EARLY, MORE ACCURATE DETECTION OF ALZHEIMER'S


FPM

The Fundació Pasqual Maragall (fpmaragall.org) research institute, the BarcelonaBeta Brain Research Centre (BBRC, www.barcelonabeta.org), has a new laboratory for the Fluid Biomarkers and Neurology research group. "It is a centre dedicated to translational research. We conduct basic and experimental research, always with the application for the patient in mind", explains Dr Marc Suárez-Calvet, head of the Fluid Biomarkers and Neurology research group at BBRC. His laboratory is developing blood markers to diagnose and find out more about Alzheimer's disease through a blood test, which would offer a more accurate diagnosis before symptoms appear: "Detecting Alzheimer's early and taking action with future experimental medications would be a significant step forward". Now, the discovery must be implemented in order to automate the process – which can currently only be carried out in certain research laboratories – and incorporate it into the patient care routine. Another of the laboratory's major projects consists of looking for factors that may have brain rejuvenation effects in the blood. According to Suárez-Calvet, this would be a therapeutic target for diseases related to ageing, Alzheimer's and other neurodegenerative diseases.

KNOWLEDGE TRANSFER

deepdetection

SPECTRAL IMAGES WITH X-RAYS FOR FOOD INSPECTION

July 2020 saw the creation of Deep Detection (deepdetection.tech), a spin-off organisation from the Institute of High Energy Physics (IFAE, ifae.es), which has put together a prototype for an X-ray inspection camera with algorithms patented worldwide. "We have incorporated technology previously developed at IFAE and we are improving it in order to fulfil the industry's needs", explains José Gabriel Macias, a doctor of Microelectronic Engineering and CTO of Deep Detection. For over two decades, the IFAE has been conducting research into high-density semiconductor detectors to detect photons and high-energy particles, which can be used as X-ray cameras for the food industry and medical imaging. Initially, Deep Detection focused on industry, creating industrial cameras that can analyse products' constitution, improve the detection of contaminants in prepared food products, and detect faults in raw materials. "With spectral images with X-rays, we can know how much meat and fat a tray of chicken breasts has and, at the same time, detect possible contaminants, bones and cartilage", the doctor states. In practice, this saves time and money, reduces the need for inspections, and allows for the recall of one particular defective product, rather than the whole batch. This technology is likely to be implemented in commercial industrial plants during 2023.

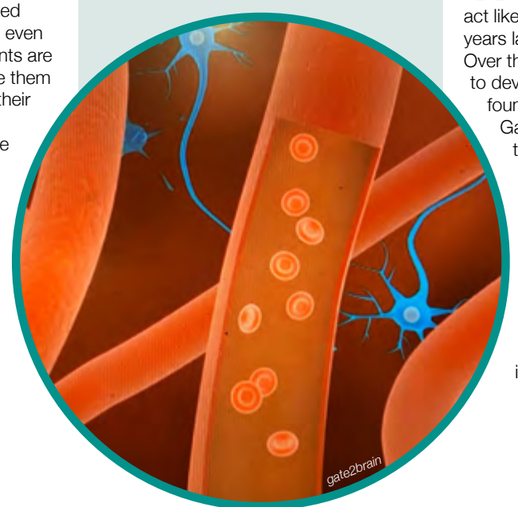

Biointaxis

GENE THERAPY FOR THE TREATMENT OF ATAXIAS

Biointaxis (www.biointaxis.com) is the biotechnology spin-off organisation from the Germans Trias i Pujol Health Science Research Institute (IGTP) and is developing a gene therapy for hereditary ataxias, which are the most common of the 200 different types in existence. In 1990, Dr Antoni Matilla, an IGTP researcher and founder of Biointaxis, started to investigate the origin of ataxias and their genetic causes. In 2014, he made a step towards finding a cure for Friederich's ataxia, the most common kind, with around 800 cases in Catalonia. In 2018, when a trial on mice worked, the spin-off organisation was created to apply the research results to patients. They are offered genetic testing, in order to find out where the problem lies, so that personalised solutions can be sought. Currently, less than 2% of people with ataxia can benefit from existing treatments. The scientists at Biointaxis, led by Dr Matilla, have developed a personalised gene therapy that can slow down or even stop the ataxia's progression. "Patients are missing a protein, which we can give them through a viral vector we insert into their cells so that they can produce the missing protein", Matilla explains. The drug's efficacy has already been demonstrated, so if the current trials demonstrate that it is not toxic, authorisation will be sought from the European Medicines Agency (EMA) and the U.S. Food and Drug Administration (FDA) to produce it and administer it to patients in a clinical phase.

CROSSING BIOLOGICAL BARRIERS TO OPTIMISE THE POTENTIAL OF DRUGS

The brain is the most protected organ in the body, to such an extent that 98% of drugs designed to treat it cannot reach it, and therefore do not work. Hence the need to develop technology able to cross existing barriers to the brain (the blood–brain barrier) so that drugs can get to it. For fifteen years, the basic research carried out at the Barcelona Institute of Biomedical Research (IRB) laboratory by doctor of Chemistry, Meritxell Teixidó, focused on peptides, which are very small proteins that act like a tractor with a trailer to bring drugs to the brain. From this research, three patents were filed, corresponding to three families of peptides, and technology to be applied in paediatric oncology started to be designed, in collaboration with Hospital Sant Joan de Déu (HSJD). "I wanted to have a positive impact on society and see how far this technology could go", says Teixidó, who is also an entrepreneur and co-founder of Gate2Brain. In 2020, Gate2Brain (gate2brain.com) was born as a spin-off from the IRB, the University of Barcelona and HSJD. This biotechnology company develops therapies to cross biological barriers. The goal is for the first clinical trial to be carried out in 2025 and for chemotherapy treatment to be made more effective, so that it reaches the brain more efficiently and causes fewer side effects thanks to this technology, which optimises the potential of drugs.


gate2brain


Oniria Therapeutics

OVERCOMING THE PERSISTENCE OF CANCER

Oniria Therapeutics (oniriatherapeutics.com) is a spin-off company from the Vall d'Hebron Institute of Oncology (VHIO), the University of Barcelona (UB) and the Catalan Institution for Research and Advanced Studies (ICREA), with support from Fundació 'la Caixa', the Spanish Association Against Cancer and the Carlos III Health Institute, created with a view to eliminating persistent cancer cells. Also known as dormant cells, these are the cause of 90% of deaths by cancer due to relapse or metastasis: "Standard treatments do not work on these cells because they do not divide, and chemotherapy only attacks cells that divide", explains Esther Riambau, CEO and co-founder of Oniria Therapeutics. Her fellow co-founders, Dr Héctor G. Palmer (head of the Stem Cells and Cancer group at VHIO and CSO at Oniria Therapeutics) and Dr Isabel Puig (senior researcher in the same group and scientific adviser on therapeutic targets at Oniria), have been conducting research into the these cells' weak points for fifteen years. Dr Puig discovered the fundamental role played by TET2 in the survival of these cells, which act like dormant seeds that can wake up years later, causing the tumour to reappear. Over the last five years, they have started to develop drugs, alongside the other co-founders, Dr Xavier Barril and Dr Carlos Galdeano, in order to modulate this therapeutic target: "We are working on two different strategies. One is not letting these cells reawaken and the other is not letting them go to sleep, so that standard treatments can kill them". The last member of the founding team is Dr Josep Tabernero. If the fundraising follows the expected rhythm, clinical trials should begin in 2025.