Electronic Supplementary information

A SERS-based 3D nanobiosensor for lactate detection: a first step towards multiplex cell metabolite monitoring

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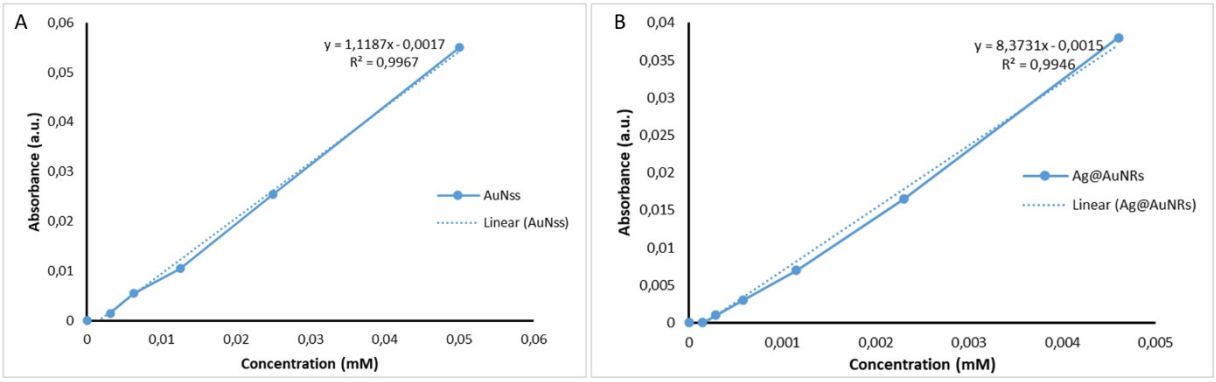

Figure S1- Calibration curves for (A) AuNss and (B) Au@AgNRs.

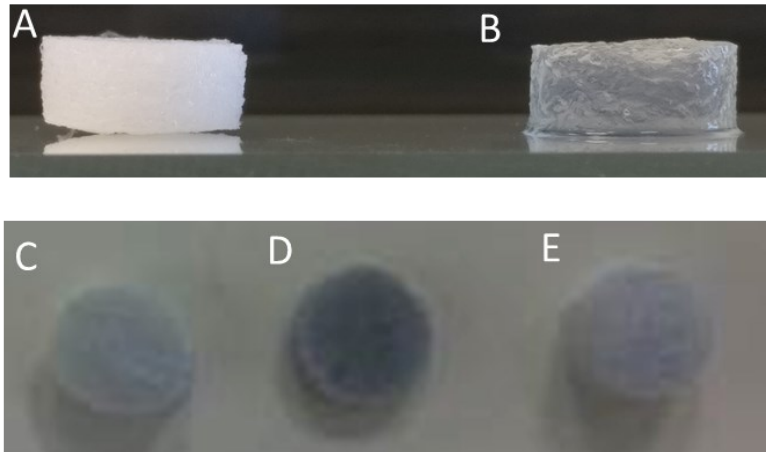

Figure S2- Optical images of (A) dry GG-SLH; (B) hydrated GG-SLH; (C) GG-SLH-AuNSTs at a concentration of 500 µM; (D) GG-SLH-AuNSTs at a concentration of 900 µM and (E) GG-SLH-Au@AgNRs at a concentration of 300 µM. (A) and (B) are taken from a lateral perspective and (C), (D) and (E) are top view photographs of the final material.

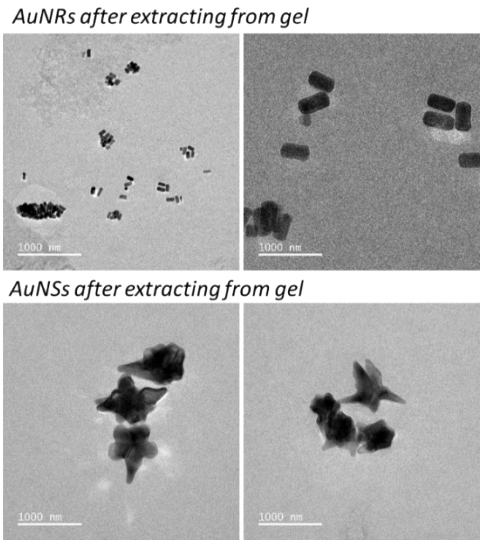

Figure S3. Transmission electron microscopy images of Au@AgNRs and AuNSs recovered after dissolving the gel to test NP morphology after gelation process.

