DNA-bidimensional architectures for biomedical applications.

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Abstract

Nucleic acids are very important biomolecules in charge of the transmission of the genetic inheritance. In order to perform their biological functions, they have unique molecular recognition properties and they are chemically and physically stable. The self-assembly properties of nucleic acids have attracted a large interest in the scientific community for their use on nanosciences [1-3]. This is also a consequence of the existence of a robust method for the preparation of nucleic acid derivatives that allows the production of these compounds carrying a large variety of functional groups, molecules of interest and materials. The development of DNA origami [4] has been one of the most important advances for structural DNA Nanotechnology [1-3]. This method uses hundreds of nucleotides "staples" to fold a long single-stranded DNA scaffold of 7-kilobase, the M13 phage genome, in a rational and desired shape. DNA origami is a versatile tool for the self-assembly of other molecular species and constitutes an excellent platform to create a variety of new nanoscale devices with great potential and applications.

In the present communication we will describe our recent work on the use of nucleic acids derivatives in the organization of molecules and materials on surfaces. Specifically we will described the development of modified DNA origamis carrying modified oligonucleotide staples [4] for the controlled deposition of nanoparticles and for the study of interactions between proteins and aptamers [5] with potential applications in the field of DNA repair.

References

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