



Università degli Studi di Napoli Federico II

PhD in Biotechnology - 38th cycle

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Nucleic Acid based biomaterials

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Oligonucleotide analogues (ODNs) are biomolecules with a great scientific potential on account of their remarkable properties (their higher bioavailability, affinity with the target, stability and higher resistance against nuclease degradation). Therefore, they can be used as nanoprobe and biosensors, but also for the development of new materials in the nanotechnology field¹. ODNs and their analogues can assume several secondary structures which play an important role in Biology, Biotechnology and Nanotechnology². In particular, ODNs rich in guanines can adopt secondary structures named G-quadruplexes, which are very interesting also from a diagnostic and therapeutic point of view.

For these reasons, the main objectives of this PhD project are the following:

- The synthesis of modified ODNs capable of being conjugated with nano-surfaces to detect the binding with specific targets.
- The assembly of ordered supramolecular structures starting from small building blocks to obtain DNA nanostructures in a simple and affordable way.

To achieve these objectives, the PhD student will use techniques such as: synthesis of oligonucleotides, CD and UV spectroscopies, PAGE, HPLC, DLS and AFM.

References

- (1) © 2013 Landes Bioscience Special Focus Review Special Focus Review; 2013. www.landesbioscience.com.
- (2) SantaLucia, J.; Hicks, D. The Thermodynamics of DNA Structural Motifs. Annual Review of Biophysics and Biomolecular Structure. 2004, pp 415–440. <https://doi.org/10.1146/annurev.biophys.32.110601.141800>.