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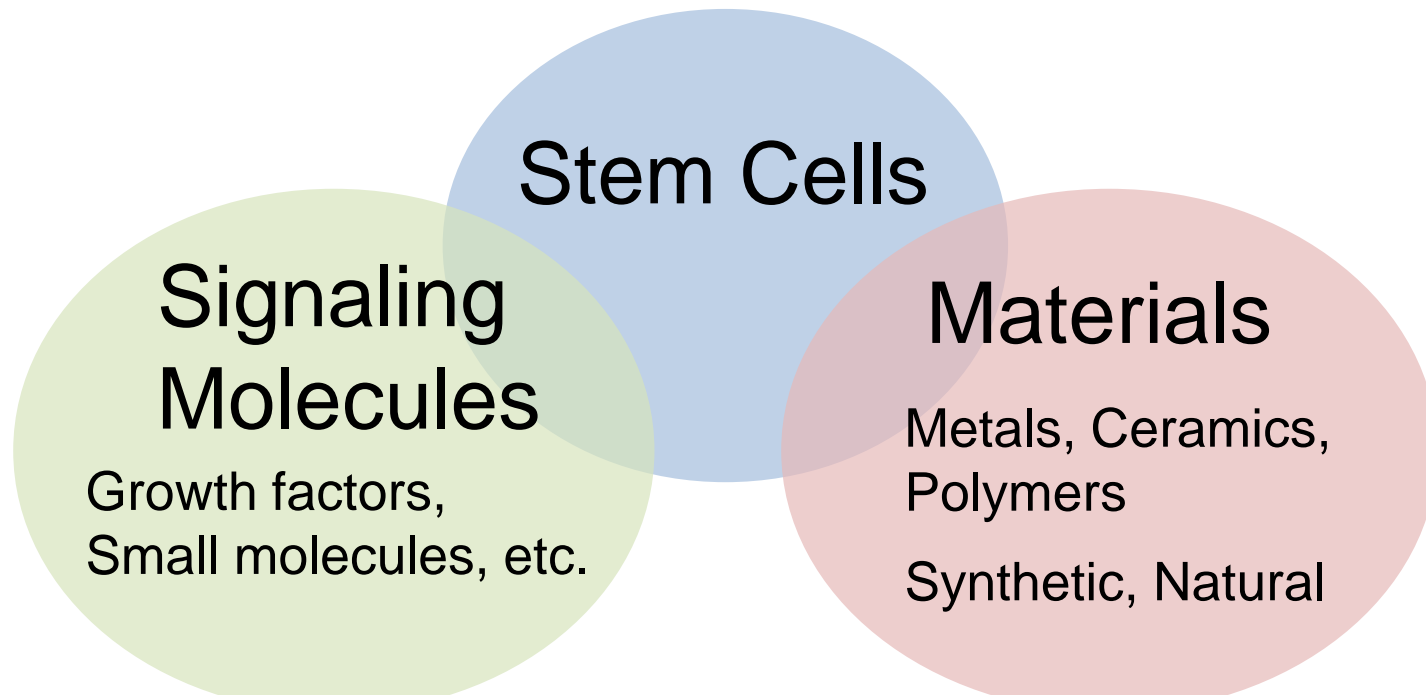
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Beyond biomimicry:
Merging Biology and Materials



Education

Apr. 2009 - Sep. 2013

Ph.D, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, Japan.

Oct. 2003 - Mar. 2005

Research Student, Okayama University Dental School, Japan.

Feb. 1999 - Jul. 2003 (D.D.S.)

DDS, University of Sao Paulo, School of Dentistry, Brazil



Positions

May. 2020 - Present

Research Associate Professor, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, Japan.

Apr. 2016 - Apr. 2020

Assistant Professor, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, Japan.

Apr. 2013 - Mar. 2014

Assistant Professor, Okayama University Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, Japan.

Apr. 2005 - Mar. 2009

Dental Practitioner

Exchange programs

Jan.2014

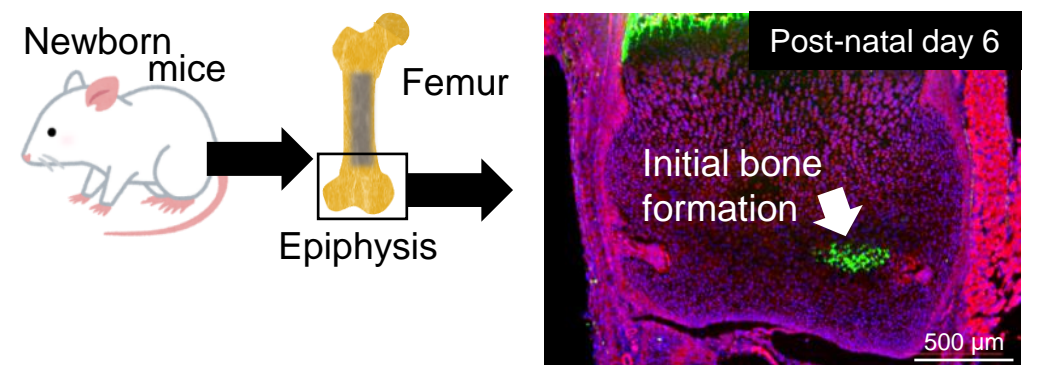
Short-term visiting Scholar, Radiation Oncology, Beth Israel Deaconess Medical Center (BIDMC), Harvard Medical School

