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강연제목: 실시간 비침습적 모니터링 상피-중간엽 전환(EMT)

Real-time noninvasive monitoring of epithelial-to-mesenchymal transition (EMT)

Abstract:

The advancement of various biomaterials and their processing technologies for fabricating micro-/nano-structures have shown their great potential in healthcare. Different scales, shapes, and intrinsic properties of the biomaterial structure can affect both the physical and chemical dynamics of the cells. Nano-scale structures often control the intracellular behavior of the cells, whereas micro-scale structures govern the proliferation and migration of the cells. Furthermore, a 0-D pore pattern and 1-D line pattern each has the potential to differentiate stem cells into osteoblast lineage and cardiac lineage cells, respectively. And sometimes, stimuli-responsive biomaterials can even adhere/detach cells on demand upon the change in the surrounding temperature.

In modern society, we are living in an era of artificial intelligence (AI) and mechanical engineers' approaches to healthcare are consequently changing. Before the development of artificial intelligence, we focused more on research and finding ways to treat diseases after they occur. But nowadays, research on how to predict and diagnose/prevent those diseases from occurring is gathering immense attention. Acknowledging diverse physical stresses inevitably exposed to individual cancer cells during the period of aforementioned observing methods, we designed/fabricated a microfluidic chip containing a unique micro-pillar structure which provides a noninvasive method of observing the 2D/3D characteristics of individual and multiple cancer cells in real-time. We believe this novel chip can accurately predict the epithelial-to-mesenchymal transition (EMT) and dramatically increase the survival rate of cancer patients.

Brief Biosketch

Professor Andrew Choi started his academic studies in the field of mechanical engineering and received his B.S. degree from the Georgia Institute of Technology in 2013. Thereafter, he received his Ph.D. from the School of Mechanical Engineering at Pohang University of Science and Technology. After receiving his Ph.D. in 2021, he spent a year as an R&D team manager in EDmicBio (venture company) and then joined the Brain Science Institute of KIST in 2022 as a young scientist postdoc. He is currently an assistant professor at the Department of Mechanical Design and Engineering at Hanyang University.