TRIAD

D2.1: Report on Research Capacity Enhancement

Reporting period: May 2024 – September 2025
Lead beneficiaries: UoC, iMM, MU
Related DoA objectives: O1 (internationalisation strategy, sharing methodologies, models, infrastructure); O4 (access to EU R&I networks)

Introduction

Deliverable D2.1 (D4, WP2) sought to strengthen TRIAD's research capacity by combining three strategic pillars: scientific exchange, access to advanced infrastructure, and integration into European R&I networks. During this first reporting period, the consortium moved beyond the stage of relationship-building and began to operationalise resource-sharing and collaborative practices. Activities were deliberately structured to generate both immediate gains (knowledge transfer, technology access, visibility) and long-term capacity outcomes (sustainable facility-sharing models, translational know-how, and network positioning for future funding).

Activities

1. Governance and Initial Exchange

- Kick-off meeting (online, June 2024): Beyond setting up governance structures, this meeting served as the first "capacity mapping" exercise. Research groups introduced their methodological strengths (e.g. telomere biology, homologous recombination assays, ALT mechanisms), which allowed the consortium to identify complementarities and potential overlaps.
- Analytical note: This early exercise laid the groundwork for creating a functional inventory of expertise that later informed joint training and pilot planning.

2. Lisbon Meeting (November 2024): Structured Capacity-Building

The Lisbon meeting represented a critical inflection point, where TRIAD shifted from mapping to integration of resources.

- Scientific exchange: Presentations by the Garinis, Azzalin and Krejčí groups highlighted current projects, but more importantly showcased *interfaces* for collaboration. For instance, telomere biology expertise was directly linked to homologous recombination assays, opening opportunities for cross-validation.
- Facility showcases: The GIMM Flow Cytometry Unit and the RHINO R-loop sensor platform (Drug Discovery Unit) provided live demonstrations. The analytical value here was dual:

    1. Technical benchmarking – partners could assess the added value of these infrastructures compared to existing resources at UoC or MU.
    2. Collaboration triggers – discussions emerged on harmonising training pipelines, co-developing RHINO-based screens, and enabling transnational access.
- TTO workshop (case study: Tessellate Bio): Importantly, this workshop linked basic research directly to translational and entrepreneurial pathways. The session did not merely showcase IP management but also positioned TRIAD researchers to consider valorisation **routes** early on, which is critical for broadening capacity beyond academic outputs.

3. International Conference Engagement

TRIAD systematically invested in visibility and integration into high-level networks:

- EMBL Symposium (The Ageing Genome, Heidelberg): TRIAD was represented both at PI and postdoc level. This broadened the exposure of early-career researchers and created opportunities for direct peer-to-peer collaborations.
- EMBO YIP Genome Integrity meeting (Istanbul, 2025): Early-career representation (M. Pospíšilová) signaled TRIAD's commitment to developing the next generation of scientists within European structures.
- EMBL Symposium on Phase Separation (2024): Poster presentation by J. Cibulka further positioned TRIAD's work in emerging, high-interest areas (phase separation in genome integrity), expanding the scope of its visibility.
- Analytical note: Participation in these events was not only dissemination - it was capacity enlargement by integration. Exposure to cutting-edge debates and peer recognition positioned TRIAD members as credible partners in upcoming Horizon consortia.

Outcomes

TRIAD's activities generated multi-level capacity outcomes:

1. Infrastructure mapping and sharing
    - Concrete identification of flow cytometry and RHINO imaging as consortium-wide accessible technologies.
    - Agreements in principle for joint facility access and initial training activities.
2. Collaboration pathways
    - Cross-fertilisation between telomere biology and recombination groups led to the preparation for co-designed pilot projects.
    - Shared technology pilots (e.g., RHINO screens) initiated, illustrating a shift from presentation to practical collaboration.
3. Translational dimension
    - Through the Tessellate Bio case study, researchers gained exposure to IP protection, licensing, and startup formation, embedding a translational mindset into TRIAD's scientific capacity.
4. European visibility and integration
    - Strong representation in EMBL and EMBO platforms provided external validation of TRIAD's expertise.

