PRESS RELEASE

A new study sheds further light on vulnerabilities in aggressive breast cancer

Triple negative breast cancer is characterised by a lack of markers indicating the most effective treatment strategies

A study led by the group of Dr. Arkaitz Carracedo in CIC bioGUNE identifies a protein which could be the subject of new treatments

Research findings have been published in the prestigious journal *Nature Communications*. The study was mostly funded by social donations through the FERO Foundation and the Provincial Executive of the AECC in Bizkaia

(Bilbao, 24 August 2016). Triple-negative breast cancer, the most aggressive type of breast cancer for which no highly-effective treatment has been found to date, has been the subject of a study conducted by the group of researchers led by Dr. Arkaitz Carracedo from CIC bioGUNE (Bizkaia), the findings from which were recently published in the prestigious journal *Nature Communications*. According to the study, "the cancer cells require the PML protein to maintain their malignant properties", thereby opening up possibilities for new protein-inhibiting therapies.

Breast cancer is an example of the highly complex nature of this disease. In reality, the term "breast cancer" encompasses between 4 and 10 different diseases with different prognoses and response to treatment. The most widely accepted classification on an international scale divides breast cancer into different groups: those which express female hormone receptors (hormone-dependent), those which reveal exacerbated levels of the HER2 receptor and, finally, those without any of these markers and known as triple negative. The existence of specific treatments which largely eliminate anti-hormonal or HER2-inhibiting tumour cells means the first two groups have a good prognosis, but the third group, classified as triple negative, still represents a serious health problem. As Dr. Carracedo of CIC bioGUNE explains, "this type of cancer is highly aggressive and has no defined markers or highly effective (in terms of disease curing) targeted therapies.

Published this week in the prestigious journal *Nature Communications*, the study, which was led by Dr. Carracedo and mostly conducted by Drs. Natalia Martín and Marco Piva, is the result of a strategic collaboration between different national (in Bilbao, San Sebastián and Barcelona) and international (France, U.K. and U.S.A.) research centres. In the course of their work, the research team identified PML protein potentiality in order to select triple-negative breast cancer patients who could potentially benefit from a new therapeutic strategy. Carracedo adds: "We have seen that PML expression is greater in breast cancer tumours with a high metastatic capacity, and that these same

cancer cells require PML to maintain that malignant property. Therefore, we propose that selecting patients on the basis of PML expression in the tumour could enable a new therapy focused on protein inhibition to be developed". According to this study, the PML protein regulates the properties of breast cancer stem cells, or, in the words of the CIC bioGUNE researcher, "those cells which are highly resistant to therapy and have a high capacity for tumour formation and metastasis. This is an ideal strategy in the context of precision medicine, the idea of which is to select the most effective treatments on the basis of the molecular characteristics of the cancer in each patient", Carracedo concludes.

"This paper is the result of 5 years of research, in the course of which national researchers have been recruited from abroad and new scientists have been trained", Carracedo points out. "What we're most proud of is that this is the result of research which has been funded socially, as most of the finance for the project has come from individual donations that have paid for the salary of one researcher and the cost of most of the experiments". In this sense, and within a context of continuing reduction in investment in R&D+i, those responsible for the study are quick to point out that many research projects are driven by funding from not-for-profit associations and foundations such as AECC (Spanish Association Against Cancer) and the FERO (Cancer Research) Foundation, a lifeline of hope for many young scientists in terms of being able to continue in their career as researchers. "We are extremely grateful to the Provincial Executive of the AECC in Bizkaia and the FERO Foundation for making this possible", Carracedo emphasizes. "Every euro contributed by each and every donor has not only made it possible for a young researcher to take forward a significant project in the field of oncology but also for us to take another step forward in increasing our understanding of the vulnerabilities of a common enemy; breast cancer".

About CIC bioGUNE

The Centre for Cooperative Research in Biosciences (CIC bioGUNE), located in the Bizkaia Technology Park, is a biomedical research organisation conducting cutting-edge research at the interface between structural, molecular and cell biology, with a particular focus on the study of the molecular bases of disease, for use in the development of new diagnostic methods and advanced therapies.