

Wednesday, 20<sup>th</sup> March, 12.00 pm, Seminar Room

Host: Prof. Luis Liz Marzán

## **Dark matter and liquid biopsies: Molecular Oncology research in Biodonostia**

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The central dogma of biology first postulated in 1958 by Francis Crick states that 'Biological information flows unidirectionally from DNA to RNA to protein'. However as protein coding RNA only accounts for ~1% of the transcribed contents of eukaryotic cells, the implication was that the remaining 99% of RNA was junk. This belief was widely held until 2001 when it was discovered that short functional non-coding (nc)RNA sequences called microRNAs (miRNAs), were found to be prevalent and highly conserved in eukaryotic genomes. It soon became apparent that miRNAs were key regulators of many cellular processes, and most importantly are aberrantly expressed in cancer and other diseases. In the short period from their discovery, the study of miRNAs have exploded onto the biological scene with nearly 100K published articles, of which nearly half of relate to cancer.

A particularly attractive feature of miRNAs compared to protein encoding mRNA that has endeared them to biomedical study is their inherent stability which means they can be robustly measured in routinely prepared paraffin-embedded biopsy samples. A further manifestation of this stability is their detection in biological fluids most notably blood leading to miRNAs being championed as non-invasive biomarkers of cancer, so called liquid biopsies. Liquid biopsies represent a paradigm change in cancer patient management as for the first time they allow the monitorisation of patient response to treatment and disease progression, a cornerstone of personalised medicine and improved patient outcome.

During this seminar I will describe some of the studies that we have carried out, firstly in Oxford, and more recently in the Molecular Oncology group of Biodonostia, starting with early descriptions of miRNAs as biomarkers and key regulators of lymphoma, to other cancer types, and more recently to on-going projects that move beyond miRNAs to explore the complete circulating transcriptome of cancer patients, and the potential of other ncRNA classes (also called the dark matter of the genome) to serve as non-invasive biomarkers.