

INCHING CLOSER TO A THERAPEUTIC BREAKTHROUGH IN FRAGILE X SYNDROME



Fragile X syndrome is the main cause behind hereditary intellectual disability. Currently, it cannot be treated through any specific or definitive method; the only options are general educational therapy and drug administration to tackle particular symptoms. Connecta Therapeutics (connectatherapeutics.com) is a corporate spin-off of the Prous Institute for Biomedical Research (PRIB). Headquartered in the Barcelona Science Park, it was established in 2019 with the overt purpose of subjecting to clinical trials a new drug, CTH120. Concocted by means of AI computational tools, it aims at finding compounds that can be able to modulate neuroplasticity. This would amount to an improvement of cognitive capacity and a mitigation of afflictions endured by people with fragile X syndrome. Since 2020, Connecta Therapeutics raised €5 million in funding. “If its efficacy is confirmed, it will be a very significant therapeutic breakthrough in how it will improve the life of these patients and their families”, asserts Jordi Fàbrega, CEO and co-founder of Connecta Therapeutics. Even though *in vivo* experiments have shown that CTH120 can have a positive effect after one single take, the firm is working to devise a program of permanent daily intake of the drug.

KNOWLEDGE TRANSFER (II)

ALGORITHMS TO CONDUCT MULTIPLE SEQUENCE ANALYSIS

Sequera Labs (seqera.io) is a company born out of the essential research undertaken at the laboratory of Cedric Notredame, the doctor in bioinformatics in charge of the Bioinformatics and Genomics Program at Barcelona’s Centre for Genomic Regulation (CRG). His research involves the development of new algorithms capable of comparing multiple biological sequences. The ultimate aim is

to conduct comparisons hinging in any relevant or recognizable biological signs found in biological sequences. “As head of the lab, I supported the researchers in my team in what knowledge transfer is concerned”, recalls Notredame. “I saw it as an opportunity to help them become established in the field”. CRG’s endorsement and the center’s technological transfer department have smoothed their work throughout this process, providing them with professional guidance from the get-go. Analyzing the immense amount of data available today is no easy task; for this reason, Nextflow is crucial. It is a scientific workflow system aiding users to speed up research by formalizing genomic analyses as pipelines that integrate all information. The system was particularly useful during the COVID-19 pandemic, since it facilitated the monitoring of medical analyses.

SOLUTIONS AGAINST WATER SCARCITY



The adverse effects of climate change cause up to 60% of agricultural losses globally, and it is estimated that in the first semester of 2023, losses due to drought have amounted to 2.3% of the country’s GDP. This translates into a great economic loss that threatens food security and hinders the possible development of crops capable of surviving with less water by adjusting their production to the new climactic conditions. Planet Biotech (planet-biotech.com) is a corporate spin-off in the field of agricultural biotechnology created at the Centre for Research in Agricultural Genomics (CRAG), focused on coming up with crops resistant to the adversities of climate change.

Ana I. Caño-Delgado, founder and scientific director of Planet Biotech, explains that it is thanks to the knowledge produced throughout the last 20 years in the scientific field of plant molecular biology that they’ve figured out the mechanisms plants use to adapt their growth and survival to the conditions of drought and high temperatures. Eventually they’ve been able to identify the key factors involved in this process. Starting from there, they have devised a methodology that makes it possible to locate plant molecules which, by acting as a drug of sorts, help it face and resist different types of strain: “Thanks to the transfer projects supported by the Catalan government and Caixa Validate, we’ve identified a series of drugs that act in a specific manner in some crops, reducing 30% of the water consumed by greenhouse tomatoes.” They’re currently strengthening the platform established to identify and analyze these drugs, and introducing computational elements as well as robots in order to augment the sifting of drugs. Their next step is to commercialize these products. They’re already working with food producers in Almeria through an incubation program sponsored by Cajamar Innova, and they anticipate that by 2026 they’ll be ready to launch the first series of products intended to reduce the water consumption of greenhouse vegetables.

GUT MICROBIOTA: A KEY ELEMENT TO THE DIAGNOSIS OF DIGESTIVE DISEASES

There’s around 1 kg of bacteria in our intestines. They coexist forming a balance and creating an ecosystem known as gut microbiota. These bacteria perform key functions in our organism. When there is an imbalance – namely, when a digestive disease occurs – the bacteria act as sensors, signaling the disruption. That is why we can identify which bacteria have been altered by monitoring the gut microbiota, which in turn makes it possible to detect digestive diseases early and come up with a personalized treatment.

GoodGut (goodgut.eu), acquired by HIPRA in 2021, focuses on the development of diagnostic tests and products for the treatment of digestive diseases. This biotechnology firm was created in 2014 as a spin-off of Girona University (UdG) and Doctor Josep Trueta’s Biomedical Research Institute in Girona (IDIBGI) in order to translate the scientific knowledge they acquired into innovative solutions that may leave a resounding mark in society.

“Using tests to analyze gut microbiota we’re able to identify the specific bacterial imprints of various digestive diseases such as intestinal dysbiosis, irritable bowel syndrome, or colorectal cancer”, clarifies its director and co-founder, Mariona Serra. They have commercialized several diagnostic tests, and they’ll continue working on lines of research centered around digestive diseases. Their goal is to cement gut microbiota as a paradigm in clinical standards by which to decisively improve the lives of those encumbered by digestive problems.



REDISCOVERING HERITAGE SITES IN HIGH ALTITUDES



Marta Flórez is a researcher and doctor in Classic Archaeology, who tackles, as transfer technician, the tasks of knowledge and scientific dissemination at the Landscape Archaeology Research Group (GIAP) of the Catalan Institute of Classical Archaeology (ICAC). She co-leads the knowledge transfer project at the Valley of Núria, funded by the Spanish Foundation for Science and Technology (FECYT), and contributes to the excavations taking place in Cerdanya’s Roman site, the highest in altitude in Catalonia. In the following years, GIAP-ICAC wants to conduct a project of knowledge transfer and heritage-raising in the region. She explains that in the field of archaeology, “transferring” means generating knowledge connected to a given cultural heritage, the mediation of which is directly linked to the development of the region, the improvement of cultural and touristic options through the provision of resources, and even the generation of added value to primary industries. Essentially, they produce knowledge on the history of the landscape, and thus transform it into a human site in which certain environmental and cultural values stand out.

Science is traditionally relegated to academics, but here it is deployed in another context. The knowledge transfer of this project involves turning an area of archaeological ruins into a heritage site by emplacing markers and information panels to create a historic route. Those visiting the area may then discover these elements, bathing in the cultural past of the landscape they are setting their feet in. The project enriches and empowers the region, boosting cultural understanding; more often than not, the antique agricultural-pastoral heritage documented by the archeologists in such high altitudes is not well known among the local population. Mountainous spaces afflicted by crisis in terms of human sustainability, perhaps even suffering severe depopulation, can thus become more appealing and gain more resources. Bringing scientific, cultural and heritage knowledge to these environments is a way to enhance them and contribute, in a way, to their territorial rebalance.