

WINGS-LST セミナーご案内

韓国のソウル大学の化学・生物工学科の **Nathaniel Hwang** 先生が来日されますので、以下の要領でセミナーを開催いたします。多数ご参加下さい。

"Biomaterials for Cell-based Therapy"

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●日時場所：2020年2月13日（木）18:00-19:00

●場所：工学部3号館6階，6B04号室（大会議室3）

*工学部3号館はフロアーがロックされていますので，6Fでエレベータをお降りになりましたら，内線27073までお電話下さい。開錠いたします。

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Biomaterials for Cell-based Therapy

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Abstract

Stem cell-based therapies have been highlighted as potential treatment strategies for many diseases. In particular stem cell injection has been shown to reverse the disease progression by secreting pro-angiogenic factors. However, short term in vivo monitoring and lack of differentiation factor have resulted in reduced therapeutic efficacy and inconvenience in the certification of differentiated stem cells after injection. In order to overcome these limitations, we have engineered the stem cell membrane with biomacromolecules and cell tracking nanoparticles. Cell surface engineering was performed via treating the cells with a mild reducing agent, TCEP, to reduce disulfide bonds on the outer cell plasma membrane, and this process resulted in increased exposure of thiol functional groups. Furthermore, reduced cells were incubated with thiol-reactive maleimide-modified biomacromolecules and/or nanoparticle. When cell surface engineered cells were injected into a nude mouse a long-term survival and monitoring were achieved. Furthermore, we also have investigated a novel method for assembling biomacromolecules on the cell surface via enzyme-mediated crosslinking. This novel enzyme-based crosslinking of biomacromolecules on the cell surface has robust potential in stem cell-based therapy and regenerative medicine.

Short biography:

Nathaniel S. Hwang is currently an Associate Professor in the School of Chemical and Biological Engineering at Seoul National University, Republic of Korea. Prof. Hwang received a bachelor's degree in Biomedical Engineering from Johns Hopkins University Whiting School of Engineering in 2002. He obtained his Ph.D. in Biomedical Engineering from the Johns Hopkins School of Medicine in 2007 under the guidance of Professor Jennifer Elisseeff. After doctoral studies, he was a visiting scholar at the University of California, San Diego, Department of Bioengineering, and worked with Professor Shyni Varghese. From 2008 through 2011, he worked as a postdoctoral associate in Professor Robert Langer's laboratory at Massachusetts Institute of Technology. In 2011, Dr. Hwang joined the School of Chemical and Biological Engineering at Seoul National University. Prof. Hwang is currently leading a group of students that work together to develop new biomaterials, study stem cells, and design new technologies for regenerative medicine. In particular, Prof. Hwang's laboratory is working toward the fabrication of bio-synthetic microenvironments conducive to stem cell differentiation by manipulating scaffold properties and incorporating the desired biological signals..