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In vitro development of a vascularized full thickness skin equivalent model

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Given the steadily increasing aging population, the study and care of non-healing wounds in the elderly, caused by aging itself or age-associated health conditions (e.g., diabetes or cardiovascular disorders) have become priority topics for researchers and clinicians. Skin autografting is considered to be the optimal approach to achieve complete healing of chronic wounds. As a result, *in vitro* skin bioengineering has been explored to develop full thickness skin equivalents for transplantation. However, currently available *in vitro* developed skin equivalents perform poorly during engraftment due to the lack of proper vasculature, often leading to the premature death of grafted tissue. Through advances in skin tissue engineering and induced pluripotent stem cell (iPSC) research, the quality and complexity of skin bioengineered equivalents may be significantly improved by inducing vasculature formation. Given the lack of and difficulty of harvesting available endothelial cells from patients in need of vascularized grafts, attaining endothelial cells from iPSCs has proven to be of recent research interest. In this study, we examined and optimized an approach to derive endothelial cells from iPSCs and determined the 'proof of concept' of a more complex, life-like 3D, full thickness skin model through the co-culturing of human fibroblasts and endothelial cells with keratinocytes.

Biography

Andrew Sumagaysay Ramos is currently a senior undergraduate studying Bioengineering at Syracuse University, USA. He has developed a passion for academic research, after having research experiences in protein nanopores, drug delivery, scaffold engineering, tissue engineering and pluripotent stem cells. He was a summer Research Fellow with the Gates Center for Regenerative Medicine and Stem Cell Biology, under the mentorship of Dr. Ganna Bilousova, conducting research in skin tissue engineering and induced pluripotent stem cells. At Syracuse University, he has participated in research under the guidance of Dr. Pranav Soman, specifically in gelatin methacrylate, its application for bone tissue engineering.

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