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Paper Title: Design and Feasibility Test of In-House Indirect Perfusion Bioreactor for 3-D Cell Culture

Authors: Thammawit Suwannaphan (King Mongkut's University of Technology North Bangkok Bangkok, Thailand); Alongkorn Pimpin, Tepparit Wongpakham, Theerawat Tharasanit and Kriengkai Chessadangkul (Chulalongkorn University, Thailand)

Email: thammawit.s@cit.kmutnb.ac.th

Abstract

Selection of bioreactor system depends on many factors such as type of products, process of culture, and product density. No standard for development methodology is available nowadays. This work demonstrated the development of multi mini-chamber indirect perfusion bioreactor to support 3-D cell culture. The systems consisted of scaffolds, cell/scaffold retainers, culture tanks with a single peristaltic pump. Flow simulation was conducted to investigate the effects of flow rate and inlets/outlets' position on the distribution of shear stresses on the cell/scaffold cassettes installed inside the bioreactor. The prototype with 4 culture tanks connected in series was tested for long period operation. Lastly, preliminary experiments to culture and differentiate pig muscle stem cells were conducted. The results showed that muscle cells were successfully differentiated both on glass slides and aloe vera scaffolds inside the developed bioreactor.