IHI Call Days | Call 9

The Human Metal Atlas: Building a Translational Research Ecosystem in Metallomics (TREM MATLAS)

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Link to the IHI brokerage platform:

- Project Profile
- Personal Profile

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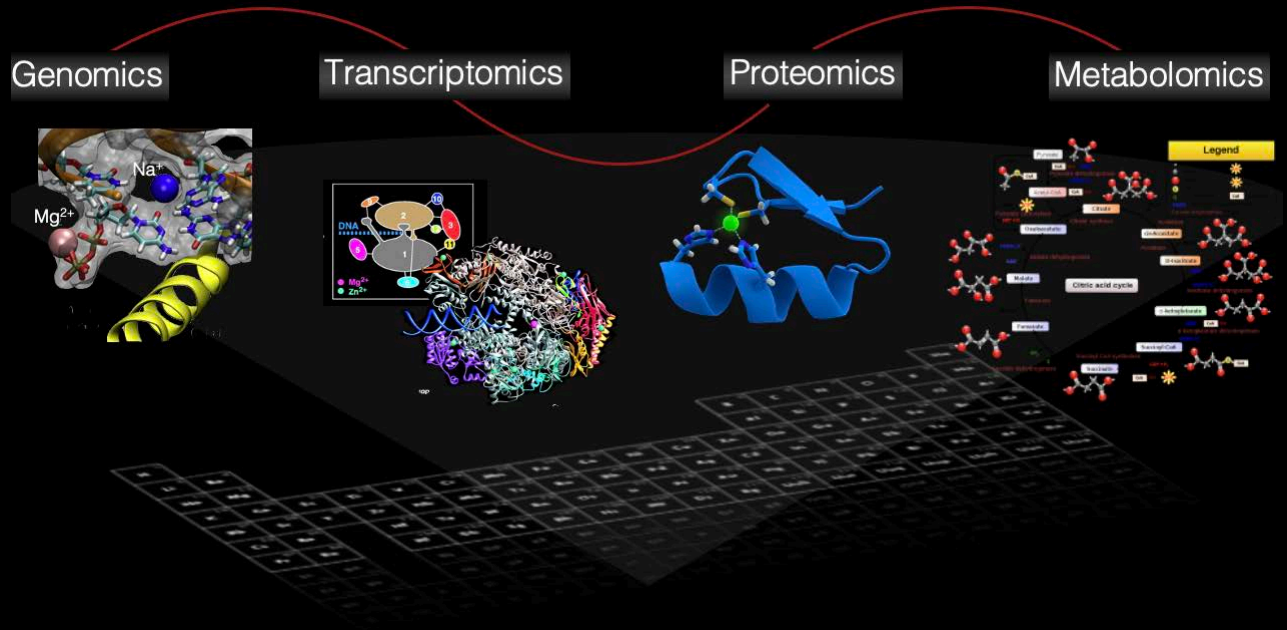
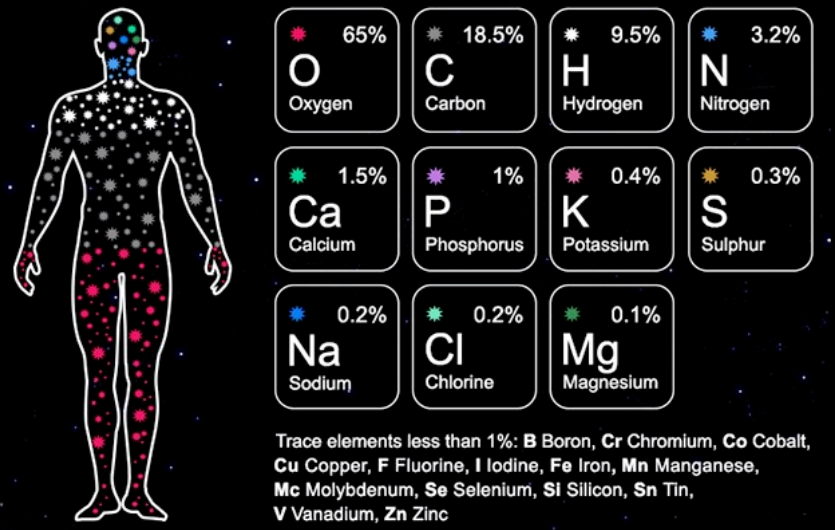
Why a Human Metal Atlas?



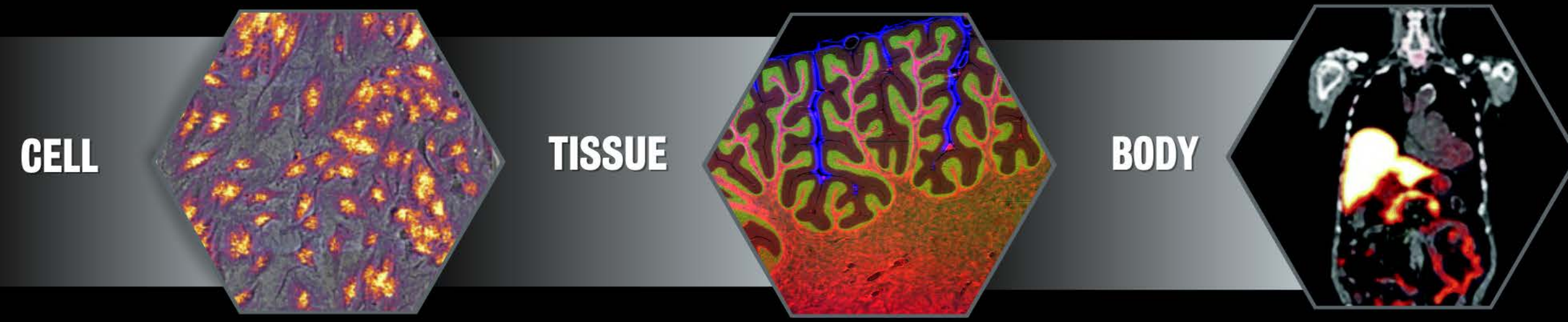


Metals are essential to life itself,
85% of the periodic table

2.5% of our body, yet critical
to health and disease

Our Vision: TREM MATLAS

The world’s first multi-scale human Metal ATLAS — from cell to whole body.



