



Advanced 3D-Bioprinting

3D-bioprinting is revolutionizing research and medicine by enabling the precise creation of intricate 3D structures using both living cells and biomaterials. Let acib help you capitalize on this technology to advance novel scaffolds, tissue engineering, drug testing and personalized medicine!

BACKGROUND

The ability to build biomimetic 3D-tissues is only possible through advances in several fields and needs careful consideration for each specific case. Which biopolymers and blends thereof are suitable scaffolds? Are they biocompatible? Are they robust and flexible enough to match the requirements of printed structures? Which bio-inks i.e. potentially useful hydrogels, laden with cells, are best suited for each specific task. What about printability and printing parameters to be observed? What about the alignment of fibers during 3D-printing and functionalization after printing to generate real-life functions?

TECHNOLOGY

acib joins forces with the Institute of Chemistry and Technology of Biobased Systems (IBIOSYS) at Graz University of Technology, Austria. IBIOSYS and acib provide an in-depth understanding of the interactions of biomolecules (proteins, carbohydrates) in homogeneous solutions and at solid/liquid or liquid/liquid interfaces, leading to better manufacturing of organic structures and inorganic/organic hybrid-systems. The focus is on the development of biomaterials with an emphasis on surface specific processes such as surface functionalization and the manufacturing of 3D structured materials by 3D printing or lithography, the development of bio-ink formulations, as well as solutions for cross linking and self-assembly in tissue engineering and beyond.

We offer several solutions such as bio-printing using simultaneous application of hydrogels and cells together with thermoplastics in a sterile environment. This is combined with other techniques such as lithography, ink jet printing, spin coating and electro writing. We house state-of-the art equipment able to chemically derivatize and to print various biopolymers and cells under controlled aseptic conditions with 5 print heads for extrusion, viscous liquids, or dispersions, with a piezoelectric pipette and a steel nozzle for cells, proteins or nucleic acids. Moreover, we can closely monitor processes at solid/liquid or liquid/liquid interfaces, especially the interaction of biomaterial interfaces with the ingredients of biological systems, such as proteins/enzymes, polyelectrolytes, microorganisms. We are finally capable of studying the chemical, and physical supramolecular structures of biomaterials, and the mechanical and rheological properties of 3D formulations.

OFFER

acib is looking for companies and/or investors to work with e.g. on:

- Development of 2D and 3D bio-based polymer formulations tailored to your purpose.
- Complex interaction studies at biomaterial interfaces in liquid or gaseous environments using QCM, SPR; AFM, XPS, MALDI-TOF, charge titrations.
- Development of new bio conjugates comprising polysaccharides and peptides using chemical and enzymatic pathways.
- Development of unique and special 3D printing techniques for you.

IP developed in such projects will be fully transferred to you as our investor/industrial partner.



acib-EXPERTS:

Prof. Karin Stana Kleinschek
Dr. Rupert Kargl

DEVELOPMENT STATUS:

Technology Readiness Level 3-5

IPR:

New IP can be generated and transferred to you as our project partner.

KEYWORDS:

3D-Printing
Bioprinting
Biopolymers
Bio Inks
Biomaterial interfaces
Sterile printing environment

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