma T, Xin X, Lichtler AC, Rowe DW, Saito T, Tanaka S, Masaki H, Nakauchi H, Chung UI, **Hojo H**, Ohba S. Stepwise Strategy for Generating Osteoblasts From Human Pluripotent Stem Cells Under Fully Defined Xeno-Free Conditions With Small-Molecule Inducers. *Regen Ther.* 14:19-31, 2020
21. **Hojo H**, Ohba S Insights into Gene Regulatory Networks in Chondrocytes. *Int J Mol Sci.* 20(24). pii: E6324, 2019
22. Xuan F, Yano F, Mori D, Chijimatsu R, Maenohara Y, Nakamoto H, Mori Y, Makii Y, Oichi T, Taketo MM, **Hojo H**, Ohba S, Chung UI, Tanaka S, Saito T. Wnt/ $\beta$ -catenin signaling contributes to articular cartilage homeostasis through lubricin induction in the superficial zone. *Arthritis Res Ther.* 21(1):247, 2019
23. Kawata M, Mori D, Kanke K, **Hojo H**, Ohba S, Chung UI, Yano F, Masaki H, Otsu M, Nakauchi H, Tanaka S, Saito T. Simple and Robust Differentiation of Human Pluripotent Stem Cells toward Chondrocytes by Two Small-Molecule Compounds. *Stem Cell Reports.* 13(3):530-544, 2019
24. Ohba S, **Hojo H**, Chung UI. A report of the 17th congress of the Japanese Society for Regenerative Medicine. *Regen Ther* 9, 10-14, 2018
25. Tanaka J, Ogawa M, **Hojo H**, Kawashima Y, Mabuchi Y, Hata K, Nakamura S, Yasuhara R, Takamatsu K, Irié T, Fukada T, Sakai T, Inoue T, Nishimura R, Ohara O, Saito I, Ohba S, Tsuji T, Mishima K. Generation of orthotopically functional salivary gland from embryonic stem cells. *Nat Commun.* 9(1):4216, 2018
26. Fujii Y, Kawase-Koga Y, **Hojo H**, Yano F, Sato M, Chung UI, Ohba S, and Chikazu D. Bone regeneration by human dental pulp stem cells using a helioxanthin derivative and cell-

- sheet technology. *Stem Cell Res Ther.* 9:24, 2018
27. Zujur D, Kanke K, Lichtler AC, **Hojo H**, Chung UI, and Ohba S. Three-dimensional system enabling the maintenance and directed differentiation of pluripotent stem cells under defined conditions. *Sci Adv.* 3, e1602875, 2017
  28. **Hojo H\***, Chung UI, and Ohba S. Identification of the gene-regulatory landscape in skeletal development and potential links to skeletal regeneration. *Regen Ther* 6, 100-107, 2017
  29. **Hojo H**, McMahon AP, and Ohba S. An emerging regulatory landscape for skeletal development. *Trends Genet* 32(12): 774-787, 2016
  30. Kashiwagi M, **Hojo H**, Kitaura Y, Maeda Y, Aini H, Takato T, Chung UI, and Ohba S. Local administration of a hedgehog agonist accelerates fracture healing in a mouse model. *Biochem Biophys Res Commun.* 479(4): 772-778, 2016
  31. Honnami M, Choi S, Liu IL, Kamimura W, Taguchi T, Ichimura M, Urushisaki Y, **Hojo H**, Shimohata N, Ohba S, Amaya K, Koyama H, Nishimura R, Chung UI, Sasaki N, and Mochizuki M. Repair of segmental radial defects in dogs using tailor-made titanium mesh cages with plates combined with calcium phosphate granules and basic fibroblast growth factor-binding ion complex gel. *J Artif Organs.* 20(1):91-98, 2016
  32. He X, Ohba S, **Hojo H** and McMahon AP. AP-1 family members act with Sox9 to promote chondrocyte hypertrophy. *Development* 143(16):3012-23, 2016
  33. **Hojo H**, Ohba S, He X, Lai LP, and McMahon AP. Sp7/Osterix is restricted to bone-forming vertebrates where it acts as a Dlx co-factor in osteoblast specification. *Dev Cell* 37(3), 238-253, 2016
  34. **Hojo H\***, Ohba S, and Chung UI. Signaling pathways regulating the specification and differentiation of the osteoblast lineage. *Regen Ther* 1, 57-62, 2015
  35. Ohba S, He X, **Hojo H**, and McMahon AP. Distinct transcriptional programs underlie Sox9 regulation of the mammalian chondrocyte. *Cell Rep* 12, 229-243, 2015
  36. Kitaura Y, **Hojo H**, Komiyama Y, Takato T, Chung UI, and Ohba S. Gli1 haploinsufficiency leads to decreased bone mass with an uncoupling of bone metabolism in adult mice. *PLoS One* 9, e109597, 2014
  37. Kanke K, Masaki H, Saito T, Komiyama Y, **Hojo H**, Nakauchi H, Lichtler AC, Takato T, Chung UI, and Ohba S. Stepwise differentiation of pluripotent stem cells into osteoblasts using four small molecules under serum-free and feeder-free conditions. *Stem Cell Reports* 2, 751-760, 2014
  38. Honnami M, Choi S, Liu IL, Kamimura W, Taguchi T, **Hojo H**, Shimohata N, Ohba S, Koyama H, Nishimura R, Chung UI, Sasaki N, and Mochizuki M. Bone regeneration by the combined use of tetrapod-shaped calcium phosphate granules with basic fibroblast growth factor-binding ion complex gel in canine segmental radial defects. *J Vet Med Sci* 76, 955-961, 2014
  39. Saito T, Yano F, Mori D, Ohba S, **Hojo H**, Otsu M, Eto K, Nakauchi H, Tanaka S, Chung UI, and Kawaguchi H. Generation of Col2a1-EGFP iPS cells for monitoring chondrogenic differentiation. *PLoS One* 8, e74137, 2013
  40. Honnami M, Choi S, Liu IL, Kamimura W, Taguchi T, **Hojo H**, Shimohata N, Ohba S, Koyama H, Nishimura R, Chung UI, Sasaki N, Mochizuki M. Repair of rabbit segmental femoral defects by using a combination of tetrapod-shaped calcium phosphate granules and basic fibroblast growth factor-binding ion complex gel. *Biomaterials* 34, 9056-9062, 2013
  41. Cabral H, Murakami M, **Hojo H**, Terada Y, Kano MR, Chung UI, Nishiyama N, and Kataoka K. Targeted therapy of spontaneous murine pancreatic tumors by polymeric micelles prolongs survival and prevents peritoneal metastasis. *Proc Natl Acad Sci U S A* 110, 11397-11402, 2013.
  42. Yano F, **Hojo H**, Ohba S, Saito T, Honnami M, Mochizuki M, Takato T, Kawaguchi H, and Chung UI. Cell-sheet technology combined with a thienoindazole derivative small compound TD-198946 for cartilage regeneration. *Biomaterials* 34, 5581-5587, 2013