- Early-career researcher engagement ensured that capacity enhancement is intergenerational, not confined to senior leadership.

Impact

TRIAD's research capacity has been enhanced along three dimensions:

- Scientific: Access to advanced methodologies (spectral flow cytometry, RHINO R-loop imaging, Nanopore TERRA analysis) accelerates ongoing research in telomeres, DNA repair, and chromatin biology.
- Operational: Clear procedures for facility sharing and preliminary SOP harmonisation improve efficiency and reproducibility across sites.
- Strategic: International integration through EMBO/EMBL provides both visibility and credibility, strengthening TRIAD's competitive positioning for Horizon Europe proposals and pan-European collaborations.

Analytically, the consortium has transitioned from being a network of research groups into a functional collaborative platform with shared infrastructures, translational awareness, and established points of contact with EU R&I networks.

Next Steps

The next phase will focus on consolidation and institutionalisation of capacity gains:

- 2nd TRIAD Meeting (Heraklion, October 2025): A dual-purpose event - internal consolidation (launch of joint pilot projects, SOP harmonisation, sample transfer protocols) and external integration (co-location with EMBO YIP Genome Integrity meeting for visibility).
- Formalisation of facility access: Drafting and signing a Memorandum of Understanding covering infrastructure access, IP handling, and data governance.
- Methodological standardisation: Development of consortium-wide SOPs for RHINO imaging, Nanopore TERRA analysis, homologous recombination assays, and EV delivery. This will directly increase interoperability and reproducibility across TRIAD laboratories.
- Pilot project launch: Early co-developed projects will serve as proof-of-principle for TRIAD's collaborative capacity and will underpin joint publications and funding applications.

Annex

- Meeting agendas.

HORIZON-WIDERA-2023-ACCESS-02 Pathways to Synergies

"TRIAD: Enhancing Synergism on Telomere Function in Health and Disease"

Kick-off Meeting "TRIAD"

June 19th, 2024

Time slots are scheduled in CET

Zoom link:

https://us06web.zoom.us/j/81002408490?pwd=Ypahl7f4OJu41w5KAaR5owTrPb0XuB.1

(Meeting ID: 810 0240 8490 Passcode: 6uTE1T)

10:00 - 10:15 **Welcome and Introduction** (Coordinator)

10:15 - 11:15 **Management meeting** (Project Officer: Dr. Maria Isabel Farfan Camacho)

11:15 - 11:45 **Q & A with the Project Officer** (Dr. Maria Isabel Farfan Camacho)

11:45 - 11:15 Coffee Break

11:15 - 11.45 **Presentation of the Garinis lab**

11:45 - 12:15 **Presentation of the Azzalin lab**

12:15 - 12:45 **Presentation of the Krejčí lab**

12:45 - 13:15 Lunch break

13:15 - 14:15 **Discussion on management and implementation** (deliverables, future meetings)


TRIAD
Enhancing Synergism on Telomere Function in Health and Disease
1st TRIAD Meeting
GIMM (Lisbon site) | 4 – 6 November 2024
Monday, November 4th
Afternoon session – Auditorium 57
16:30–17:00 – Welcome and Introduction – Maria Mota
17:00–17:50 – Presentation of the Azzalin lab
17:50–18:40 – Presentation of the Garanis lab
Dinner
Tuesday, November 5th
Morning session – Auditorium 57
09:30–10:30 – Presentation of the Krejčí lab
Technology Transfer workshop
10:30–11:30 – TTO at GIMM – Pedro Silva and Sílvia Almeida (AccelBio)
11:30–12:00 – Coffee break
12:00–13:00 – TT hands-on
Lunch
Afternoon session – Room P3-B-32
14:00–15:00 – Flow Cytometry Facility at GIMM – Mariana Fernandes
15:00–15:30 – Drug Discovery Facility at GIMM – Robert Martin
15:30–16:00 – Coffee break
16:00–18:00 – Round table 1
Dinner
Wednesday, November 6th
Morning session – Room 7
9:00–12:30 – Round table 2
10:30–11:00 – Coffee break
Lunch & Departure
Funded by the European Union

