Selected Projects
Competition 2009-2010

A new biosensor paradigm for continuous detection of multiple analytes

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The capacity to monitor selected drugs, analytes or biomarkers in living organisms is crucial for drug discovery and the future of healthcare. It allows the monitoring of biological response during *in vivo* animal experimentation with minimal animal sacrifice and discomfort as well as a reduction in cost and development time. In a clinical setting it also improves the accuracy and rapidity of diagnosis and permits ultimately the implementation of personalized medicine approaches and the development of artificial organs such as an artificial pancreas for the optimal control of diabetes.

The proposed project involves the development and validation of a new generation biosensor that offers unique and broadly applicable capabilities, combining the capacity to monitor several analytes simultaneously in real time, for use *ex vivo* and *in vivo*. Relying on the evanescent field-based detection of the fluorescence of Quantum dots, the proposed biosensor brings together expertise in electrical engineering, physics, pharmacology, chemistry and physiology. As a first step, the integration of the various components will provide a pH-actuated biosensor. In a next step, it will be optimized for the individual detection of glucose and insulin.

Finally, application of the proposed biosensor for the simultaneous real time detection of glucose and insulin will yield a prototype the size of the tip of a needle that will be tested *ex vivo* and *in vivo* in rats. The proposed biosensor has also the potential to serve in many diseases to improve diagnosis and monitor treatment.