Teaching

1. Biomaterials
2. Tissue Engineering
3. Dental Materials

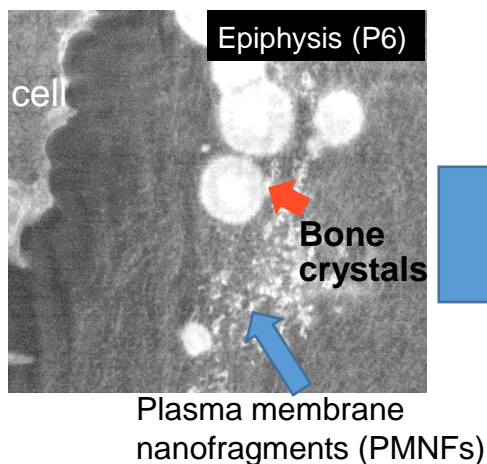
Research

Beyond Biomimicry: Development of bioinspired bone materials

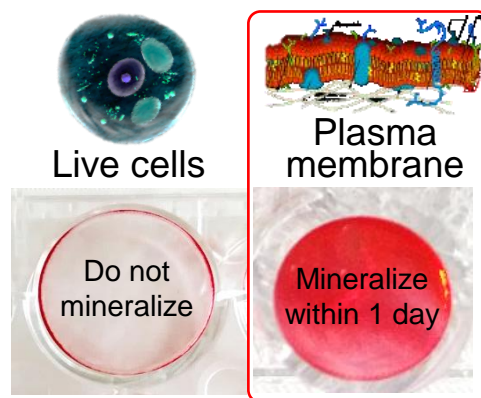


Upper panel: Identification of the initial site of bone formation in mouse femur epiphysis (green area labeled with calcein).

Bone formation *in vivo*



Rapid bone formation *in vitro*

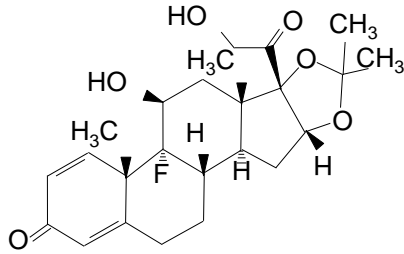


Lower panel: (Left) SEM photograph showing the plasma membrane nanofragments (PMNFs, blue arrow) are nucleation site for bone formation (red arrow). (Right) *In vitro*, PMNFs could induce rapid bone formation within 1 day.

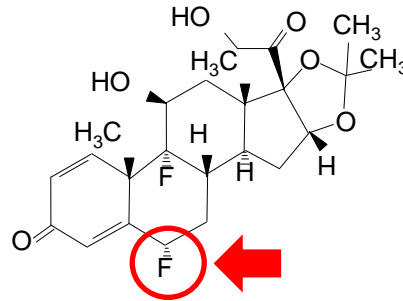
Research

Cartilage regeneration

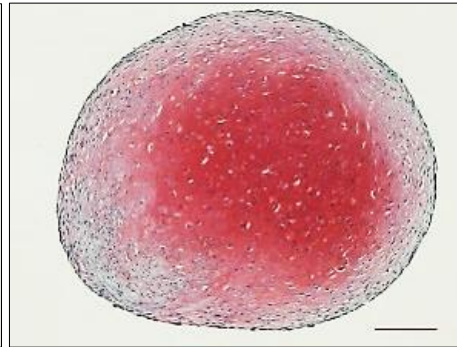
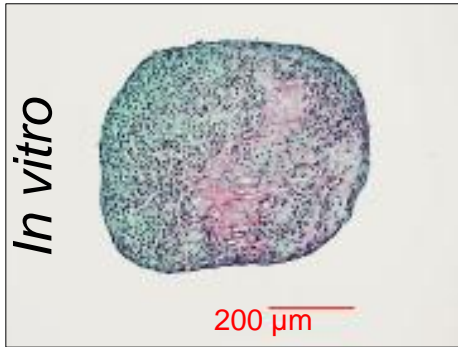
TGF- β 3+TA