EMBO | EMBL Symposium

The ageing genome:
from mechanisms to disease

10 – 13 June 2025 | EMBL Heidelberg and Virtual
#EESAgeing

Organisers:

George Garinis
Institute of Molecular Biology & Biotechnology, Greece

Björn Schumacher
University of Cologne, Germany

Jacqueline Jacobs
Netherlands Cancer Institute, The Netherlands

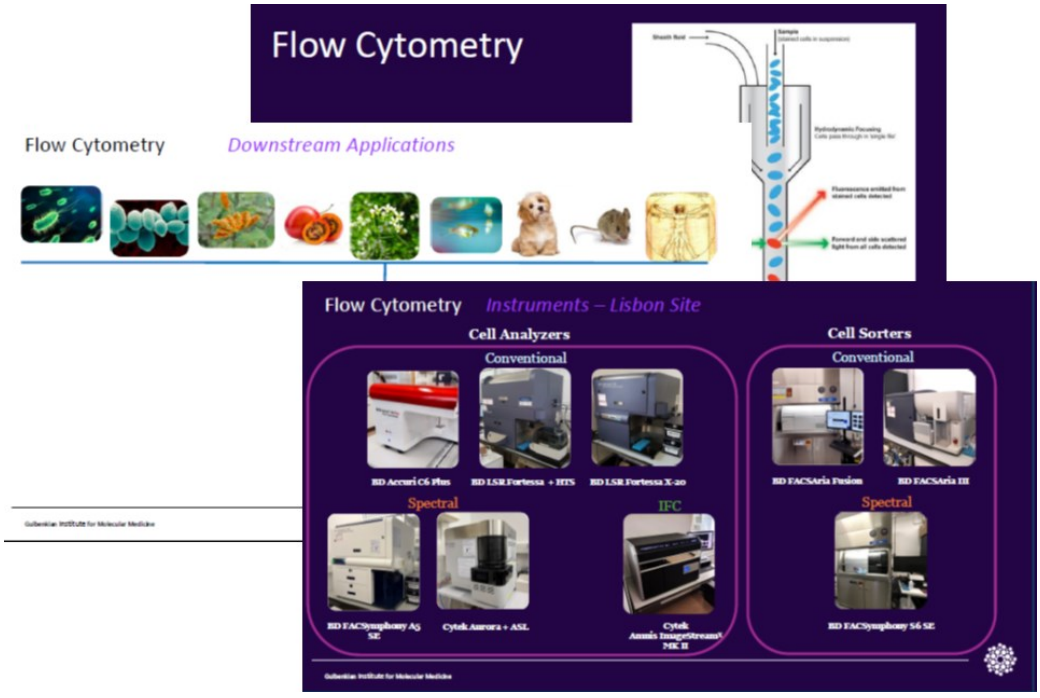
Agnel Sfeir
Sloan Kettering Institute, MSKCC, USA

