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Designing culture process to maintain population balance of skeletal muscle myoblasts and fibroblasts in culture

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Skeletal muscles mainly consist of a heterogeneous population of contractile myoblasts and non-contractile fibroblasts. Contractile property and self renewal ability of myoblasts lead to a concept of its transplantation for the treatment of cardiovascular diseases, as a substitute of cardiomyocytes that lack proliferative capacity. Several preclinical and clinical studies have validated the safety and efficacy of myoblast transplantation in cardiac treatment. In contrast, fibroblasts are shown to being capable of synthesizing and secreting proangiogenic growth factors and extracellular matrix (ECM) components that can help to enhance the angiogenesis in damaged heart, although excessive production of ECM can cause fibrosis. Thus, it is assumed that co-transplantation of skeletal myoblasts with controlled population of fibroblasts could be a suitable approach for myocardial regeneration. However, maintaining population balance of myoblasts and fibroblasts in co-culture during expansion is still challenging because of high growth of fibroblasts compare to myoblasts. We aimed to design a suitable culture conditions to improve the growth properties of myoblasts. The growth properties of purified myoblasts and fibroblasts were evaluated in various culture media (such as F10, DMEM, and F10-DMEM in 1:1 mixture) with surface coating of laminin and supplementation of skeletal fibroblasts conditioned media. Moreover, effect of culture conditions on migration rate of myoblasts was also evaluated as it was shown to improve proliferative potential. It was found that modification of culture condition significantly improves the growth of myoblasts, which is equivalent to fibroblasts, and will be suitable for maintaining population balance during expansion.

Biography

Shiplu Roy Chowdhury has completed his Ph.D at 2009 from Osaka University and postdoctoral studies from Tissue Engineering Centre, Universiti Kebangsaan Malaysia. He currently holds a position as a Research fellow in Tissue Engineering Centre, Universiti Kebangsaan Malaysia. His research focused on designing culture process to improve the quality of cells in culture as well as engineered construct. He is involved in several researches focusing on fabrication of nano-topographic surface and scaffold for stem cell differentiation and developing tissue engineered construct, and their application in various tissue defect. He has published 8 papers in peer-reviewed international journals.

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