

Gate

GENE.CELL.TISSUE
ENGINEERING

GHENT ADVANCED THERAPIES & TISSUE ENGINEERING

Your gate to self-healing



GATE IN NUMBERS



'The platform brings together experts from 35 research groups over more than 10 expertise domains, to design everything from a molecule to a whole organ-on-a-chip, engineer a cell or construct living tissue.'

— Dr Gudrun Antoons



35+ Research groups



10+ Disciplines



4 Knowledge institutions

- Ghent University
- Ghent University Hospital
- VIB
- IMEC



6 Ghent University Faculties



11 Business developers to support your research



4 Core facilities

- cGMP unit
- small animal facility
- 3D printer facility
- Centre for Advanced Light Microscopy



2 Clinical research centers

- HIRUZ, Health Innovation and Research Center of Ghent University Hospital
- D.R.U.G., the drug research unit of Ghent University Hospital

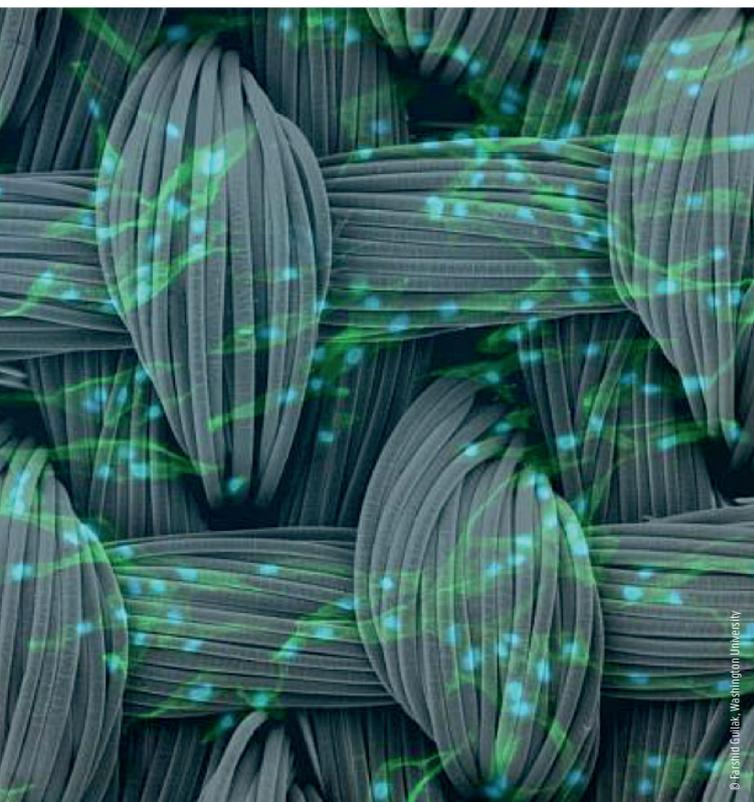
ABOUT US



GATE CONNECTS RESEARCHERS AND INDUSTRY TO ACCELERATE RESEARCH IN REGENERATIVE MEDICINE

Regenerative medicine is by nature a multi-disciplinary field, in which innovation management is becoming evermore complex. To meet these increasing challenges, Ghent University, University Hospital Ghent, VIB and imec are joining forces. This led to the foundation of GATE, a platform where researchers and clinicians from various disciplines and expertise work together with innovation professionals to develop faster, more efficient and more market-oriented solutions for regenerative medicine gene therapy, (advanced) cell therapy and tissue regeneration. **Our ambition is to cover the complete process from early research to first-in-human clinical trials, realizing the promise of regenerative medicine and advanced therapies.**

The use of a combination of cells and engineering materials.



'By opening the gate to multidisciplinary research in regenerative medicine we are closing the gap in healthcare challenges, like the treatment of incurable diseases or building artificial organs and human-on-chips.'

— Professor Phillip Blondeel



'Research in this field is complex, so multidisciplinary is really crucial. For example, when targeting tissue engineering, often a suitable cell carrier in a predefined and/or patient-specific shape is required. It is exactly there that biomaterials and additive manufacturing, such as 3D-printing, play a crucial role. For each project, all the necessary experts are brought on board in order to achieve an optimal end result.'

— Professor Sandra Van Vlierberghe

WHAT WE OFFER

BUSINESS

A team of **11 business developers** supports GATE researchers and clinicians:

- to build valorization strategies
- to generate IP
- to facilitate access to capital investments
- to collaborate with the industry
- to commercialise gene, cell and tissue engineering know-how
- to setup a spin-off trajectory, including clinical development of advanced therapies



'GATE has included valorisation in its research projects from the start and a team of business developers supports the collaboration with the business world. This market has been growing enormously for five years now and various spin-offs from GATE are in full preparation.'

— Dr. An Van Den Bulcke

Gene therapy has become reality to cure a number of rare diseases, which has immediate impact on society.



BROAD COMMUNICATION

GATE reaches out to industry, government & society via our broad communication platform, and via representation at (inter)national conferences and industrial events.

FUNDING

GATE offers you **support in project scoping, partnering and proposal development**, in collaboration with the EU and TechTransfer offices of Ghent University.