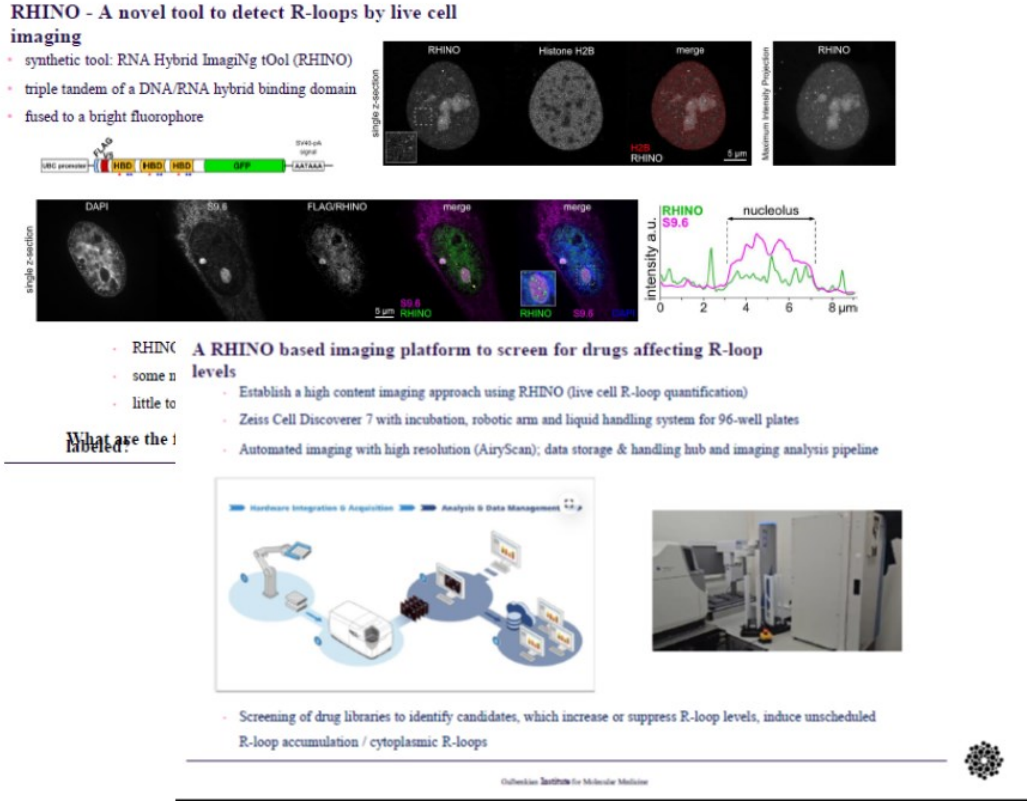
Abstract deadline: Tuesday, March 18, 2025

Registration deadline: Tuesday, April 29, 2025

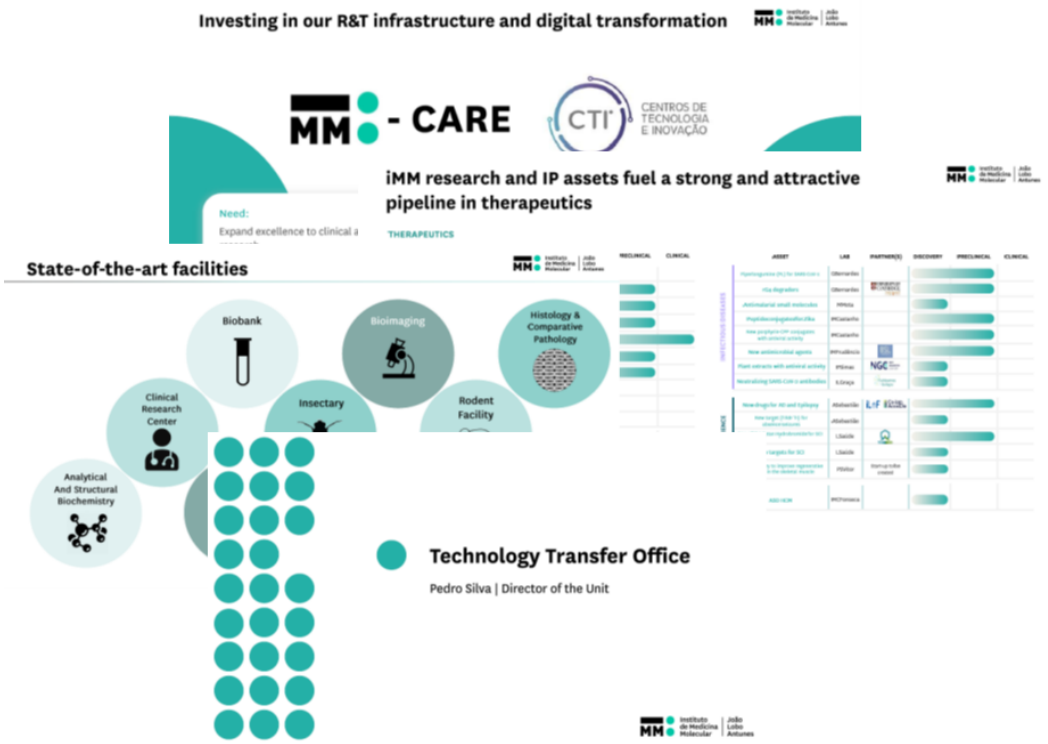
More information: s.embl.org/ees25-05

- Facility presentation slides (Flow Cytometry, Drug Discovery Unit).

