Upgrading nanobiosensing platforms: comparison between different inkjet printed biosensors for detection of Neutrophil Gelatinase Associated Lipocalin-2 (NGAL)

Massimo Urban[1],
Giulio Rosati[1], Arben Merkoçi[1,2]

[1]Catalan Institute of Nanoscience and Nanotechnology (ICN2), Edifici ICN2, Campus UAB, 08193 Bellaterra, Barcelona, Spain
[2]Catalan Institution for Research and Advanced Studies (ICREA), Passeig de Lluís Companys, 23, 08010 Barcelona, Spain

massimo.urban@icn2.cat
arben.merkoci@icn2.cat

Efforts have been put by the research community into developing and using different nanomaterials for biosensing applications[1]. Nanobiosensors take advantage of the unique proprieties of the nanomaterials to enhance the response, sensitivity and performance of the analytical device[2]. Each different component of the biosensor play a unique role into the overall performance of the device, and all the elements have to cooperatively work and interact together, in harmony going from the analyte to be detected to the readout interphase. This large variety of interactions readily give a perspective of the level of complexity and the technological requirements for fabricating reliable biosensors.

Advancement in the biotechnology of the receptors, introducing aptamers and selection techniques like SELEX, or applying new discoveries to the biosensing field, such as CRISPR-Cas family, resulted in a fast progresses in the area[3,4].

With the advent and rapid growth in the field of nanomaterials, more effort has been put into engineering and tune the proprieties of the transducing element of the sensor opening endless possibilities and combinations, with different receptors and transducing mechanisms. Upgrading already established platforms, introducing new features and materials with complementary properties, is the key, to push the reliability, performance and qualities of the devices.

Here we show a possible approach using a consumer inkjet printer, comparing different transduction mechanisms and different materials for the detection of Neutrophil Gelatinase Associated Lipocalin-2 (NGAL), as a case study. Inkjet printing may be one ideal candidate for fast prototyping and the continuous upgrade of nanobiosensing platforms, thanks to its versatility, available choices for materials, and combinations of layout and substrates[5].

References

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