

**SEMINAIRE**

**IPBS , *salle des commissions* , niveau 2  
205 route de Narbonne TOULOUSE CEDEX 4**

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**Mardi 20 mai 2008 à 11 h.**

**Dr Gabor FORGACS** (Department of Physics, Biology and Biomedical Engineering University of Missouri, Columbia )

**" *Organ printing* "**

We introduce a novel tissue and organ engineering technology, organ printing, which aims at constructing three-dimensional biological structures of specific shape, functionality and composition, for the basic sciences, drug testing and eventually for applications in regenerative medicine. The method is based on established principles of developmental biology, in particular known mechanisms of early morphogenesis, the sequence of natural pattern-forming processes (such as cell sorting, tissue liquidity and tissue fusion that will be detailed), through which organs acquire their final shape. Importantly, it relies on the self-organizing capacity of cells and tissues. The method utilizes the bioink – cell aggregates of specific size and composition; the biopaper – the bio-friendly material into which the bioink is delivered and the bioprinter – the delivery instrument. Biological structures are arrived at through a three-phase process: preprocessing, or bioink preparation, processing, the actual automated delivery/printing of the bioink into the biopaper by the bioprinter and post-processing, the maturation/incubation of the printed construct in the bioreactor. Final structure formation takes place during post-processing via the fusion of the bioink particles. We will describe each of the components and demonstrate each phase. Specifically, we will show the preparation of tubular organ structures, such as blood vessels and sheet-like constructs, such as cardiac grafts. Finally, we will illustrate the process of building extended vascularized tissue blocks.

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