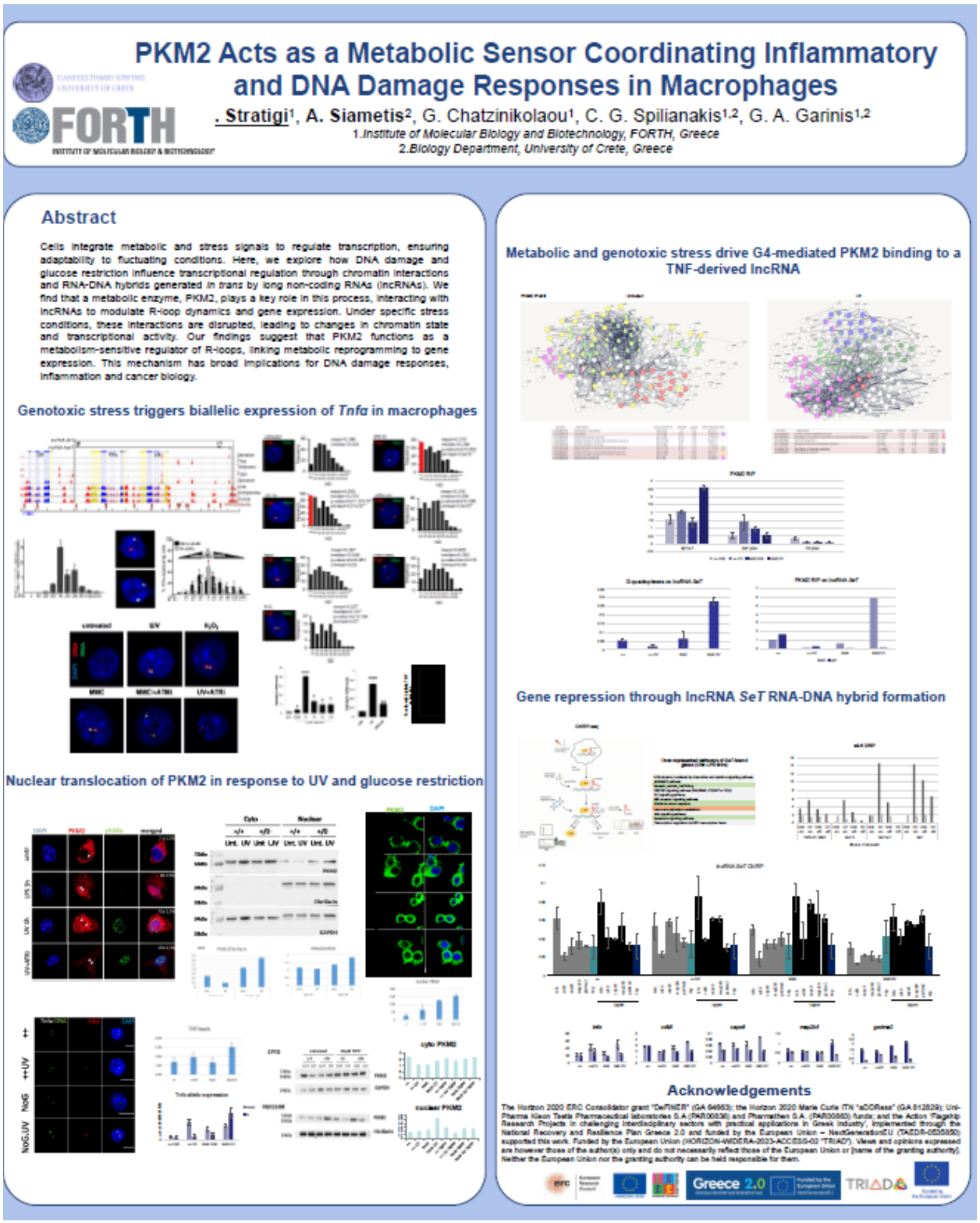




- TTO workshop materials (Tessellate Bio case study, AccelBio, GIMM TTO practices).



- Posters and presentations from EMBO/EMBL meetings.



