Study of the interactions between aptamers / protein by spectroscopic methods

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An aptamer is a relatively short monobrin nucleic acid structure (15 to 100 bases) having excellent affinity and specificity for various targets: peptides, proteins, hapten, etc. This property is mainly due to their particular structural characteristics, involving conformation changes in space. This structural change can lead to the formation of double helices of variable length via the matching of complementary regions. In our study we used an aptamer with a thymine spacer arm (T) and another aptamer without the thymine spacer arm (T) to compare their interaction with the target MnSOD, a biomarker of liver cancer. This interaction was characterized with different techniques such as extinction spectroscopy, PM-IRRAS and Raman spectroscopy. For this study, the aptamers are grafted onto gold nanoparticles to be able to observe the surface plasmon shifts and record the SERS during the interaction. The results show an interaction between the aptamer and MnSOD with a conformational change of the aptamer.

Figure1: UV-Visible results of grafting the aptamer with T (a) by corbodiimide bonding and (b) thiol bonding (c) characterization of aptamer with Raman spectroscopy

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