

A good year for Spanish science

WORDS MICHEL CRUZ

It may come as a bit of a surprise to many until they have actually used it, but the Spanish health system is surprisingly good. We say this with all due respect for both Spain and the general ignorance of many a foreigner, but for all the enthusiastic exclamations about this country and its many attributes, it is still seldom seen as a technological powerhouse.



UPDATE

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The fact that Spain is currently at the forefront of medical research and playing a leading role in some of the most exciting medical breakthroughs in recent years will therefore also come as something of a surprise to those of us more accustomed to hearing about American, Japanese or Northern European prowess in this field.

All the same, Spanish doctors and scientists are currently forging ahead in the search for cures for such global diseases as malaria and AIDS, as well as making important discoveries about the detailed functioning of the human body. These are therefore good times for Spanish technology – a coming of age for the country's scientific community that seems set to produce a new wave of Severo Ochoas and Santiago Ramón y Cajals.

OVERCOMING AIDS



Professor Mariano Esteban of CSIC in Madrid



CSIC laboratory



Research detail

Emerging at the beginning of the eighties, AIDS was the new dreaded disease of the modern era, a sexually transmitted virus that depleted the body's immunity until even a common cold became deadly. By the turn of the century, drugs had been developed that contained HIV and stopped it from developing into full-blown AIDS. As long as it is detected soon enough, patients can live a full life, though they remain dependent upon costly medicine for the rest of their lives.

That is, until a new breakthrough was announced that promises to be the AIDS vaccine the world has been hoping for. In trials conducted with human subjects, 92 per cent of the participants developed an immune response to HIV after receiving the MVA-B vaccine, sparking hopes that this is the vaccine that will produce the immunity to fight back not just against the spread of AIDS but also to kill HIV itself. Trials are continuing, but this could be the long-awaited moment that we overcome the dreaded disease.

A salient fact in all of this is that the MVA-B vaccine, which promises so much, was developed

at the Spanish National Research Council (CSIC) in Madrid. The leader of the project, Professor Mariano Esteban, is surprisingly humble about his team's momentous achievement, explaining it almost in terms of a complicated puzzle that needed solving: "The MVA-B jab contains four HIV genes that stimulate the production of T and B lymphocytes."

Our body is full of this type of white blood cell, each of which is designed to fight different infectious germs, but the problem is that natural lymphocytes do not recognise the HIV one, so they don't know how to fight it. What the new vaccine does is 'inform' the lymphocytes about the HIV pathogen so that they begin to recognise and destroy it as they would any other disease. This allows the body to fight the virus and overcome it. Professor Esteban emphasises that the trials are still at too early a stage to cry victory, but the international press has already hailed it as potentially one of the most important medical breakthroughs in years.

www.csic.es

Hot on the heels of this Spanish success comes another, the news that researchers are hopeful of having found a way of pushing that age-old tropical tormentor, malaria, off the map. British medical journal, *The Lancet*, reported in January that the trials of a new malaria vaccine developed in Barcelona are producing fantastic results.

The vaccine, known as RTS-S and produced under the GlaxoSmithKline banner, was developed by a Spanish team of researchers led by Dr. Pedro Alonso, Director of the Barcelona Centre for International Health Research (CRESIB). After many unsuccessful attempts in the past at creating an effective drug capable of combating this devastating tropical disease, it seems this Spanish team are about to crack it.

Trials on infants under the age of one in Mozambique have proved overwhelmingly positive, with the majority shown to be resistant to the mosquito-borne disease after receiving the jab. Although, here too, more testing and further development are required before any major claims of success can be made official, this is the greatest breakthrough against malaria in years, sparking so much excitement exactly because it focuses on the most vulnerable age group of all. If the promised new malaria vaccine can indeed protect young children from malaria, it will be able to save countless newborn babies in the tropics every year. 🌐 www.isglobal.org

DEFEATING MALARIA

Exploring
the human
microbiome



Dr. Francisco Guarner and his research team © Unitat de Comunicació i Imatge Vall d'Hebron Research

Rated one of the great science breakthroughs of 2011, the exploration of the human microbiome by research teams led in Spain by Dr. Francisco Guarner made some unexpected discoveries. In studying the internal microbial communities of the human body, and more specifically the intestine, they managed to disprove the earlier assumption that we all share a rather random selection of said bacteria types.

Instead, they found that just as people belong to a range of different blood types, so there are three distinct combinations of gut bacteria that occur in different individuals, splitting the world's population into three groups when analysed on this basis. The great Spanish contribution to this European-wide research project led by MetaHit was the development of the technology required for this groundbreaking in-depth research.

Researchers at the Vall d'Hebron Research Institute (VHIR) were able to build and fine-tune the necessary equipment in collaboration with the Barcelona Supercomputing Center, which calibrated and analysed the data, effectively providing the means by which exploration and understanding of the human body can be taken to another, previously unattainable level. The scientific harvest of 2011 was therefore a very good one, with Spain making contributions that, if they make it through all the test stages, will have a major impact on a global scale. 🌐 www.vhir.org