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The I-GENE project:

a new concept of genome editing



Dear Readers,

The I-GENE team is pleased to welcome you to the 10th issue of the I-GENE newsletter. This issue will be dedicated to the I-GENE final conference that was held at the ExCel in London on March 19-20 as a satellite event of the "Advanced Therapies Congress", the largest cell and gene therapy conference and exhibition in Europe. This was an incredible and unique opportunity for I-GENE researchers to meet industry leaders and policymakers, share insights, forge partnerships, and chart the course for the future of advanced therapies.

Please stay updated on the I-GENE project and don't miss our next and final project newsletter! We'll be closing this series of updates by unveiling all the secrets of our cutting-edge technology and sharing our expectations regarding how it can revolutionize treatment paradigms across diverse medical conditions.

Prof. Vittoria Raffa
I-GENE coordinator

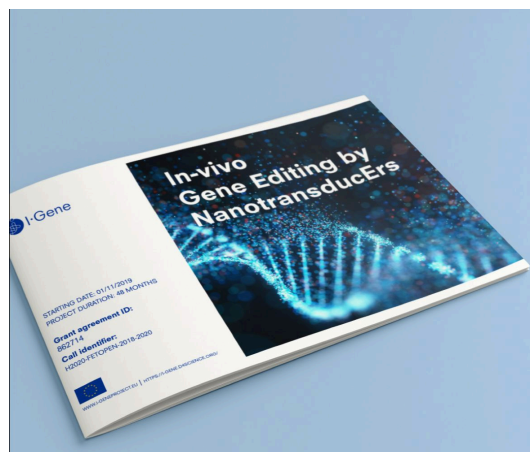
ABOUT I-GENE PROJECT

The objective of I-GENE project is to re-design the story of genome editing by developing a photo-switchable system. The I-GENE project is founded by EU (grant agreement ID: 862714) under the FET-OPEN scheme of HORIZON 2020, fostering novel ideas for radically new technologies.

Please follow our social media and website to get updates on the I-GENE mission and research activities.

<https://i-geneproject.eu/project/>

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Be smarter than a Cas9

Dr Vittoria Raffa (project coordinator) presented the long-term vision of the I-GENE tech: the dream of a safe and cost-affordable medication for genome editing based on CRISPR/Cas available for all. We are moving towards an era of smart gene editing tools where we control the time and the place of activation of the editing.

I-GENEering a photo-switchable vector for gene editing

Dr Piotr Barski (WP2 leader) from Prochimia explain the rational design pathway (simulations, synthesis, testing circle) of the I-GENE nanotransducer, capable of:

- crossing the biological compartments
- finding its precise genomic location at nucleotide accuracy
- turning on its complete functionality upon receiving the external light activation signal while staying on target



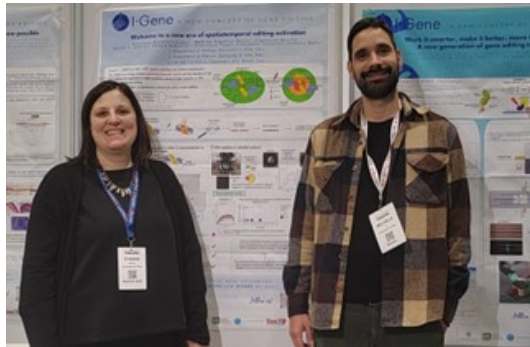
Fighting against pandemics having a gene editing armour

Dr. Michele Lai from the University of Pisa explains that it is crucial to develop fast and effective armour against viruses. In this talk, you learned how the I-GENE nanotransducer can be easily adapted to fight against current health issues. This technology allows for viral elimination via editing.

RNA under the spotlight

Dr Ismael Moreno Sánchez was our special guest at the I-GENE final conference. Dr Ismael Moreno Sánchez was presenting how he optimizes CRISPR-Cas as an in vivo RNA targeting systems. The work



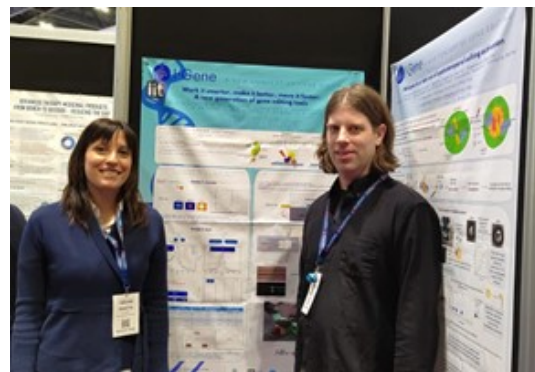


Beyond gene therapy

Dr Chiara Gabellini (WP3 leader) and Michele Lai (WP4 leader) speculate about the potentiality of I-GENE tech in fields such as oncology and virology.

