



***Ph.D. School in Chemical Sciences
Cycle XXXVIII***

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Research project title: Exploring multivalency effects in G-quadruplex forming aptamers for diagnostics and theranostics

Key words: Oligonucleotide aptamers; G-quadruplex; Multivalency; Molecular and conformational characterization; Theranostics

Research project abstract: Multivalency is a key principle in nature to establish strong, but reversible interactions between e.g. a receptor and a ligand, a virus and a host cell, or two cells, starting from multiple low affinity interactions which act synergistically, thus leading to robust, high affinity binding events. With this PhD project we intend to construct mini-libraries of multivalent aptamers based on G-quadruplex-forming oligonucleotides specific for cancer-related proteins, varying: 1) the nature and number of the aptamers; 2) the scaffold on which the aptamers are immobilized; 3) the nature of the linkers anchoring the aptamers onto the central scaffold. Evaluation of the synthesized multivalent aptamers through chemical, biophysical and biochemical experiments will allow identifying the best candidates, which will be finally tested in their bioactivity. Optimization of the best systems will provide effective tools for cancer diagnostics and therapy, also in a combined approach (theranostics)