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Bioceramics for treatment of cancer and bone disease

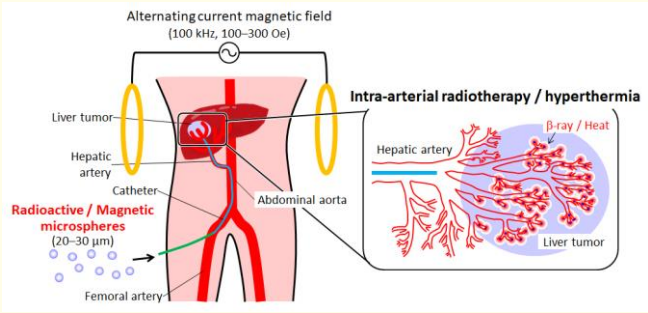
1. **Development of ceramic micro/nano-particles for intra-arterial therapy for deep-seated cancer**
2. **Formation of antibacterial and bioactive TiO_2 surface layer on titanium by surface chemical treatment**
3. **Elucidation of bone-bonding mechanism of hydroxyapatite –From a view point of protein adsorption–**
4. **Development of inorganic-organic composites for wound dressing**

1. Chigama H, Kanetaka H, Furuya M, Yokota K, Kawashita M: Evaluation of apatite-forming ability and antibacterial activity of raw silk fabrics doped with metal ions, Mater. Trans., 60, 808-814, 2019.
2. Kawashita M, Development and evaluation of the properties of functional ceramic microspheres for biomedical applications, J. Ceram. Soc. Japan, 126, 1-7, 2018.
3. Kawashita M, Iwabuchi Y, Suzuki K, Furuya M, Yokota K, Kanetaka H: Surface structure and in vitro apatite-forming ability of titanium doped with various metals, Colloids Surf. A, 555, 558-564, 2018.
4. Kawashita M, Hasegawa M, Kudo T, Kanetaka H, Miyazaki T, Hashimoto M: Effect of fibronectin adsorption on osteoblastic cellular responses to hydroxyapatite and alumina, Mater. Sci. Eng. C, 69, 1268-1272, 2016.
5. Kawashita M, Endo N, Watanabe T, Miyazaki T, Furuya M, Yokota K, Abiko Y, Kanetaka H, Takahashi N: Formation of bioactive N-doped TiO_2 on Ti with visible light-induced antibacterial activity using NaOH, hot water, and subsequent ammonia atmospheric heat treatment, Colloids Surf. B, 145, 285-290, 2016.

We are conducting research on medical materials (especially ceramic materials) that contribute to the treatment of cancer and bone diseases. Specifically, various materials synthesis methods such as sol-gel method are used to synthesize medical therapeutic materials (especially fine particles) and bone filling materials, and to evaluate their chemical, physical and biological properties. We aim to gain knowledge that leads to clinical application.

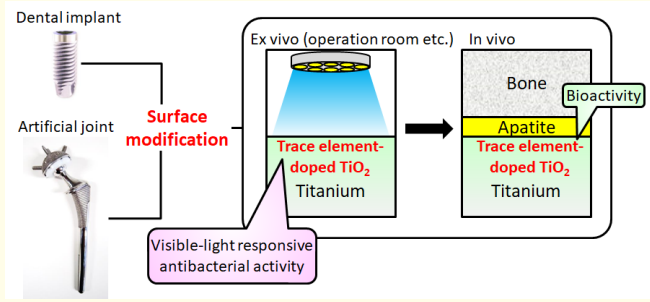
Development of ceramic micro/nano-particles for intra-arterial therapy for deep-seated cancer

Radioactive or magnetic microspheres are useful for intra-arterial radiotherapy or hyperthermia of cancer. We try to develop radioactive or magnetic micro/nano-particles by using various synthetic techniques.



Formation of antibacterial and bioactive TiO_2 surface layer on titanium by surface chemical treatment

Trace element-doped TiO_2 can show visible-light responsive antibacterial activity as well as bioactivity. We try to form antibacterial and bioactive TiO_2 surface layer on titanium by surface chemical treatment.



Elucidation of bone-bonding mechanism of hydroxyapatite –From a view point of protein adsorption–

Hydroxyapatite (HAp) is widely used as an artificial bone because it bonds to living bone. However, the detailed bone-bonding mechanism of HAp has not been clarified yet. We are trying to elucidate the bone-bonding mechanism of HAp from a view point of adsorption of serum proteins such as fibronectin (Fn).