

Biopharmaceuticals Major Challenge: The University of  vry and Genopole present in three of the eight laureate projects

ART-TG, CiTHERA, I-Stem and Yposkesi, all affiliated with the University of  vry-Paris Saclay and/or Genopole, are contributing their expertise to three projects named on 3 February 2022 as laureates for the [French Government's Major Challenges program](#). A part of the France 2030 investment plan, the program's  13-million call retained eight technological innovation projects in all, with the objective of supporting the production of innovative biotherapies and gene & cell therapies for both common and rare diseases.

The  vry research and innovation hub: a major actor in biotherapies

The field of innovative biotherapies is truly bringing hope not only for rare, currently untreatable genetic disorders but also more common pathologies like cancers or infectious diseases. The research and innovation hub at  vry constitutes one of France's major sites for the biotherapy sector. It unites the AFM-Telethon with close to 20 actors in that sector, all either accredited by Genopole or under the academic supervision of the University of  vry.

The radical change innovative biotherapies can bring to the therapeutic armamentarium is however dependent on overcoming the hurdle of the mass production of these complex treatments at a reasonable cost. Indeed, the few innovative therapies currently on the market are exorbitantly priced compared to conventional therapeutics. To address this need to bring medical innovation to the patient's bedside affordably, and also that of ensuring the nation's healthcare independence, the French government is empowering the development of a national advanced therapy medicinal products industry.

Making France a leader

In June 2021 French President Emmanuel Macron presented an ambitious plan to advance healthcare called Health Innovation 2030. This latter, a part of France Relance and the fourth Investments for the Future program (PIA4), aims to make France both sovereign and Europe's leader in healthcare. Health Innovation 2030 comprises notably a budget of  800 million to support biotherapy development, stimulate French competitiveness in that sector and accompany the creation of the necessary industrial infrastructure, actions intended to position France as the bellwether of biotherapies and the biomanufacturing of innovative therapies. Launched in 2020, the Biopharmaceuticals Major Challenge is also a part of that same strategy. It supports projects that improve yield and reduce costs in the production of advanced therapy medicinal products.

Four actors and three laureate projects

Thus, the Major Challenge's aptly named project call, "*Biopharmaceuticals: improving yield and controlling production costs*," finances projects marrying the competencies of public and private actors and targeting the development of technologies to improve yield and quality in biomanufacturing processes.

Four entities at the University of  vry and Genopole are a part of the laureate consortia. They are participating in three of the eight projects retained from the call.

ASMA: Acoustic solutions for manufacturing advanced therapies

The associated actors from Évry: The Genopole company **Yposkesi** and the Genomic Therapy Technology Research Accelerator (**ART-TG**; founding member of the "**Magenta**" industrial integrator).

The project: A combination of microfluidics technologies, suspension culturing and acoustic wave cell membrane poration to improve key steps in the transfer of genetic material during gene and cell therapy production.

Alain Lamproye, Executive President of Yposkesi:

"This project has a real potential to significantly improve the yield of gene therapy production processes, which is currently a key issue for all companies working in this field. Yposkesi is very happy to provide its expertise for the development of these novel technologies."

Anne Galy, Director of the Integrare research unit (UMR-S951) at Genethon and Director of ART-TG:

"ART-TG is delighted at the idea of working with the ASMA consortium to develop instruments that will soon enable the automated production of vectors and cells for gene therapies."

STELLAR: Stem cell differentiation evaluation on line–light holographic analysis recording

The associated actors from Évry: The stem cell institute **I-Stem**.

The project: The deployment of a continuous, non-destructive, cell differentiation quality control system for pluripotent stem cell-based cell therapies. The project will use holographic microscopy with automated imaging and deep learning (AI) methods.

Christine Baldeschi, Professor at the University of Évry, Director of the I-Stem Genodermatoses Team:

"The association of microscopy and AI technologies enables a gain in productivity and a reduction in the cost of quality controls, which can be done continuously during production with no damage to the cells. If standardized, this quality control system could be deployed for a wide range of cell types and thus therapeutic applications."

