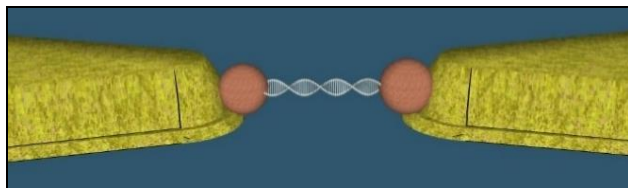


Molecular Electronics with DNA towards Detection of Nucleic Acids

Danny Porath

Institute of Chemistry and Center for Nanoscience and Nanotechnology, The Hebrew University of Jerusalem, 91904 Israel
danny.porath@mail.huji.ac.il



The DNA double-strand recognition, as well as the ability to manipulate its structure open a multitude of ways to make DNA useful for molecular electronics. We recently reported a breakthrough in measuring charge transport in DNA (Nature Nanotechnology 2020) in a special configuration. This finding is of great importance by itself for understanding electricity in DNA in particular, and for molecular electronics in general. However, it also paves the way for the design of new ultra-sensitive detectors for DNA and RNA. Addressing these challenges is at the heart of early detection of cancer, pathogens, emergency medicine as well as for pandemics like the COVID-19.

References

- [1] "Direct measurement of electrical transport through DNA molecules", Danny Porath, Alexey Bezryadin, Simon de Vries and Cees Dekker, **Nature** 403, 635 (2000).
- [2] "Charge Transport in DNA-based Devices", Danny Porath, Rosa Di Felice and Gianuario Cuniberti, **Topics in Current Chemistry** Vol. 237, pp. 183-228 Ed. Gary Shuster. Springer Verlag, 2004.
- [3] "Long-range charge transport in single G4-DNA molecules", Gideon I. Livshits et. al., **Nature Nanotechnology** 9, 1040 (2014).
- [4] "Advances in Synthesis and Measurement of Charge Transport in DNA-Based Derivatives". R. Zhuravel, A. Stern, N. Fardian-Melamed, G. Eidelshstein, L. Katrivias, D. Rotem, A. Kotlyar and D. Porath, **Advanced Materials** 30, 1706984 (2018).
- [5] "Backbone charge transport in double-stranded DNA", R. Zhuravel et. al., **Nature Nanotechnology**, 15(10), 836 (2020).