

Biomaterials-based cellular reprogramming and stem cell differentiation for personalized regenerative medicine

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I would like to introduce recent works about cellular reprogramming and stem cell differentiation through the specific interaction of stem cells and biomaterials for personalized regenerative medicine. Understanding the biophysical relationships between stem cells and applied biomaterials can facilitate the ability to control the functions and behaviours of stem cells. However, the role of biomaterials and especially 3D microenvironment in stem cell biology remains largely unexplored, compared with that of 2D cell-culture environment. In the first topic, I would like to introduce 3D hydrogel systems to accelerate cellular reprogramming. On the other hand, in the second topic, I will introduce a novel technique for mesenchymal stem cells (MSCs) isolation from pluripotent stem cells (PSCs) by utilizing specific integrin interaction of MSC on a biomaterial. In addition, I will briefly introduce recent my works about various approaches for personalized regenerative medicine. Therefore, I believe these approaches would be useful to prepare a standard protocol providing personalized and therapeutic stem cells in regenerative medicine.