

Title: Sensors & MicroPhysiological Systems: the Organ-On-Chip case

Abstract. Over the past years, there has been growing interest in the development of MicroPhysiological Systems (MPSs) that are capable of recapitulating aspects of human physiology in vitro and the molecular bases of transport defects across epithelia in specific organs (due to their relevant association with diseases). The MPS devices may enhance the comprehension of disease models and improve the drug development for personalized medicine applications in vitro. The European Commission BOHEMIA study identified the “Human organ replacement” an EU research priority for 2021-2027 program; moreover, several microfluidic platforms have been developed with the goal of mimicking physiological conditions in cell culture, and the integration of sensors within these platform (e.g. Organ-On-Chip devices) usually allows higher sensitivity due to concentrated analyte availability and real-time monitoring capabilities. Among different type of devices, the microfabricated chemical and physical sensors integration is considered an urgent and challenging need of the community, because of low cost, miniaturization capability, high sensitivity/specificity and easy adoption in industrial environments for high-throughput drugs analysis.