

Title: **Electrochemical studies involving quadruplex DNA structures.**

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Date: January 2019

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DNA is the molecule that contains the necessary instructions for the development, life and reproduction of an organism. Due to these properties it has been studied widely over the last years in Science, from Biology to Nanoscience.

According to the sequence and the spatial disposition different functions and processes are produced. The most typical and well-known structure is the double helix, B-DNA, which was described firstly by Watson and Crick in 1953. However, it has been observed that DNA can fold in multiple forms, like G-quadruplex or i-motif structures. The guanine rich sequences can fold into G-quadruplex, whereas the cytosine rich sequences form the so-called i-motif structures. These two structures seem to have an important biological interest because both, guanine- and cytosine-rich regions have found near the promoter regions of some oncogenes and at the extremes of the telomeres.

This project has focused on the potential application of electrochemical techniques, especially Differential Pulse Voltammetry (DPV) and screen-printed electrodes, for the study of the equilibrium in solution of guanine- and cytosine-rich sequences. A conformational study has also been carried out using circular dichroism and molecular absorption spectroscopies. The obtained results suggest that electrochemical techniques could be useful to detect folding of different DNA structures.

Keywords: DNA, G-quadruplex, i-motif, voltammetry, circular dichroism, UV-Vis spectroscopy.