PRESS RELEASE

CIC bioGUNE inaugurates a Nuclear Magnetic Resonance spectrometer for the study of metabolic diseases

The innovative equipment has been acquired with financial support from the Department of Territorial and Economic Development of the Bizkaia Provincial Government

Amongst other things, the equipment will be used to determine biomarkers for prostate cancer and to identify congenital pathologies in newborns

(Bilbao, 29 June 2016). The inauguration of an innovative 600 MHz Nuclear Magnetic Resonance (NMR) spectrometer in the facilities of CIC bioGUNE is a further boost to the commitment of this research centre to investigation into metabolic diseases. The new equipment is specially designed for analysis of biofluids – more specifically, urine and serum – and will be used, amongst other things, to determine biomarkers of prostate cancer and of metabolic syndrome, to determine metabolic health in adults and to identify congenital pathologies in newborns.

The acquisition of the spectrometer has been part funded by the Department of Territorial and Economic Development of the Bizkaia Provincial Government, alongside Bruker Biospin and CIC bioGUNE.

A delegation from Bruker, the equipment manufacturer, was present at the inauguration ceremony, thereby consolidating their strategic collaboration with CIC bioGUNE. The delegation was led by Iris Mangelschots, President of Bruker BioSpin's Applied, Industrial and Clinical Division; Thorsten Thiele, Director of Marketing Communications at Bruker Corporation; and Víctor G. Pidal, President of Bruker Española S.A., and was received by Jesús Jiménez-Barbero and José María Mato, Scientific Director and General Director of CIC bioGUNE, respectively.

The analysis of body fluids such as urine is essential in the study of metabolism-related diseases and a key source of information to determine their causes and possible clinical treatments. High resolution NMR spectroscopy is highly effective in metabolomics, the scientific study of chemical processes involving metabolites (substances produced during metabolism). NMR is an essential tool for metabolomic analysis of all types of biofluids, providing comprehensive information on metabolites and their relation with different pathologies.

The new Avance III 600 MHz NMR spectrometer will be used to analyse urine samples from patients with prostate cancer to find markers carrying information on the progression of the disease. Serum and urine samples taken from people with metabolic syndrome and at risk of cardiovascular disease will also be analysed. CIC bioGUNE will use the new equipment to compile serum and urine samples from a significant number of people from the Basque Country, with a view to analysing a collection of

100 to 150 metabolites mostly belonging to the primary metabolism. The study of these samples will contribute to determining the metabolic health of the adult population in the Basque Country.

Another area of research which will benefit from the new equipment is the identification of congenital pathologies in newborns. Scientists at CIC bioGUNE will investigate the use of NMR to analyse urine from newborn infants for metabolic evidence derived from a series of congenital diseases. In collaboration with the four hospitals in the Basque Country equipped with neonatal units, a complete metabolic profile of newborns in the Basque Country is being drawn up with the ultimate aim of identifying quantitative variations in metabolites that may be used as an accessory tool in the diagnosis of rare congenital diseases.

State-of-the-art NMR technology

The spectrometer unveiled today is equipped with state-of-the-art NMR technology and fitted with SampleJet, a multi-jet sample automation system allowing samples to be kept refrigerated prior to their use in the equipment. This technology complies with all protocols for metabolic analysis of urine and serum established by Bruker itself and by an international consortium led by Imperial College, a prestigious British university specialised in medicine, science and engineering.

Nuclear Magnetic Resonance is a physical phenomenon based on the quantum mechanical properties of the central core (the nucleus) of atoms. These properties enable the structure of matter to be analysed on a sub-molecular level. The equipment acquired by CIC bioGUNE is focused on the structural analysis of molecules (NMR spectroscopy). Other applications of NMR include the study of tissues and complete organisms (magnetic resonance imaging) and analysis of the structure and interaction patterns of the molecules of life (biomolecular NMR).

Metabolomics Platform

One of the studies conducted by the CIC bioGUNE Metabolomics Platform has been to analyse serum samples taken from people with liver fibrosis. Findings from this study have enabled a protocol to be drawn up for separation of stages 1 to 4 of liver fibrosis. This research has also identified metabolites that may be markers of fibrotic progression.

CIC bioGUNE, leading-edge research into cell biology

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.