Synthesis and characterization of new fluorophore and radiometal-labeled vectors for the validation of new diagnostic and therapeutic targets in oncology

Molecular imaging techniques are increasingly being used in the localization and staging of disease, as well as for therapy control. The most sensitive imaging methods are those using nuclear probes for single photon emission computed tomography (SPECT) and positron emission tomography (PET). Over the past years, a variety of imaging probes have been developed for different molecular targets. Radiolabeled probes (especially peptides but also antibody-derived fragments) are gaining more and more interest as invaluable tools in both preclinical and clinical setting for the discovery and validation of new oncology and immune-oncology molecular targets, as well as to deep investigate their role in cancer development, progression and response to therapy. Specifically, Prof. Antonio Rosato's team is working on the design and development of both metal-essential and peptide-based (radio)probes for the identification and evaluation of new molecular targets. The research is focused on the validation of the follicle-stimulating hormone receptor (FSHR) as a new pan target in primary and metastatic solid cancers, by using fluorophore and Technetium-99m-labelled FSH-derived peptides. FSHR is normally expressed by the gonads, and overexpressed by ovarian and prostate cancers. Recently, some authors suggested that FSHR expression is not limited to gonadal tumors, since soft tissue sarcomas, pituitary adenomas, thyroid, adrenal and neuroendocrine tumors are FSHR+. Thus, there is an urgent need in understanding the real FSHR expression in cancer, and its role in tumor development. Additionally, FSHR is expressed by the endothelial cells of tumor blood vessels (TBV) of primary and metastatic solid tumors, suggesting its involvement in tumor angiogenesis and metastasis. Overall, FSHR represents an invaluable opportunity for early cancer diagnosis and therapy. In spite of this, the research is currently at a preliminary stage. Thus, further studies are imperatively needed to both investigate FSHR role in cancer and the unique potential of FSHR-targeting.