DISTINGUISHED LECTURE in BIOLOGICAL ENGINEERING

“The Power of Miniaturization in Medicine: Engineered Hepatic Tissues and Cancer Nanotechnology”

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EPFL – room SV1717

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Abstract:
Our laboratory studies how micro- and nanoscale systems can be deployed to understand, diagnose, and treat human disease. In this talk, I will describe our progress in two application areas: liver disease and cancer. In the area of hepatic tissue engineering, we are developing microtechnology tools to understand how ensembles of cells coordinate to produce tissues with emergent properties in the body. We have used this understanding to fabricate human microliver tissues in both '2D' and '3D' formats that enable us to study host-pathogen interactions in hepatitis and malaria.

In the area of cancer, we are developing nanotechnology tools to meet the challenge of delivering cargo into the tumor microenvironment where transport is dominated by diffusion. Our strategy is to design nanotechnologies which emulate nature's mechanisms of homing, activation, and amplification to deliver cytotoxic drugs, diagnostic tools, imaging agents, and siRNA to tumors.

Thus, using nature as a guide, we are establishing a framework for building systems from micro- and nanoscale components that function collectively to treat human disease.

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