

Solid-state adhesives of biocompatible apatite for hydrogels

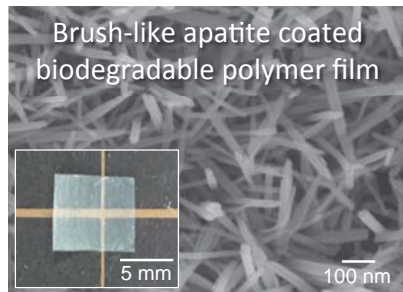
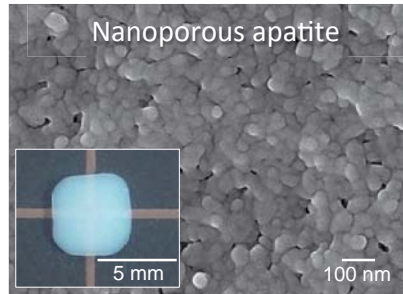
Masahiro Okada

Department of Biomaterials, Graduate School of Medicine,
Dentistry and Pharmaceutical Sciences, Okayama University

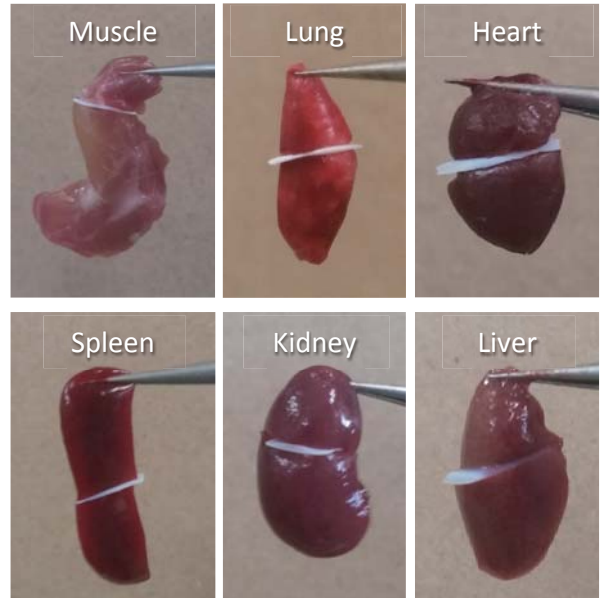
Nanostructured apatite

Apatite is:

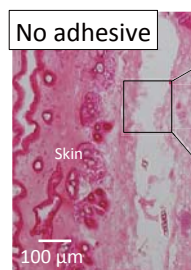
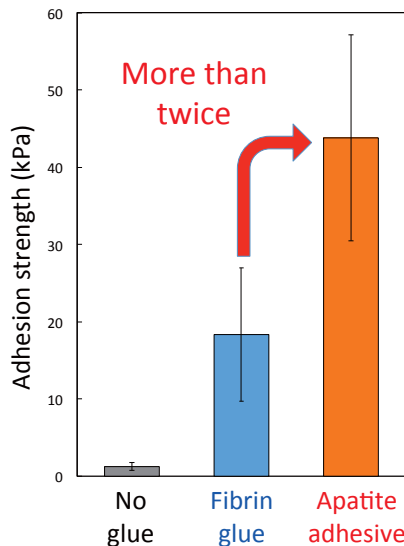
- ✓ bone mineral component.
- ✓ $\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$.
- ✓ prepared by chemical synthesis, and its shape and composition can be controlled.
- ✓ used as artificial bones, purification columns, tooth powder, cosmetics, and catalyst supports, due to its non-toxicity, bioactivity, and protein affinity.



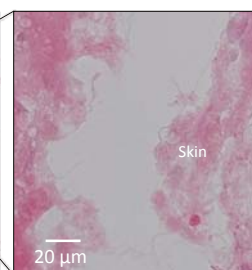
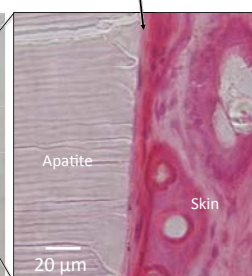
Adhesion to soft tissues



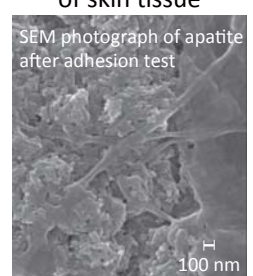
Superior adhesion to soft tissues



Condensed protein layer



Cohesive failure of skin tissue



- How to adhere?
- ✓ Protein adhesion
 - ✓ Condensation of proteins
 - ✓ Water bridging

Reference: Okada et al. Acta Biomaterialia 57 (2017) 404–413.

Nanostructured apatite can also adhere to several kinds of synthetic hydrogels.
If you have an interest in other kinds of solid-state adhesives, please contact us.