PKM2 Acts as a Metabolic Sensor Coordinating Inflammatory and DNA Damage Responses in Macrophages

. Stratigi[1], A. Siametis[2], G. Chatzinikolaou[1], C. G. Spilianakis[1,2], G. A. Garinis[1,2]
1.Institute of Molecular Biology and Biotechnology, FORTH, Greece
2.Biology Department, University of Crete, Greece

Abstract

Cells integrate metabolic and stress signals to regulate transcription, ensuring adaptability to fluctuating conditions. Here, we explore how DNA damage and glucose restriction influence transcriptional regulation through chromatin interactions and RNA-DNA hybrids generated *in trans* by long non-coding RNAs (lncRNAs). We find that a metabolic enzyme, PKM2, plays a key role in this process, interacting with lncRNAs to modulate R-loop dynamics and gene expression. Under specific stress conditions, these interactions are disrupted, leading to changes in chromatin state and transcriptional activity. Our findings suggest that PKM2 functions as a metabolism-sensitive regulator of R-loops, linking metabolic reprogramming to gene expression. This mechanism has broad implications for DNA damage responses, inflammation and cancer biology.

Genotoxic stress triggers biallelic expression of *Tnfa* in macrophages

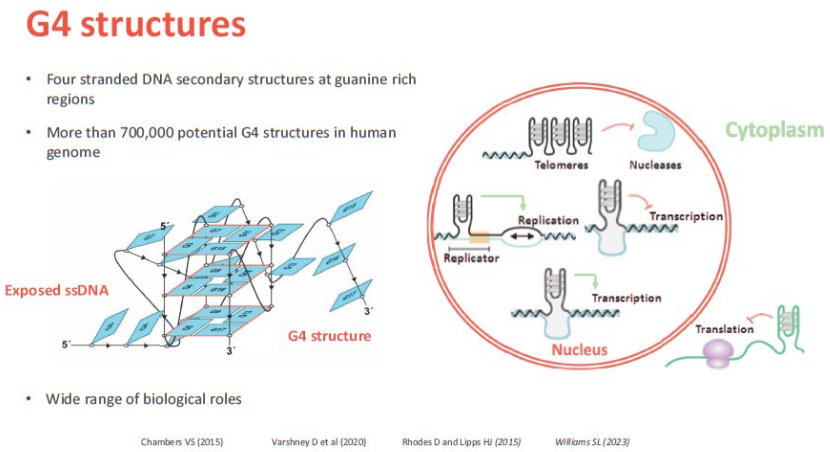
Nuclear translocation of PKM2 in response to UV and glucose restriction

Metabolic and genotoxic stress drive G4-mediated PKM2 binding to a TNF-derived lncRNA

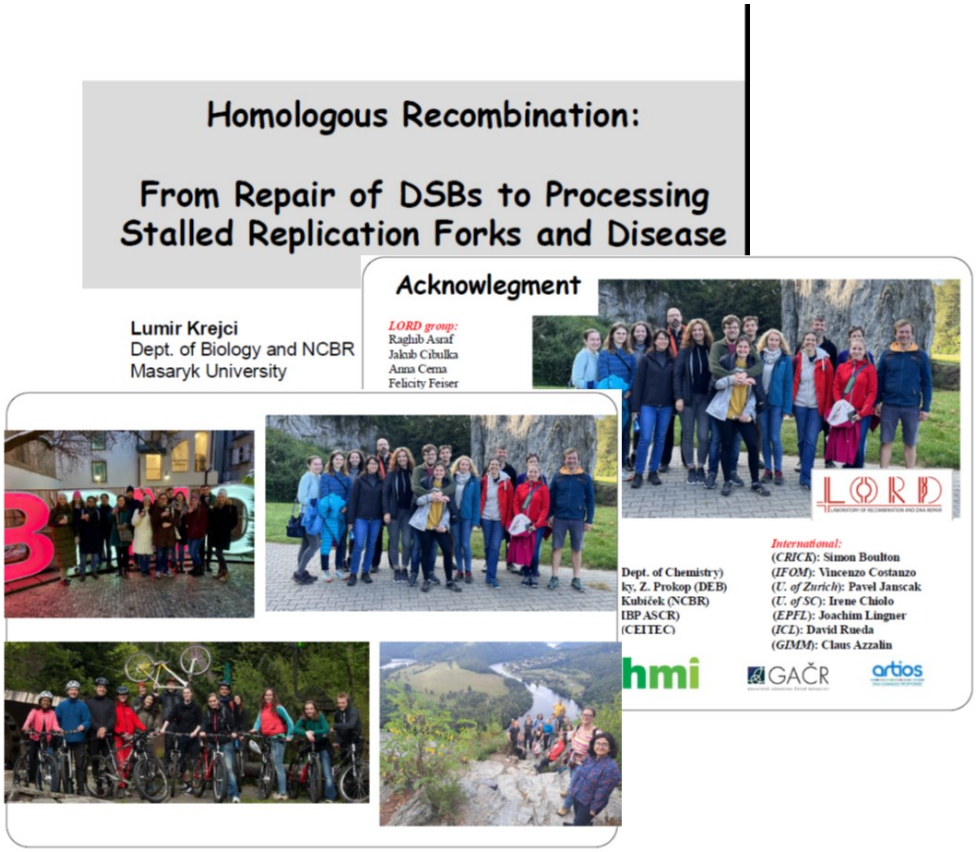
Gene repression through lncRNA *SeT* RNA-DNA hybrid formation