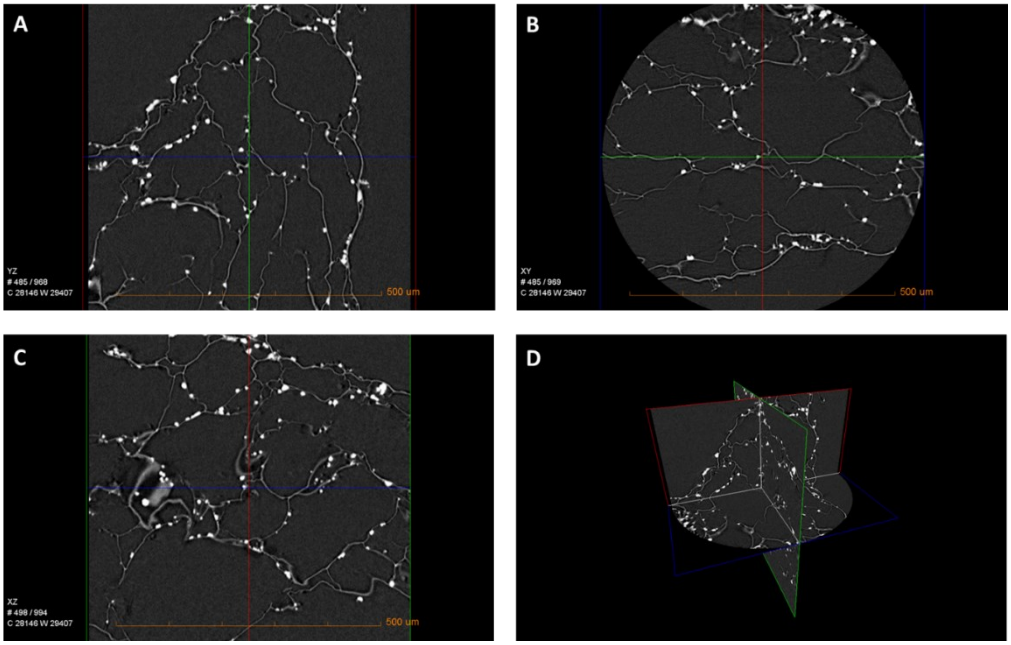

Figure S4- NanoCT analysis of the GG-SLH-NPs: (A, B, C) different cross-sections of the GG-SLH-NPs showing the pores of the hydrogel as well as the NPs inserted within the hydrogel (shiny spots) and (D) virtual reconstruction of the three previous cross-sections.

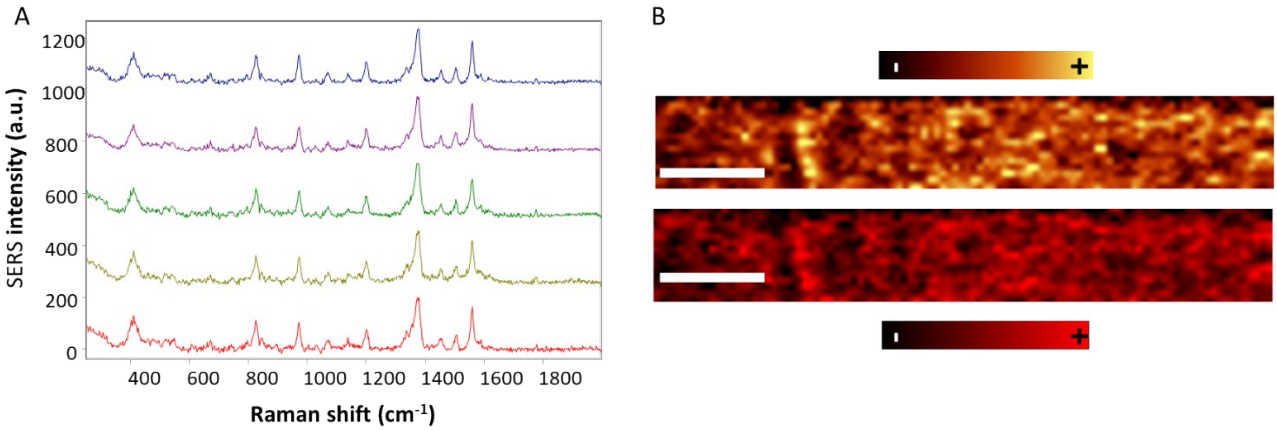

Figure S5. Stability of the GG-SLH-AuNSTs hybrid materials. Samples were measured 6 months after the measurements presented in Figure 4A under the same conditions. (A) Five SERS spectra of 1NAT acquired at five different points of the hybrid material after storage for 6 months; (B) SERS mapping of the 1368 cm^{-1} band (orange) and of the 1555 cm^{-1} band (red) of the same area of the NP loaded hydrogel.