MULTIDISCIPLINARY RESEARCH

Through various events **GATE maps out for you the U(Z)Gent landscape of gene, cell and tissue engineering** to inspire and accelerate your research.

- Scientific meetings
- Connecting Expertise Events
- Brainstorm sessions

GATE reaches out to industry, government & society via our broad communication platform & our GATE events.





GATE offers you access to a technology platform of gene, cell and tissue therapies.

REGIONAL ECOSYSTEM

GATE connects researchers and clinicians to create an innovative ecosystem of regenerative medicine and advanced therapies in the Ghent Region to attract high-potential researchers, funders and investors.

PLATFORM & TECHNOLOGY SHARING

GATE offers you **access to a technology platform and proprietary developments of gene, cell and tissue therapies.**



'By continuous investment in an on-site clinical GMP for ATMPs at the Ghent University Hospital, and by combining this with a long-standing tradition in clinical trials, Ghent University Hospital wants to enable a safe and smooth translation of research to solutions for patients. This happens in close collaboration with industrial partners.'

— Dr. Tim Desmet

IMPACT ON HEALTHCARE & ECONOMY

GATE covers the complete process from early research to first-in-human clinical trials. In the long term, we strive for better survival, higher life quality, less scar tissue, less complications, less pain, lower hospital bills, faster work resumption and lower health insurance costs. In short, **innovation with impact on healthcare & economy.**

GATE-APPLICATIONS

GATE promotes research and technological development of engineered gene, cell, and tissue products for biomedical research objectives, bioengineering applications (artificial organs, organ-on-a-chip) and clinical applications of gene, cell and tissue therapy to restore, repair or regenerate biological function in diseased or injured patients.

ORGANOIDS AND ORGAN-ON-CHIP

Advanced 3D in vitro models that mimic the structure and function of a human organ emerge as promising tools for drug discovery, disease modeling and personalised medicine, by replacing animal testing. Examples at U(Z)Gent include iPSC-based 3D heart models of congenital heart disease, liver-on-chip and eye-in-a-dish for toxicity screening, organoids for oral vaccine development or modelling cancer. GATE wants to bring these high-throughput screening tools closer to biotechnology, pharmaceutical, cosmetics and chemical companies.

GENE THERAPY

Gene therapy seeks to modify or introduce genes into a patient for treating, preventing or curing disease. U(Z)Gent develops gene therapy for epilepsy, hereditary blindness and deafness.



'Research on CAR T-cell therapy is moving at a swift pace. We want to expand the application field of CAR T-cells from oncology to infectious diseases'

— Professor Linos Vandekerckhove



CELL THERAPY

Cell therapy is an emerging technology based on delivering cells as medicines. U(Z)Gent develops clinical stage cell therapies for diseases such as cancer, cardiac and infectious diseases.

TISSUE ENGINEERING

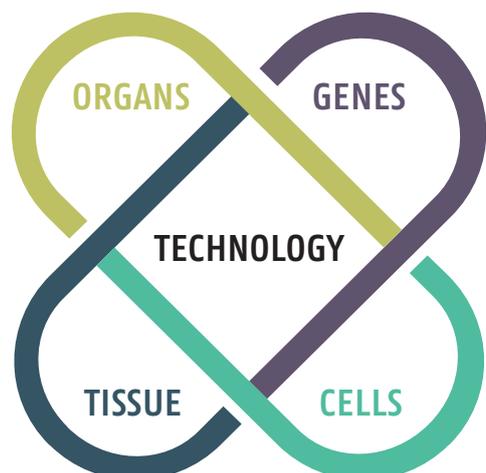
Tissue engineering exploits the power of materials and bioactive molecules to guide stem cell behavior and construct living tissues and organs for repair therapies. U(Z)Gent applies tissue engineering principles for wound dressings, implantable stents, designing a meniscus, or, for example, to develop an adipose-based tissue therapy for breast reconstruction or osteoarthritis.



'Gene therapy has become reality to cure a number of rare diseases in ophthalmology. Together with industry, we have participated in the development of Luxturna, the first FDA and EMA approved gene therapy for RPE65-related retinal dystrophy. We expect gene therapy to revolutionise the treatment of hitherto incurable neurological diseases such as epilepsy.'



— Professors Bart Leroy and Robrecht Raedt



GATE offers a platform for sharing technologies.

GATE-TECHNOLOGIES

The platform covers a broad scope of technological expertise, from designing genetic tools and cell products for therapy, to the development of new materials to guide stem cell behavior and construct tissues and organs for regenerative medicine, as well as artificial systems for drug screening and personalized medicine.

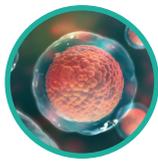
GENES & NANODELIVERY SYSTEMS



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GATE combines versatile platform technologies of nucleic acid design, chemical synthesis and modification, with innovative and bioinspired approaches (e.g. electro- and photoporation, DNA plasmids, AVV, polyplexes, nanoparticle adjuvant delivery, exosomes) for targeted delivery of different types of RNA molecules, towards the development of gene therapy for rare diseases (eye, hearing and neurological disorders) as well as a broad spectrum of RNA therapeutics (cancer, influenza, Covid-19).

