

Executive summary

Optimizing Gene Editing with Advanced Omics: Safety, Off-Target Detection, and Cell Phenotyping

Duration: Four days 11–14 of March 2025

GENYO, Spain

Organized by the European COST action "*Genome Editing to Treat Human Diseases*" (*GenE-Humdi*, CA21113), this four-day course offers an immersive experience into the latest technologies and methodologies in gene editing, with a focus on leveraging advanced omics tools to refine CAR-T application. The program combines expert-led theoretical lectures, hands-on practical sessions, and networking opportunities to empower participants in advancing their research capabilities.

Key Features of the Course

1. **Omics Integration in Gene Editing:** Learn how advanced omics technologies, including transcriptomics, single-cell analysis, and cytometry, are applied to improve gene editing protocols by analysing safety, off-target effects, and cell phenotyping.
2. **Single-Cell Analysis for Gene Editing:** Understand the unique advantages of single-cell platforms for CRISPR validation and genome editing analysis.
 - **Simplify Your CRISPR Analysis:** The Mission Bio Tapestri® platform enables high-resolution measurements of zygosity, co-occurrence of edits, off-target effects, chromosomal translocations, and genome stability at single-cell resolution—without the need for clonal outgrowth or extensive bioinformatics support.
 - **Whole Genome CNV Analysis:** Gain insights into genome-wide copy number variations (CNVs) critical for assessing CRISPR-induced modifications.

3. Advanced CAR-T Applications: Explore approaches to improve CAR-T therapies by optimizing cell subpopulations or using innovative genetic modification through gene editing.
4. GMP Facility Visit: A guided visit to GMP-certified production facilities in Córdoba offers a unique perspective on clinical-grade manufacturing processes essential for CAR-T therapeutic applications.

Outcomes

Participants will:

- Gain in-depth theoretical knowledge of advanced omics applications in gene editing.
- Acquire practical experience in isolating specific CAR-T subpopulations and analysing CRISPR edits with single-cell platforms.
- Develop insights into GMP standards for clinical-grade production.
- Enhance their research capabilities through bioinformatics training and data integration techniques.
- Build collaborations with leading experts and peers for future projects.

Target Audience:

This course is designed for MSc students, PhD candidates, postdoctoral researchers, and early-career professionals working in gene editing or related disciplines.

Certification:

Participants will receive a certificate of completion recognizing their expertise in integrating omics technologies into gene editing research.

Join us at GENYO, Spain, to elevate your gene editing research with cutting-edge tools and technologies!

Announcement:

Training School: Optimizing Gene Editing with Advanced Omics: Safety, Off-Target Detection, and Cell Phenotyping

Presentation

The **Genome Editing to Treat Human Diseases (GenE-HumDi)** COST Action (CA21113), chaired by Dr. Karim Benabdellah (Genyo, Spain) and co-chaired by Dr. Alessia Cavazza (UCL, UK), is pleased to announce the next practical training course in its series of genome editing (GE) initiatives.

This training course reflects the commitment of the GenE-HumDi network to foster emerging European scientists in the gene editing field and advance its mission of establishing and sharing gene editing standards to support clinical translation.

Over four days (March 11-14, 2025), leading experts in gene editing and omics technologies will provide participants with theoretical foundations and practical skills for designing, evaluating, and improving genome editing protocols. Attendees will explore the integration of advanced omics tools, including transcriptomics and single-cell analysis, with a specific focus on refining CAR-T therapeutic applications.

The course is planned as a small, face-to-face group format to ensure excellence in training and to nurture international networking among participants.

Topic of the course

The course will cover a range of essential topics aimed at advancing participants' understanding and skills in gene editing. The course will introduce the integration of omics technologies, including transcriptomics, single-cell analysis, and cytometry, in gene editing protocols, with a focus on improving safety, specificity, and efficiency. Participants will learn methods for assessing off-target effects and enhancing the precision of gene editing tools. The course will delve into the use of single-cell platforms, such as the Mission Bio Tapestry® platform, to perform high-resolution analysis of genome stability, zygosity, and chromosomal translocations. It will also explore advanced applications in CAR-T therapies, with an emphasis on optimizing gene editing in CD4+ and CD8+ subpopulations and understanding the roles of specific subpopulation such as TSCM and TCM cells.

Hands-on workshops will provide practical experience in designing and evaluating Cas9 guide RNAs for therapeutic purposes, while bioinformatics tools will be employed to analyze and interpret data. A guided visit to a GMP-certified facility will offer insights into clinical-grade production processes for gene editing tools. Throughout the course, participants will have ample opportunities for networking and collaboration with experts in the field.

Audience

This course is aimed at enhancing the skills of students and early career scientists, with a focus on gene editing technologies. Participants will benefit from hands-on experience and theoretical knowledge in areas such as CRISPR-Cas9, cell culture techniques, omics technologies (e.g., transcriptomics, cytometry), and CAR-T therapies. Previous exposure to gene editing, basic molecular biology, and omics tools

will be beneficial, although not mandatory. The course also offers opportunities for personal growth and international networking, helping attendees advance their expertise in a collaborative environment.

Funding Availability

To foster excellence and international networking, GenE-HumDi will select 30 participants to attend the practical course in Granada.

Additionally, a call will be opened to provide funding for up to 14 selected participants, to cover Travel cost and Daily Allowances, in accordance with the COST guidelines <https://www.cost.eu/uploads/2024/11/COST-094-21-V2.0-Annotated-Rules-for-COST-Actions-Level-C.pdf>

Travelling

The course will be held in **Granada, Spain on March 11th–14th 2025** at the Pfizer-University of Granada-Junta de Andalucía Centre for Genomics and Oncological Research (GENyO). Granada has its own airport located within minutes of the Historic Alhambra Castle, the city center, and the health and technology park where GENyO is located. Granada is close to major travel hubs such as Málaga or Madrid, allowing easy travel to the city by various means of transport: bus, taxi, car, train, and/or high-speed train.



Registration

If you are interested in attending the training school, please fill out the attached registration form. Don't hesitate to apply for funding. Be sure to apply early and avoid leaving it to the last minute. The deadline for registration is January 31st.

[Registration form](#)

Support

For Further details visit www.genehumdi.eu or contact the Action Grant Holder Manager [Raquel Soriano](mailto:Raquel.Soriano@juntadeandalucia.es), raquel.soriano@juntadeandalucia.es

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