The scope of the research carried out by our Group ranges from the identification of aetiological agents and mechanisms, to the translation of the findings into the clinical and Public Health domains, focusing on bladder, pancreatic, and breast cancers. We employ a wide variety of biomarkers to better characterise exposures, genetic susceptibility patterns, and cancer outcomes. Omics data provide a unique opportunity in this regard and the Group explores its integration in epidemiologic studies.

The strategic goals of the Group are to:

- Identify non-genetic and genetic factors, as well as their interactions, associated with cancer development and progression and with its molecular/omics subphenotypes.
- Develop and apply statistical/informatics tools to model the risk and course of patients with cancer by integrating epidemiological and clinical data with omics information.
- Assess clinical and public health strategies for cancer control using current genomic tests and data.

“The Integration of omics and non-omics data in the same risk models poses several challenges and demands appropriate analytical strategies. We are contributing to this field towards the personalised prevention of cancer.”
RESEARCH HIGHLIGHTS

Research findings
In 2019, the Group focused its research on pancreatic and bladder cancers. Regarding pancreatic cancer (PC), we progressed in the characterisation of pancreatic cancer risk factors by investigating the common genetic background of PC and autoimmune diseases through a computational approach, and further evaluated the less explored association between PC and autoimmune diseases (AIDs) through an epidemiological analysis. Finally, we contributed to the discovery and validation of both urinary- and tumour-predictive and prognostic markers in large Spanish and European studies of both non-muscle and muscle invasive BC.

Methodological contributions
The Group continues to explore analytic strategies and tools to integrate both omics and non-omics (Ono) data. In this regard, we reported that the efforts to integrate Ono data are scarce, having been done mainly in the epidemiologic field. We identified and listed the challenges in Ono data integration and proposed integrative analytical strategies towards its integration (FIGURE 2).

Translational activities
The Group actively provides methodological support to several clinical trials on immunotherapy and vitamin D in BC. We continue to sustain the Spanish Familial PC Registry (PanGen-FAM) and the European Registry of PC (PanFebr). We also lead the Research Work Stream of the Pancreatic Cancer Europe (EPC) multistakeholder platform. By joining efforts and participating in the European Alliance of Personalized Medicine Annual Meeting, we also made advances in increasing awareness of PC among health policy makers and in discussing the urgent need to invest in PC research.

FIGURE 1

FIGURE 2
Challenges found in the integration of omics and non-omics (Ono) data and analytical designs for building hybrid models containing Ono data.


AWARDS AND RECOGNITION
Stand Up To Cancer (SU2C)/Ludwig Foundation – Pancreatic Cancer Collective Grant, $1 million over 2 years (2017-2019), awarded to María Malats and Rafael Rabadán (Columbia University, USA), identification of Genomic and Immune Factors in High-Risk Populations for Pancreatic Cancer.
External Scientific Advisor of the ASCO funded GENRIL (Genetic and Molecular Epidemiology) and metabolomics screening: towards precision medicine in cancer prevention.
Scientific External Advisor of the H2020-funded VISION Project.