CIC bioGUNE
Biozientzietako Ikerkuntza Kooperatiboko Zentroa
Centro de Investigación Cooperativa en Biociencias

PRESS RELEASE

Harvard University and the Pasteur Institute will use CIC bioGUNE technology for the research of cancer and neurodegenerative diseases

(Bilbao, 17th May 2010).- Several international scientific institutions of wide renown, such as Harvard University and Pasteur Institute have signed collaboration agreements with the Centre for Co-operative Research in Biosciences, CIC bioGUNE. Thanks to this agreement, they will be able to use pioneering technology (TUBEs) that has been entirely developed in the Basque centre. This technology allows identifying possible therapeutic targets for such pathologies as cancer and neurodegenerative diseases.

The basis of the personalised medicine lies in offering an adequate therapy to a patient, that is to say, a therapy that corresponds to the pathology that affects each person. In spite of the fact that an external manifestation of one disease can be very similar to another, the molecular origin can be completely different. Accumulating a certain type of molecule can have catastrophic consequences for the cell and disturb its function. It can also cause the cell to multiply anarchically or even kill it. This is the case in cancer and neurodegenerative diseases.

The team of Dr. Manuel S. Rodriguez in CIC bioGUNE Proteomics Unit developed a system called TUBEs (Tandem-repeated Ubiquitin Binding Entities). The system captures the molecules that are involved in the degradation of proteins (ubiquitin traps). This system allows identification of the possible therapeutic targets for numerous pathologies, where protein destruction plays an important role.

Similarly, CIC bioGUNE signed, last year, an agreement with the American company Life-Sensors for the commercialisation of this technology, which is now being purchased by widely known scientific institutions, such as Harvard University or Pasteur Institute and other universities (Heidelberg, Nottingham, Coimbra). These institutions are interested in decoding molecular mechanisms which control various pathologies.

The frenetic search for specific treatment for these pathologies has become very intense. Even if results may take a few years to see the light, the first fruits of the work can already be seen; that is to say, some medicines have been developed, for instance, Bortezomib, to be used by the patients who suffer from so far incurable diseases (multiple myeloma, mantle cell lymphoma, etc.).

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PRESS RELEASE

- **TUBEs**

TUBEs (Tandem-repeated Ubiquitin Binding Entities) is a pioneering tool which captures and "freezes" the ubiquitin proteins (proteins whose main function is to label other proteins to destroy them), so that afterwards, target proteins can be identified for therapy.

In short, it is a "molecular trap", so that through capturing and purifying the proteins involved in a disease, we can achieve a better understanding of how they work in essential cell processes.

Dr. Manuel Rodríguez explains that "this tool is useful not only for learning about cellular processes, but also for searching for drugs which have beneficial effects with such pathologies as immune and inflammatory diseases, neurodegenerative diseases and various types of cancer".

The research project is based on a degradation path of the ubiquitin-proteasome proteins, which were discovered by the Israeli scientist Aaron Ciechanover, winner of the Nobel Prize in Chemistry in 2004.

According to Manuel Rodríguez, "this path is involved in numerous processes vital for the functioning of cells", which are complex to understand. "What we do not know is how these processes are regulated, because they are highly dynamic and reversible."We made up this 'trap' of ubiquitin, to understand better how these processes are regulated in their normal and pathological state and then identify targets of therapeutic interest", explains Rodriguez.

Ubiquitin is a small protein which is present naturally in eukariotic cells. The main function of ubiquitin is to label other proteins which are to be destroyed in a process known as proteolysis. Some ubiquitin molecules anchor themselves to the protein that is going to be eliminated and the protein moves towards the proteasome, that is to say, the structure where the proteolysis process is carried out. Ubiquitin can even label the membrane proteins of the cell, for instance receptors, in order to eliminate them from the membrane.

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