Designs and Applications of Equipment for Biomanufacturing

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Abstract

Tissue engineering and regenerative medicine (TERM) combines cells, biomaterial scaffolds, and signaling molecules into three-dimensional living constructs that can be used to replace injured tissues and organs or as predictive models for drug discovery and toxicology assays. Although several proof-of-concept experiments have been published showing great potential, numerous obstacles are still preventing TERM from becoming a routine clinical practice. Among the most challenging is the limited availability of appropriate biomanufacturing tools that allow building biomimetic constructs with multiple components organized in a spatially controlled manner.

A promising approach to overcome those limitations is 3D Bioprinting. This emerging approach allows drawing complex 3D models with computer-aided design (CAD) software and uses robotics to deposit biomaterials and cells layer-by-layer with micrometer precision, which results in 3D constructs that recapitulate to a large extent the structures and functions of native tissues.

Since 2007, regenHU has dedicated its engineering skills to assist the scientific community with cutting-edge 3D bioprinting/biomanufacturing solutions. This presentation will outline the features that stand regenHU's bioprinters out of the crowd, describe the multiple printing technologies available, list the capabilities of the software suite, and discuss recent scientific breakthroughs that were made possible thanks to our 3D Discovery™ Evolution bioprinters.

Biography

Dr. Redouan Mahou completed his PhD at EPFL in the Laboratory for Regenerative Medicine and Pharmacobiology. His dissertation aimed to advance cell therapy through combining innovative hydrogel formulations and encapsulation technologies. His work culminated with a nomination for the *Prix DuPont des Matériaux* and a CTI grant (in collaboration with Geneva University Hospitals) to translate the findings into the clinic. In 2014, Dr. Mahou joined the University of Toronto to work toward engineering biologically active implants that trigger desired host responses. For example, he devised polymeric scaffolds that upon sub-Q implantation caused blood vessels to grow and mature. Another strand of his research focused on developing endothelialized ECM building blocks for vascularized modular tissue engineering. Dr. Mahou has published 20 papers in peer-reviewed journals, lectured and led lab sessions for undergraduates, supervised MSc and BSc theses, and secured over $3M in funding. In 2018 he joined regenHU to lead the Sales Department, interface with partners who are implementing 3D Bioprinting in their research and advise them on the existing solutions that are most adapted to their specific needs.