



European Research Council

Established by the European Commission

Press release

28 October 2012

EU-funded researchers develop cheaper and more sensitive HIV detection test

Two EU-funded scientists from Imperial College London (UK), Prof Molly Stevens and Dr Roberto de la Rica, have successfully tested a pioneering HIV detection technique that is ten times more sensitive than any identification method used to date. The new methodology, which also offers a much simpler and cheaper naked eye based read-out could be commercialised in the near future and would allow much earlier diagnosis of the disease. The results of the project are published today in *Nature Nanotechnology*.

The new tests, provided that they are clinically validated, will be of help in laboratories with fewer resources. It would not be necessary to conduct numerical analysis to count number of virus per collected blood sample millilitre, to conclude that one is before a new case of HIV. A mere colour change in the analysed samples, generated by the growth of gold nanoparticles which are extremely tiny objects and recognisable to the human eye, would be enough to confirm or discard infections.

Prof Molly Stevens and Dr Roberto de la Rica looked for an HIV protein (a molecule named *antigen p24*) which had been previously used to detect HIV in newborns with a relative degree of success. Their new results are radically different with the nanotechnology techniques they have developed and applied in their recent tests. Scientists detected HIV in 10 patients that would not have been identified as virus carriers on the basis of conventional techniques.

“Using current technology to look for early signs of a virus or a disease can be like finding the proverbial needle in a haystack” said Prof Molly Stevens, who is supported by a European Research Council Starting Grant of € 1.6 million for five years. *“Our new detection system, is highly innovative; it is not only an affordable methodology that will greatly improve the standard of living of patients with HIV infection in low income countries but as it is also more sensitive than any existing conventional test, it will also enable the ultrasensitive detection of disease biomarkers, i.e. biological indicators of disease, with the naked eye”* she added.

According to Prof Stevens' post-doctoral research assistant, Dr Roberto de la Rica, who is supported by a €212,000 Intra-European fellowship from the Marie Curie Actions, another EU research grant scheme, the breakthrough is remarkable. *“We have abandoned principles within the existing methodological framework to propose a radically new line of investigation. The test will allow us to detect HIV infection in patients that were previously undetectable, and costs will be significantly cheaper.”*

The study was conducted on the basis of 30 blood samples donated by the St Mary's Hospital based in London. The first 10 were from healthy patients while 10 others were from



European Research Council

Established by the European Commission

HIV-infected patients with high viral concentration levels in their blood. The remaining 10 were provided by HIV carriers with an extremely low viral charge – all cases were detectable with the new technique.

Further research would need to be done before any commercialisation of the tests but the scientists hope they could translate the research to clinical and point of care use in the near future, provided that they get the necessary funding.

Background information:

This new study builds upon the results of a previous research on prostate cancer, carried out by Molly Stevens and Roberto de la Rica in collaboration with Luis Liz-Marzán and Laura Rodríguez, two scientists from the University of Vigo (Spain) earlier this year. Their work is now expected to lead to the development of super-sensitive tests for earlier detection of prostate cancer.

[Prof Molly Stevens](#) is a 38 year-old Professor of Biomedical Materials and Regenerative Medicine and the Research Director for Biomedical Material Sciences in the Institute of Biomedical Engineering at Imperial College. In addition to her ERC Starting Grant, she has received numerous awards including the Polymer International-IUPAC award for creativity in polymer science, the Rosenhain medal and the Norman Heatley Prize for Interdisciplinary Research from the Royal Society of Chemistry, the Jean Leray Award from the European Society for Biomaterials and the 2012 EU40 award from the European Materials Research Society for top materials scientist in Europe under the age of 40. She has also been recognised by Technology Review's TR100 as one of the young researchers most likely to change the world (read more [here](#)). Set up in 2007 by the European Union, the European Research Council aims to stimulate scientific excellence by encouraging competition for funding between the very best, creative researchers of any nationality, any field of research and of any age, based in or moving to Europe. Since its launch, it has funded over 3,000 researchers.

Dr Roberto de la Rica is a 34 year-old Spanish expert in Bionanotechnology with post-doctoral experience in world-class institutions such as Hunter College at the City University of New York and the MESA + Institute for Nanotechnology of the University of Twente, in the Netherlands. The grant he is benefiting from is covered by the [Marie Curie Actions](#).

Last year, the European Commission proposed a substantial increase of the funding of the ERC budget from €7.5 billion for 2007-2013 to €13 billion for 2014-2020 under the new framework programme ('Horizon 2020'), as well as an increase of the renamed Marie Skłodowska-Curie Actions to €5.75 billion.

About Imperial College London

Consistently rated amongst the world's best universities, Imperial College London is a science-based institution with a reputation for excellence in teaching and research that attracts 14,000 students and 6,000 staff of the highest international quality. Innovative research at the College explores the interface between science, medicine, engineering and business, delivering practical solutions that improve quality of life and the environment - underpinned by a dynamic enterprise culture.



European Research Council

Established by the European Commission

Since its foundation in 1907, Imperial's contributions to society have included the discovery of penicillin, the development of holography and the foundations of fibre optics. This commitment to the application of research for the benefit of all continues today, with current focuses including interdisciplinary collaborations to improve global health, tackle climate change, develop sustainable sources of energy and address security challenges.

In 2007, Imperial College London and Imperial College Healthcare NHS Trust formed the UK's first Academic Health Science Centre. This unique partnership aims to improve the quality of life of patients and populations by taking new discoveries and translating them into new therapies as quickly as possible.

Links

Nature Nanotechnology article:

<http://www.nature.com/nnano/journal/vaop/ncurrent/full/nnano.2012.168.html>

Nature Materials article: <http://www.nature.com/nmat/journal/v11/n7/full/nmat3337.html>

ERC website: <http://erc.europa.eu>

MCA website: <http://ec.europa.eu/research/mariecurieactions/>

Imperial College London: www.imperial.ac.uk

ERC Press Contacts:

Maud Scelo (Communication advisor)

Tel: +32 (0)2 298 15 21

erc-press@ec.europa.eu

Madeleine Drielsma (Communication advisor)

Tel: + 32 (0)2 298 76 31

erc-press@ec.europa.eu