Colorimetric Detection of SARS-CoV-2 based on Multiple AuNPs Aggregation

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Most colorimetric detection methods based on nanoparticle aggregation involve the use of two different batches of NPs. The target sequence hybridizes with the capture probes on the surface of the particles forming a sandwich-type structure.[1-3] Due to this type of architecture, the NPs aggregate and a color change occurs in the solution, which goes from red to blue/purple. This type of aggregation based on two types of NPs and a target sequence has certain disadvantages such as: a limit of detection around the uM range, poor selectivity, instability of the NPs functionalized with 3' thiolated-oligonucleotides, need for a certain number of hybridization events between the NP and the target sequence for a colorimetric detection, limitation on the length of the target, among others.

Taking this into account, this work presents the results obtained for enzyme-free colorimetric detection of RNA sequence up to 235 nucleotides, without prior amplification by PCR, using multiple batches of hybridized NPs sequentially to the complementary strand. With this type of architecture, an improvement of the detection limit has been observed as the number of NPs involved in the system increases, as well as a better optical response and a higher selectivity, even in long chains of up to 235 nucleotides (**Figure 1**)

REFERENCES

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FIGURES

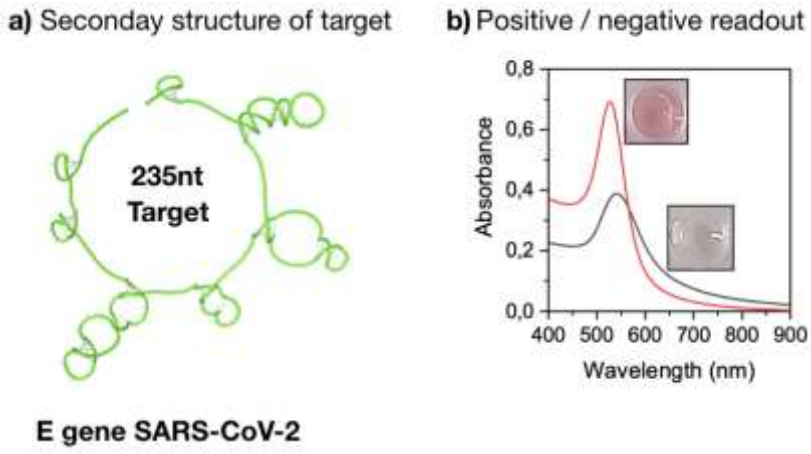

Figure 1: a) Secondary structure of target sequence (E gene SARS-CoV-2): 235 nt. **b**) Positive (aggregated particles, transparent solution) and negative (dispersed particles, red solution) results of the system.