

Three-dimensional tubular nanomembrane DNA biosensor

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We present an on-chip integrated and ultrasensitive label-free DNA biosensor based on rolled-up nanomembrane electrodes¹. A specific sequence of the avian influenza virus H1N1 is detected down to attomolar concentrations, 4 orders of magnitude lower than its planar counterparts, and without the need of amplification strategies. Moreover, the proposed geometry causes an opposite behavior of the impedance response to the expected. An analysis of the electric field speaks in favor of an enhanced charge transport through the DNA, although conformational changes cannot be excluded. This biosensor, beyond sensitive diagnostic applications, provides a powerful tool to study electrical properties of the DNA under variable experimental conditions.

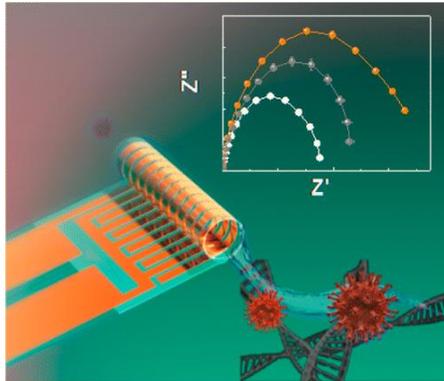


Figure 1: conceptual figure showing impedimetric DNA detection with the tubular biosensor.

REFERENCES:

1. M. Medina-Sánchez, B. Ibarlucea*‡, N. Pérez, D. D. Karnaushenko, S. M. Weiz, L. Baraban, G. Cuniberti, O. G. Schmidt. High-Performance Three-Dimensional Tubular Nanomembrane Sensor for DNA Detection. *Nano Letters* **16**, 4288-4296 (2016).