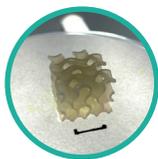
CELLS, 3D CULTURES AND ORGANOID



© Yurchenko Stanislav

GATE integrates know-how of stem cell engineering with fundamental research of (developmental) biology and biomechanics to find ways to direct cell differentiation into tissue-specific cells, promote cell-matrix interaction and cell-to-cell communication, and to inducing vascularization in 3D tissue constructs, for example.

BIOMATERIALS AND PROCESSING



Design of novel functional materials (natural and synthetic polymers, bioinks, ceramics) with high degree of biocompatibility and tunable biodegradation. These soft and hard biomaterials are developed for optimal processing via advanced processing technologies (electrospinning, SLA, DLP, extrusion, or multiphoton 3D-printing). The fabricated biostructures are intended to serve as cell carriers, or as scaffolds for newly created tissues, bioresorbable implants and diagnostic devices.

MICROFLUIDICS AND LAB-ON-CHIP



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Microfluidic devices, lined with human living cells embedded into biomaterials, to create more *in vivo*-like organ-on-chip systems by controlling the microenvironment while enabling automated high-throughput screening and increasing reliability in drug discovery and other health care applications.

ANALYTIC TOOLS IN GENE, CELL AND TISSUE ENGINEERING



© Konstantin Kolosov

GATE researchers benefit from tools and technologies that have been developed to construct, manipulate or analyze genes, cells, 2D/3D cell cultures and organoids, tissue and organs (including, but not limited to, genome editing, nucleic acid delivery systems, single cell sequencing, transcriptomics, proteomics, bioinformatics, high-content imaging, biosensors, microfluids, machine learning, computational modeling).

GMP MANUFACTURING



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A clinical GMP facility is available at the hospital site. The unit aims to have broad accreditations in several fields, in order to accommodate the translation of internal research to clinical trials, and to provide support for commercial clinical trials in the field of gene, cell and tissue engineering. This unit is currently accredited for mRNA production, dendritic cell manipulation and filling and packaging of cell products. The unit will expand its capabilities with accreditations for on-site viral vector production and clinical grade CAR T production. Further expansion of the accreditations in the field of gene, cell and tissue therapies is planned over the coming years.

REGULATORY AND CLINICAL TRIALS

HIRUZ, the Health Innovation and Research Center of Ghent University Hospital, provides support with the submission and registration, monitoring and project management of clinical trials. D.R.U.G. (the drug research unit of Ghent University Hospital) conducts Phase 0 – I – II clinical trials evaluating new candidate drugs, according to the ICH/GCP and local, European and international legislation.

OUR GATE TEAM

The GATE Steering Committee consists of 6 elected professors from different faculties of Ghent University and representatives from Ghent University Hospital, Imec and VIB. As a multidisciplinary team, they set out GATE's strategic plan and goals. Our team of 11 business developers sets up valorisation strategies and manages strategic research funding (IOF, Vlaio,...), and is responsible for industrial matchmaking, IP management and patent filing, licensing & venturing.

STEERING COMMITTEE (INTERIM)



Prof. Philip Blondeel



Prof. Robrecht Raedt



Dr. Bernard Depypere



Prof. Linos Vandekerckhove



Prof. Bart Leroy



Prof. Sandra Van Vlierberghe

BUSINESS TEAM



Daisy Flamez - Biomarked



Dominic De Groote - DiscoverE



An Van Den Bulcke - Chemtech



Ilse Christiaens - Composites



Frederik Leys - E-Poly



Eva Rijckeboer- NB-Photonics



David Aubert - MedTeg



Tim Desmet - ACT-T



Griet Verhaegen - VIB



Wolfgang Eberle - imec



Gudrun Antoons - GATE Coordinator

JOIN OUR NETWORK!

GATE researchers are connected to a broad network of stakeholders to accelerate regenerative medicine and to create added value for society.

– GATE for researchers

For researchers who want to be involved in multidisciplinary research on gene, cell and tissue engineering, become a GATE member and...

- receive up-to-date information on GATE and gene, cell and tissue engineering research at Ghent University, University Hospital Ghent, VIB and imec;
- participate in GATE events and workshops;
- make your research and team visible for other researchers;
- receive support from our business developers to valorize your research or to acquire funding for your research;
- make use of the GATE technology platform of gene, cell and tissue therapies;
- get in touch with other researchers, find complementary expertise, and start new collaborations to accelerate your research.

– GATE for industry

For industrial players who are seeking partnerships in the field of gene, cell and tissue therapies, join our network and we will....

- Keep you up-to-date on the most recent research developments at Ghent University, University Hospital Ghent, VIB and Imec;
- Connect you with the relevant research groups within GATE, based on your research question;
- Set-up collaboration agreements and public-private partnership funding (VLAIO, EU,..);
- Provide commercial clinical trials;
- Provide regulatory support;
- Provide access to the necessary research equipment or samples (biobanking).

Accelerate your research with GATE.



Contact us

To become a GATE member,
contact GATE coordinator Gudrun Antoons.

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