SOFTCELL

The associated actors from Évry: The laboratory **CiTHERA** (affiliated with INSERM Unit 1310, a founding member of the "**Magenta**" industrial integrator).

The project: A novel, entirely French gentle-agitation bioreactor used today for phytoplankton growth and soon for the bioproduction of human stem cells for therapeutics.

Annelise Bennaceur-Griscelli, Director of CiTHERA:

"This project will consolidate CiTHERA's mission of developing a bank of iPS cells and their derivatives for the cell therapy sector, within the setting of the national infrastructure INGESTEM. It unites the competencies and innovative stem cell expansion and differentiation protocols employed by CiTHERA and the Inserm U1310 unit with bioreactor models never used hereto for human cells. This disruptive technology brings a response to a major, currently unresolved issue: the cell-altering shearing forces occurring during large-volume medium homogenization, a problem that continues to be an obstacle for the industrial-scale biomanufacturing of cell therapies, regenerative therapies and immunotherapies for cancer."

More information on the University of Évry – Genopole partners:

ART-TG* (INSERM), located at Genopole, is a technological innovation laboratory, an accelerator for clinical R&D and an enabler for the industrialization of gene therapies specialized in immune cell therapies and lentiviral vector production (www.art-tg.com).

CiTHERA* (UMS INSERM, University of Évry, Paris-Saclay University) provides expertise for the bioengineering of induced pluripotent stem (iPS) cells, develops a bank of clinical grade iPS cells and coordinates INGESTEM, a national infrastructure for stem cells and tissue engineering.

I-Stem (INSERM, University of Évry, AFM-Téléthon) is an institution at Genopole developing cellular models, high throughput therapeutic screening and cell therapies from human pluripotent stem cells.

Yposkesi (AFM-Téléthon and SPI investment fund managed by Bpifrance) is a Genopole-accredited company and Europe's leader in the pharmaceutical production of gene therapy vectors.

*ART-TG and CiTHERA are the building blocks of **Magenta**, an industrial integrator accredited in 2020 by the Biopharmaceuticals Major Challenge for the production and monitoring of innovative cellular products, lentiviral vectors and gene therapies.

Press release (in French) from the Ministry for Solidarity and Health: [Investir l'avenir – biomédicament : annonce des 8 lauréats de l'appel à projets \(aap\) « grand défi biomédicament »](#)

About Genopole

Genopole is France's leading biocluster for research in genetics and biotechnologies in healthcare and the environment. It unites 77 biotech companies, 18 research laboratories and 26 technological platforms, as well as a range of tertiary-level training programs with the University of Évry-Paris Saclay. Genopole's objectives are to create and support biotech companies and the transfer of technologies to the industrial sector, favor the development of life sciences research, and promote advanced training programs for those domains. Genopole is funded primarily by the French State, the Île-de-France Administrative Region, the Essonne Administrative Department, the Grand Paris Sud Urban Area, the city of Évry and the AFM-Téléthon. www.genopole.fr

About the University of Évry

With its nearly 12,000 students, the University of Évry is now part of Paris-Saclay University, an academic aggregation representing 15% of French research. The University of Évry stands out particularly for its cutting-edge research in such fields as genomics and post-genomics, applied mathematics, informatics, information and communications technologies, space sciences and technologies, robotics, and autonomous air and terrestrial vehicles. The university's work and research involve close partnerships with the Genopole biocluster and the institution acts as a reference organism for the Aeronautic and Spatial Careers and Qualifications Campus grouping. Finally, the university's social sciences branches (*economy, law, sociology, history, musicology, etc.*), beyond addressing societal issues, also explore economic equilibriums, compare public and private law, and question humankind's place at work and its relationships with visual media, art and music. www.univ-evry.fr

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