Semen miRNAs could be non-invasive biomarkers for prostate cancer

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Drs. Vigues, Larriba, and Castells. Credit: IDIBELL

Researchers of the Human Molecular Genetics group at the Bellvitge Biomedical Research Institute (IDIBELL), led by Dr. Sara Larriba, in collaboration with Dr. Francesc Vigués and Dr. Manel Castells of the Urology Service of Bellvitge University Hospital (HUB), show the usefulness of certain molecules—miRNAs in semen—as non-invasive biomarkers for prostate cancer. The results of this study were protected by a patent and are published in *Scientific Reports* this week.

Semen could be considered a liquid biopsy of the organs of male reproductive system and specifically of prostate gland: approximately 40% of semen is derived from prostatic tissue, so that its contents are most likely to contain prostate disease-specific derived molecules. Dr. Larriba's research group, which focuses on the "Molecular Genetics of Male Infertility and Urogenital Cancer" research line, has determined that the quantification of certain molecules of ribonucleic acid, known as miRNAs, contained in extracellular vesicles from seminal plasma might be clinically useful as non-invasive biomarkers for prostate cancer.

"Our study shows semen exosome miRNA-based models as molecular biomarkers with the potential to improve prostate cancer diagnosis/prognosis efficiency. These miRNA-based tests should provide reliable information that will help physicians to take clinical decisions as well save unnecessary invasive biopsies to the patients, improving the efficiency of detection of prostate cancer and patient outcome," Dr. Larriba explains.

Prostate cancer is the most prevalent type of malignant male cancer in Western countries. A significant decrease in deaths due to prostate cancer has been associated with the use of the PSA screening test. However, the deficiencies of serum PSA as a biomarker are well documented: "In many cases, having elevated PSA levels does not mean having prostate cancer. Thus, PSA screening has resulted in an over-diagnosis of prostate cancer, and in many unnecessary biopsies of benign disease, Dr. Vigués explains. "Additionally, serum PSA levels do not correlate with tumor aggressiveness, survival, or response to pharmacological treatments leading to over-treatment of indolent tumors. Given this context, more accurate non-invasive biomarkers for prostate cancer with diagnostic and prognostic purposes would be very welcomed indeed, Dr. Castells adds.

"Our aim is to offer our results to the clinics as a diagnostic test. In that

respect, as our next step, we should carry out further prospective studies on larger cohorts of patients before this miRNA-based biomarker could be adopted in the daily clinical practice," Larriba concludes.

More information: Maria Barceló et al, Semen miRNAs Contained in Exosomes as Non-Invasive Biomarkers for Prostate Cancer Diagnosis, *Scientific Reports* (2019). DOI: 10.1038/s41598-019-50172-6

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