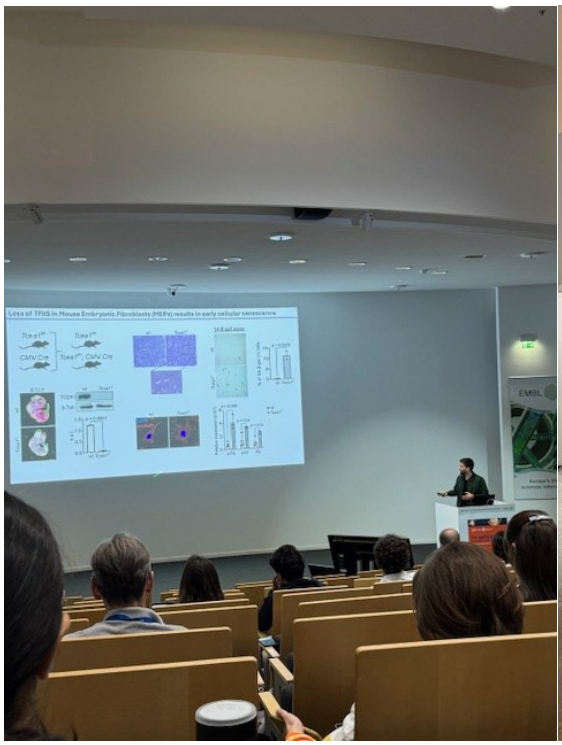
Acknowledgements

The Horizon 2020 ERC Consolidator grant "DeTINER" (GA 64953); the Horizon 2020 Marie Curie ITN "aDDRess" (GA 813284); Uni-Pharma Kleon Tsetis Pharmaceutical laboratories S.A (PAR00836) and Pharmathen S.A. (PAR00960) funds; and the Action "Flagship Research Projects in challenging interdisciplinary sectors with practical applications in Greek industry", implemented through the National Recovery and Resilience Plan Greece 2.0 and funded by the European Union – NextGenerationEU (TAEDR-0535850) supported this work. Funded by the European Union (HORIZON-WIDERA-2023-ACCESS-02 "TRIAD"). Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or [name of the granting authority]. Neither the European Union nor the granting authority can be held responsible for them.



- Photographs and screenshots from Lisbon meeting and external events.






THANK YOU
CMAzzalin lab
Sara, Patricia, Daniela, Beatriz, Marta, Joana, Inês, André, Valentina, Yong Woo, Beatriz, Bruno
Search for novel regulators of ALT activity and cell viability
Bruno
Sara
Beatriz
Patricia
Daniela
TERRA and shelterin funct
Yong Woo
Patricia
Valentina
What we do in the lab:
Telomeres and TERRA across evolution
1st TRIAD Meeting
November 2024
GIMM
Gulbenkian Institute for Molecular Medicine