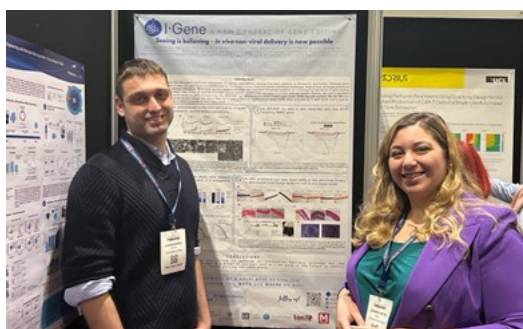
Work it smarter, make it better, move it faster

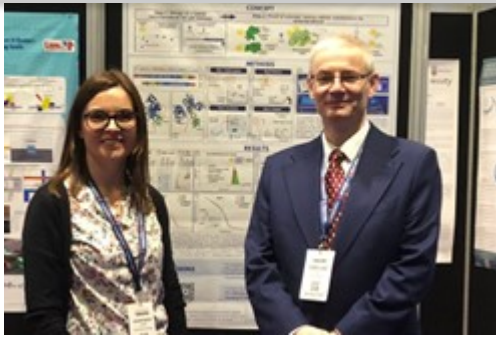
Dr Marta D'Amora (Istituto Italiano di Tecnologia, IIT, WP1 leader) and Dr Arnoud Everhardt (Lionix, WP5 leader) presented the new generation of gene editing tools: the light-switchable I-GENE nanotransducer and the I-GENE LoC (lab-on-chip).



Seeing is believing - *in vivo* non-viral delivery is now possible

Dr Alessandro De Carli and Dr Carmen Piazza from the University of Pisa explain that the I-GENE nanotransducer can spontaneously enter human cells, representing a promising, cost-effective, and safe alternative to the use of viral delivery systems, for investigating thousands of gene editing approaches for treating human diseases.

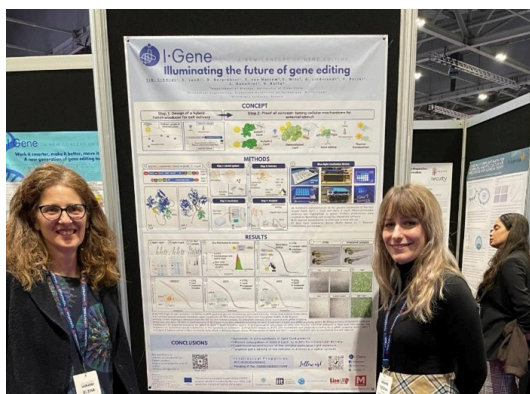
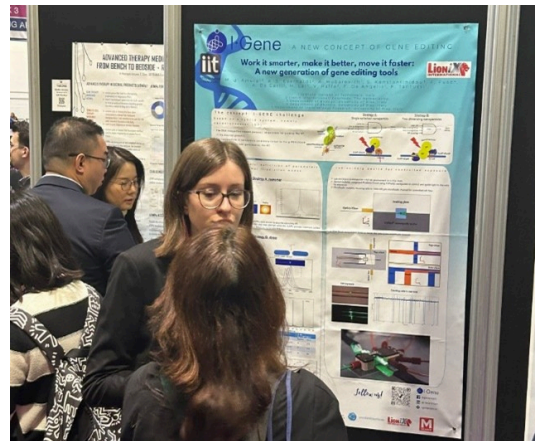




Dr. Agnieszka Litniewska and Dr. Dariusz Witt from Prochimia Surfaces presented the I-GENEER kit, designed for highly specific, inducible *in vitro* DNA cleavage, mediated by the Cas ribonucleoprotein complex (RNP). The kit contains the components for the preparation of a dedicated Nanotransducer (NT) that is ready for coupling the Cas endonuclease. The formed NT-RNP complexes may be used for *in vitro* / *in vivo* cleavage of target DNA/RNA templates under inducing conditions of laser light.

Spatiotemporal editing activation

Dr Soultana Konstantinidou explains how the I-GENE tech enables spatial and temporal control over the activation of gene editing. A Near-infrared (NIR) irradiation is used to activate the I-GENE nanotransducer for the light-induction of DNA double-strand breaks (DSBs).



Illuminating the future of genome editing

Dr Tiziana Schmidt (right) and Dr Elena Landi (left) from the University of Pisa explain how the Cas9 enzyme can be split into the N-terminal and C-terminal domains, conjugated to AuNPs for intracellular delivery, and conditional reconstitution of the complex can be achieved upon blue-light exposure.



... and many thanks to Mascha Stroobant (right), our project manager!



Do you want to be an active partner of our network. You can! Please, register to our gateway! We are looking for you and your collaboration.

<https://i-gene.d4science.org/>

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I-GENE Consortium



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