# “DNA-nanoantenna ECL assay development for bacteria detection”

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Early detection of bacteria forming biofilms can have a significant impact in a variety of fields such as healthcare, food industry and environment protection. Development of highly sensitive, specific, and cost-effective biosensors for bacteria detection is necessary for the prevention of infections, especially due to increase in the number of new multi-drug resistant bacteria. Electrochemiluminescence (ECL) based biosensors (i.e. electrochemically generated light) has attracted much attention due to their high selectivity, controllability, and sensitivity. In this case, novel transition metal complexes based on ruthenium are of high interest since they provide advantages such as strong luminescence, good solubility in several aqueous and non-aqueous solvents, and good ECL efficiency, that makes them excellent luminophores. Furthermore, ECL signal generated by novel ruthenium dyes can be effectively enhanced when is coupled with surface plasmon resonance (SPR). The use of plasmonic nanoparticles as gold NPs can be used to amplify the ECL signal mediated by ruthenium complexes. Nevertheless, several factors (e.g. particle size, shape, distance and etc.,) play a key role in the SPR-ECL process and they can be optimized. Therefore, the objective is to find out the optimal distance between luminophore and particle using DNA as spacer. Characterization of the DNA-nanoantenna ECL system through spectroscopic (UV-VIS and fluorimetry) and electrochemical techniques such as cyclic voltammetry will provide the information needed to build reliable, highly sensitive, selective, and specific optical DNA-based biosensor for and early detection of bacterial infections.