

CoNVat Project: Advanced Nanobiosensing Platforms for Point-of-care diagnostics and surveillance of coronavirus

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The dramatic spread of COVID19 pandemics has evidenced the need of novel diagnostic tools that enable rapid testing and screening of the population with sensitivity and specificity levels comparable to laboratory techniques. In fact, reliable and early diagnostics of COVID-19 has become one of the major challenges in the correct management of the Pandemics. Strong efforts are being pursuing at worldwide level to surpass this bottleneck by offering reliable, fast and user-friendly diagnostics tests than can be employed at the point-of-need. Biosensing technology is one of the most well prepared to tackle this challenging goal.

CoNVat project is one of the first projects funded by the H2020 European Union Framework program to fight against COVID-19. Our main objective is to deliver a novel Point-of-Care (POC) Nanophotonics Biosensor platform capable to provide an accurate and fast SARS-CoV-2 coronavirus detection, without requiring complex equipment and for both human and animal reservoirs samples.

CoNVat will provide a unique technology for efficient screening and diagnosis of the SARS-CoV-2 coronavirus infection, providing rapid detection results (less than 30 minutes) and directly from the human/animal sample, without the need of PCR or other time-consuming treatments. The POC biosensor employed is based on proprietary cutting-edge nanophotonic technology that enables ultrasensitive analysis of body fluids in few minutes and in decentralized settings, which has already demonstrated sensitivities at the attomolar (aM) level for direct specific RNA detection and 4 cfu/mL for whole pathogen detection directly in human samples.

The POC biosensor device is being optimized for:

- (i) direct detection of SARS-CoV-2 in respiratory body fluids and saliva by incorporating specific antibodies for the capture of complete units of the SARS-CoV-2 virus, for a rapid diagnostics and screening.
- (ii) viral RNA analysis in a multiplexed format, including complementary DNA probes that hybridize to exclusive sequences of SARS-CoV-2 RNA, for a more accurate diagnosis and identification of virus strains among different coronaviruses and other clinically relevant viruses.

The **CoNVat** device will be employed for rapid infection detection in pandemic or epidemic outbreaks, but also in prevention and surveillance by routine screening and evaluation of reservoir species. A scheme of the CoNVat project is presented in Fig. 1.

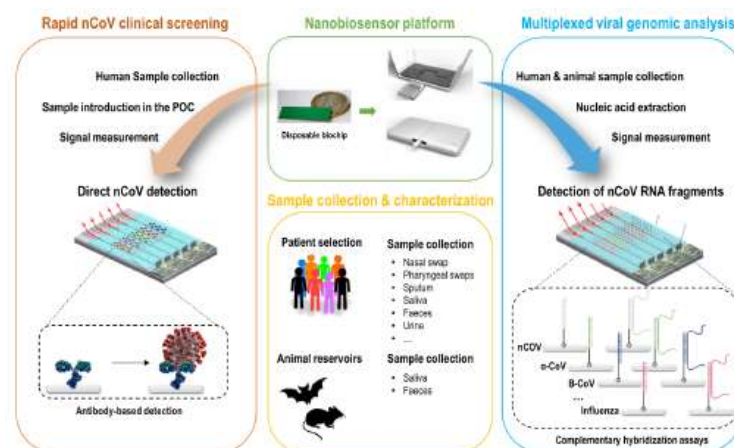


Figure 1: General scheme of the CoNVat project