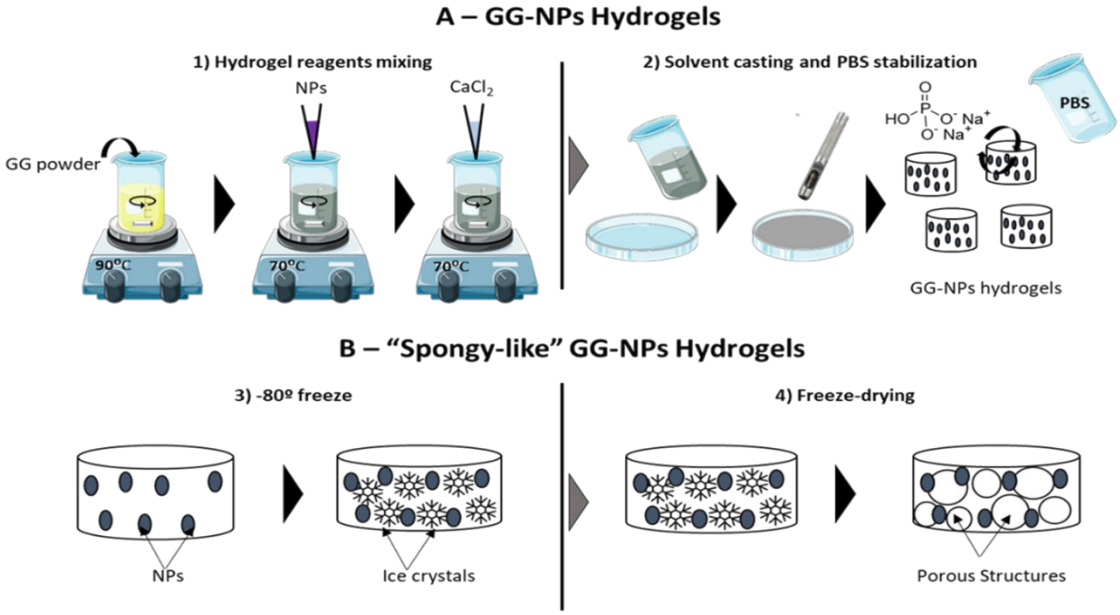

Figure S6. Production of "spongy-like" Gellan Gum with incorporated nanoparticles hydrogels (GG-SLH-NPs).

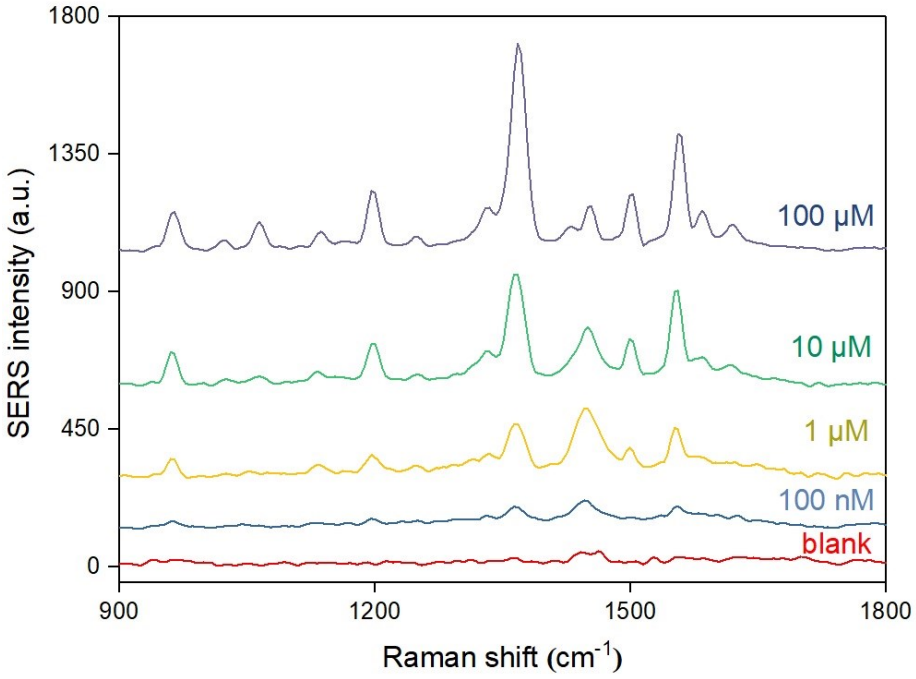

Figure S7. SERS spectra of 1NAT at different concentrations captured from the solution by GG-SLH-Au@Ag NRs.