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44. Komiyama Y, Ohba S, Shimohata N, Nakajima K, **Hojo H**, Yano F, Takato T, Docheva D, Shukunami C, Hiraki Y, and Chung UI. Tenomodulin expression in the periodontal ligament enhances cellular adhesion. *PLoS One* 8, e60203, 2013
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46. Yano F, **Hojo H**, Ohba S, Fukai A, Hosaka Y, Ikeda T, Saito T, Hirata M, Chikuda H, Takato T, Kawaguchi H, and Chung UI. A novel disease-modifying osteoarthritis drug candidate targeting Runx1. *Ann Rheum Dis* 72, 748-753, 2013
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49. **Hojo H\***, Ohba S, Yano F, Saito T, Ikeda T, Nakajima K, Komiyama Y, Nakagata N, Suzuki K, Takato T, Kawaguchi H, Chung UI. Gli1 protein participates in Hedgehog-mediated specification of osteoblast lineage during endochondral ossification. *J Biol Chem* 287, 17860-17869, 2012
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51. Nakajima K, Komiyama Y, **Hojo H**, Ohba S, Yano F, Nishikawa N, Ihara S, Aburatani H, Takato T, and Chung UI. Enhancement of bone formation ex vivo and in vivo by a helioxanthin-derivative. *Biochem Biophys Res Commun* 395, 502-508, 2010
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53. **Hojo H\***, Yano F, Ohba S, Igawa K, Nakajima K, Komiyama Y, Kan A, Ikeda T, Yonezawa T, Woo JT, Takato T, Nakamura K, Kawaguchi H, and Chung UI. Identification of oxytetracycline as a chondrogenic compound using a cell-based screening system. *J Bone Miner Metab* 28, 627-633, 2010
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55. Takarada T, **Hojo H**, Iemata M, Sahara K, Kodama A, Nakamura N, Hinoi E, and Yoneda Y. Interference by adrenaline with chondrogenic differentiation through suppression of gene transactivation mediated by Sox9 family members. *Bone* 45, 568-578, 2009
56. **Hojo H**, Igawa K, Ohba S, Yano F, Nakajima K, Komiyama Y, Ikeda T, Lichtler AC, Woo JT, Yonezawa T, Takato T, and Chung UI. Development of high-throughput screening system for osteogenic drugs using a cell-based sensor. *Biochem Biophys Res Commun* 376, 375-379, 2008.
57. Hinoi E, Ueshima T, **Hojo H**, Iemata M, Takarada T, and Yoneda Y. Up-regulation of per mRNA expression by parathyroid hormone through a protein kinase A-CREB-dependent mechanism in chondrocytes. *J Biol Chem* 281, 23632-23642, 2006
58. Hinoi E, Fujimori S, Wang L, **Hojo H**, Uno K, and Yoneda Y. Nrf2 negatively regulates

- osteoblast differentiation via interfering with Runx2-dependent transcriptional activation. *J Biol Chem* 281, 18015-18024, 2006
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