

Specialized Research Consortium of Biomaterials

Major research goals

To organize a platform for Biomaterial research and development. Especially for bone, cartilage, soft tissue regeneration and biopolymer/biometallic devices. Applying new techniques for future medicine including individualize- and tele-medicine. To meet the need of biomaterials to replace or support human body due to extended life span and aging society.

Major research topics

1. Technologies of Therapeutic Biomaterials for Otolaryngologic Disease

PI: Hyong-Ho Cho, Dept. of Otolaryngology-Head and Neck Surgery

: We are trying to develop a scaffold to facilitate tympanic membrane regeneration for otitis media patients. Diagnostic and therapeutic instrument for otitis media is under work. There are out growing numbers of hearing loss, however with no definitive treatment. We are seeking some kind of growth factors or modulator in order to restore hair cells in this circumstance. Diagnostic equipment for Obstructive Sleep Apnea and

allergic rhinitis is our another major goal.

2. Development of Orthopedic Biomaterials

PI: Myung-Sun Kim, Dept. of Orthopaedic Surgery

: There are many metal, nonmetal, biopolymer used in the orthopedic field. These are already causing billions of dollars for the national healthcare finance. We are trying to develop a new way for more efficient and effective biomaterials for bone, cartilage replacement.

3. Bio- Integrative Printing for Individualized Bone Materialization

PI: Min-Suk Kook, Dept. of Oral and Maxillofacial Surgery

: Facial bones are complex in there shape and strength. It is hard to apply just few kinds of form to reconstruct in the facial area. We are developing a individualized bone reconstructive method by 3D-bioprinting technology.

4. Development of Telemedicine System

PI: Tag Heo, Dept. of Emergency Medicine

: In the line of developing many medical devices, we are also working on telemedicine system. There are many places, especially



Director

Prof. Hyong-Ho Cho, M.D., Ph.D.

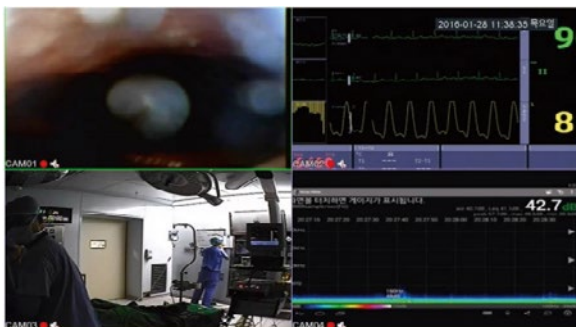
in islands along the southwest coast, that lack hospitals for severely injured emergent patients. This is also important for the efficiency of national healthcare service.

Major achievements

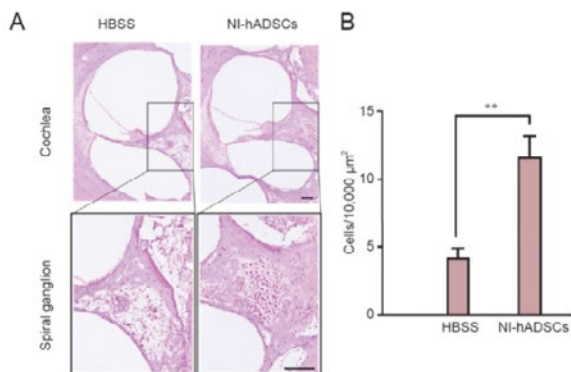
1. Oat extract, Avenanthramide for protection and treatment of hearing loss. 2016.09
2. Monitoring and recording system for patient's body and luminal position during sleep endoscopy. 2016.03
3. Multiporous high density polyethylene scaffold for facial implantation by 3D printing. 2016.10
4. Eggshell Membrane for tympanic membrane, skin reconstruction 2016.

Representative figures of major achievements

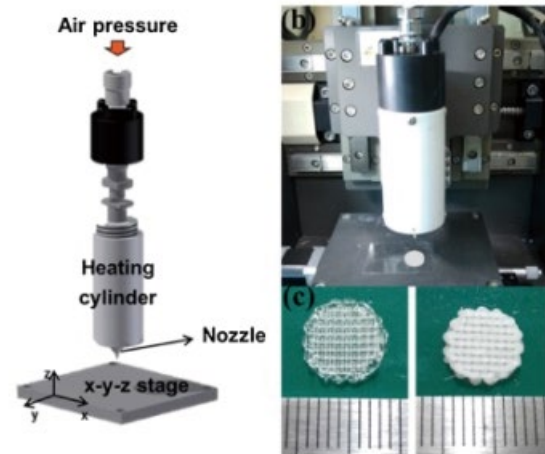
1. Monitoring and recording system for patient's body and luminal position during sleep endoscopy. 2016



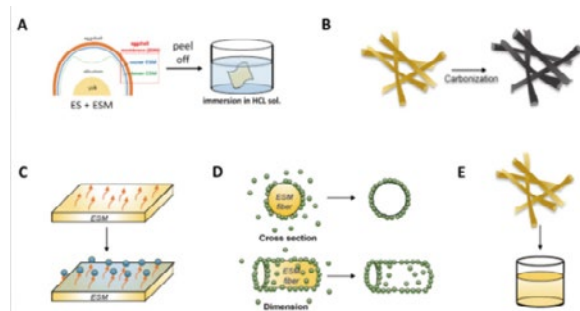
2. Recovery of spiral ganglion neurons after transplantation of human adipose tissue derived stem cells. 2016



3. 3D Bio-printing system. 3D PLGA/n-Hap/b-TCP composite scaffolds 2016



4. Eggshell Membrane for bioengineering 2016



Major relevant publications

1. Jang S. et al. Transplantation of human adipose tissue-derived stem cells for repair of injured spiral ganglion neurons in deaf guinea pigs. *Neural Regen. Res.* 2016;11(6):994-1000
2. Park S. et al. Eggshell membrane: review and impact on engineering. *Biosystems Engineering* 2016;151:446-63
3. Roh HS. et al. Polytetrafluoroethylene Surface Modification Using Atmospheric-Pressure Plasma Polymerization. *J Nanosci & Nanotechnol* 2016;16(11):11964-7
4. Myung SW. et al. Au Nanoparticles Grafting on Polyethylene by Using Atmospheric Pressure Gas Discharge. *J Nanosci & Nanotechnol* 2016;16(11)
5. Roh HS. et al. In vitro study of 3D PLGA/n-Hap/b-TCP composite scaffolds with etched oxygen plasma surface modification in bone tissue engineering. *Applied Surface Sci* 2016;388:321-330