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Supervisors: Valeria Di Bussolo; Sebastiano Di Pietro **Ph.D. project Title:** Stereoselective synthesis of glycans and glycoconjugates for chemical and biological application

Research summary: Tumors have several metabolic disregulation, but the best known, and probably the most central to their proliferation, is the Warburg effect. The unusually high rate of glycolysis that results in an increased uptake of D-Glucose can be exploited through glycoconjugation in the attempt to early detect, to monitor, or to treat pathologies that are still an unmet medical need. The main project of my PhD work is to synthesize and characterize new glycoconjugated lanthanide-based probes with potential diagnostic application. The unique photophysical properties of lanthanides ions in complexes, in particular their long-lived photoluminescence, make them versatile molecular probes with respect to common organic fluorophores, allowing the use of time resolved detection setup, a definitive asset for bioassays and luminescence microscopy. The first generation of glycoconjugated lanthanide-based complexes will exploit known coordination motifs, such as azamacrocycles bearing polyconjugated antennae, to assure both a good stability and excellent sensitization of the metal ion. Particular attention will be paid to the stereocontrol of the glycosylation process.

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