

New molecular imaging technologies for detecting cellular processes

January 11 2011



The final scanner is installed at the Carlos III university of Madrid laboratories. Established by SEDECAL. Credit: Carlos III university of Madrid

A group of Spanish researchers at Universidad Carlos III de Madrid have designed and developed a biomedical scanner that detects cellular processes at the molecular level and indicates malfunctioning of an organ before said malfunction can produce an anatomical change.

The work carried out by these scientists has ranged from the initial design of an electronic architecture for gamma ray detectors to industry transfer of a complete [scanner](#), after having adequately validated a prototype through experimental studies at the Gregorio Marañón Hospital. The results of this research, headed by professors Juan José

Vaquero and Manuel Desco, from the Department of de Bioengineering and Aerospace Engineering at UC3M, have been recently published in the journals *IEEE Transactions on Nuclear Science* (two articles) and *Physics in Medicine and Biology* (one article).

The electronic technology equipment designed by the researchers- which is in patent process-is based on molecular imaging, a type of biomedical imaging capable of detecting live [cellular processes](#). "These techniques differ from conventional medical imaging in that the information they show is function not form, which means that they are capable of showing the malfunctioning of an organ before the malfunction turns into an anatomical change", Juan José Vaquero explained. "In other words", he added, "they allow for earlier detection of a possible anomaly, which enormously facilitates treatment". In addition to making an earlier diagnosis possible these types of scanners are used in biomedical research and in pharmaceutical laboratories, for example, to speed up the development of new medicines

The growth of molecular imaging in recent years, according to experts, is chiefly due to the narrowing of the gap between molecular biology and imaging technologies, and it is expected that an acceleration of the transfer of these techniques to clinical practice will be produced. In fact, some of the characteristics of molecular imaging itself are already present in techniques for clinical use in humans such as nuclear medicine imaging or magnetic resonance imaging. "Computerized tomography by a sole photon emission, better known by its Anglo-Saxon acronym SPECT, is probably the most widespread molecular imaging technique in clinical practice, and from there stems the interest in having preclinical systems which allow the study of human illnesses to be carried out on animals", Professor Manuel Desco pointed out.

The Department of Bioengineering and Aerospace Engineering at UC3M focuses on the development of preclinical molecular imaging

scanners used in research work on animals. Obtaining good quality in these applications constitutes a much more difficult technical challenge than with humans, due to the large difference in size (with animals being approximately 280 times smaller). The research group has completed the development of SPECT type of system for laboratory animals at University installation, which has features placing it among the top on an international scale in terms of facilities and cost.

This UC3M research group, in addition to carrying out research which leads to scientific publications, focuses a large part of its interest on technology transfer so that it can be commercialized. The company, SEDECAL, the largest domestic manufacturer and exporter of electro-medical imaging equipment, is going to commercialize the system in the immediate future. The research team from this Madrid public university continues to work on new developments in the area of technology, in close contact with national industry. Part of the developments are under the framework of the AMIT (Advanced [Molecular Imaging Technologies](#)) Project from the most recent CENIT public funding, whose scientific coordination oversees this equipment at the UC3M.

Provided by Carlos III University of Madrid

Citation: New molecular imaging technologies for detecting cellular processes (2011, January 11) retrieved 1 May 2024 from <https://phys.org/news/2011-01-molecular-imaging-technologies-cellular.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.