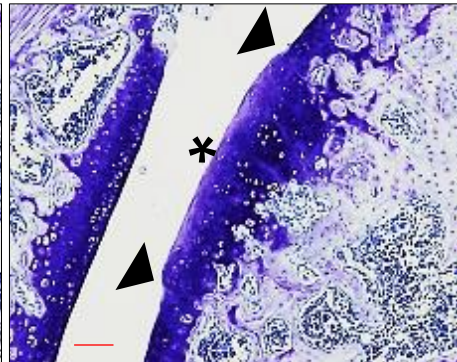
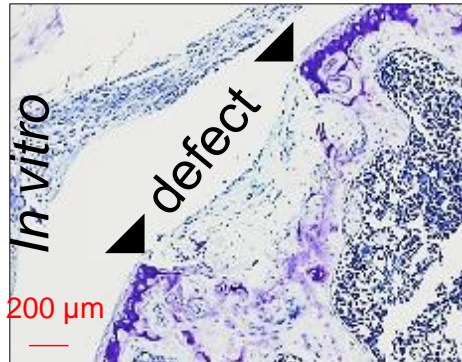
TGF- β 3+FA



Upper panel: Molecular structures of triamcinolone acetonide (TA) and fluocinolone acetonide (FA). Arrow indicate the only difference in fluoride ion between the two molecules.



Middle panel: Safranin O staining showing high deposition of cartilage matrix in the chondrogenic organoids treated with TGF- β 3+FA.



Lower panel: Toluidine blue staining of the regenerated cartilage with TGF- β 3+FA organoids.

Exchange programs and invited lectures

National University of Singapore, 2019



The University of Melbourne, 2019



Hanoi University, 2018



Welcoming French students!



Linköping University, 2018



Welcoming Brazilian students!



OKAYAMA UNIVERSITY

Awards

2019

Japanese Society for Biomaterials - Young Investigator Award
Japanese Society for Dental Materials and Devices - GC Award

2018

Japanese Society for Dental Materials and Devices - Young Investigator Award

2016

Japanese Society for Cartilage Metabolism – Society Award

2015

The 4th Hyper Bioassembler Symposium – Best Presentation Award

2012

International Association for Dental Research Japanese Division - Young Investigator Award
International Association for Dental Research - Hatton Divisional Award

2011

Japanese Society for Bone and Mineral Research – Best Presentation Award



Main recent publications

2021

Hara ES, Okada M, Nagaoka N, Nakano T, Matsumoto T. Re-evaluation of initial bone mineralization from an engineering perspective. *Tissue Eng Part B Rev*, 2021, In press. doi: 10.1089/ten.TEB.2020.0352.

Farahat M, Kazi GAS, **Hara ES**, Matsumoto T. Effect of Biomechanical Environment on Degeneration of Meckel's Cartilage. *J Dent Res*, 100(2):171-178, 2021.

2020

Akhter MN, **Hara ES**, Kadoya K, Okada M, Matsumoto T. Cellular Fragments as Biomaterial for Rapid In Vitro Bone-Like Tissue Synthesis. *Int J Mol Sci*, 21, 5327, 2020.

Pham HT, Ono M, **Hara ES**, Nguyen HTT, Dang AT, Do HT, Komori T, Tosa I, Hazehara-Kunitomo Y, Yoshioka Y, Oida Y, Akiyama K, Kuboki T. Tryptophan and Kynurenine Enhances the Stemness and Osteogenic Differentiation of Bone Marrow-Derived Mesenchymal Stromal Cells In Vitro and In Vivo. *Materials*, 14(1):208, 2021. <https://doi.org/10.3390/ma14010208>

Jiao Y, Okada M, **Hara ES**, Xie S, Nagaoka N, Nakano T, Matsumoto T. Micro-architectural investigation of teleost fish rib inducing pliant mechanical property. *Materials*, 13(22):5099, 2020. <https://doi.org/10.3390/ma13225099>

Okada M, **Hara ES**, Yabe A, Okada K, Shibata Y, Torii Y, Nakano T, Matsumoto T. Titanium as an instant adhesive for biological soft tissue. *Adv Mater Interf*, 7, 1902089, 2020.

2019

Kunitomi Y, **Hara ES**, Okada M, Nagaoka N, Kuboki T, Nakano T, Kamioka H, Matsumoto T. Biomimetic mineralization using matrix vesicle nanofragments. *J Biomed Mater Res A*, 107(5):1021-1030, 2019.

2018

Hara ES, Okada M, Kuboki T, Nakano T, Matsumoto T. Rapid bioinspired mineralization using cell membrane nanofragments and alkaline milieu. *J Mater Chem B*, 6: 6153-6161, 2018

Hara ES, Okada M, Nagaoka N, Hattori T, Kuboki T, Nakano T, Matsumoto T. Bioinspired mineralization using chondrocyte membrane nanofragments. *ACS Biomater Sci Eng*, 4:617-625, 2018.

Hara ES, Okada M, Nagaoka N, Hattori T, Iida LM, Kuboki T, Nakano T, Matsumoto T. Chondrocyte burst promotes space for mineral expansion. *Integr Biol*, 10:57-66, 2018.