A centralised digital resource for diagnostics, therapeutics, and healthcare.

Challenges and Objectives

Challenge:

Leverage discoveries in bio-metals research to unlock new classes of therapeutics & personalised interventions

Objective:

Map metal dynamics across scales to elucidate new health determinants & priority diseases (SO1)

Needs:

Effective prevention, earlier detection, improved monitoring & targeted personalised therapeutics in health and disease

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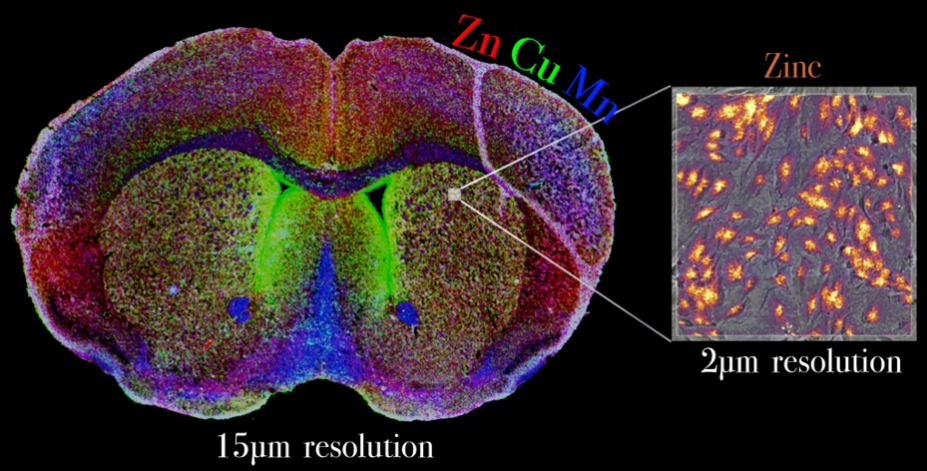
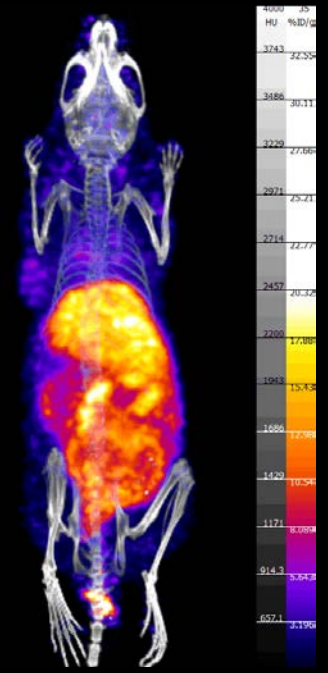
TREM MATLAS – The Solution

For the first time visualising metals across scales from cell to whole body - revealing new mechanisms, markers & targets in disease.

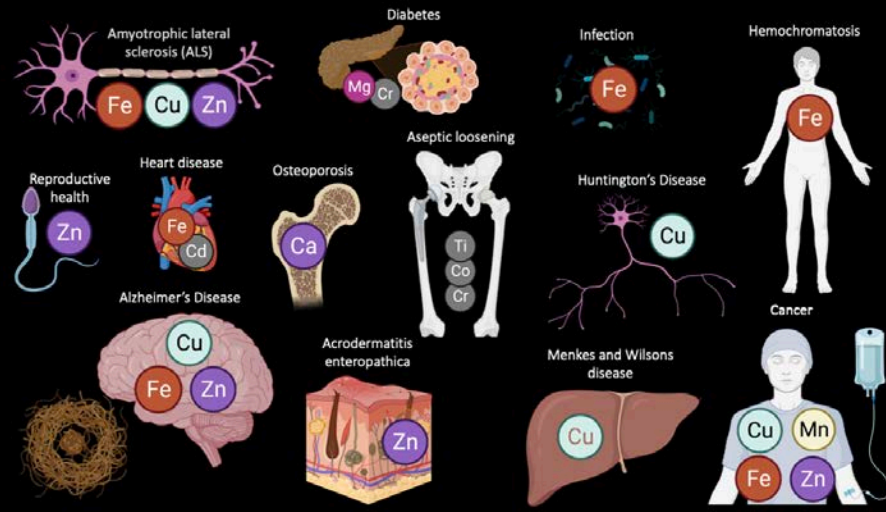
LOCATION



DYNAMICS



FUNCTION



Suitability for IHI

Essential PPP Collaboration:

Accelerate translation of advanced metallomics research & infrastructure into new clinical applications through shared resource and funding.

Industry Contributions:

Biotech & Pharma: Biomarkers & targets ID'd by MATLAS developed into effective diagnostics and targeted therapies

Imaging & Radiochemistry: Precision imaging and metal tracking enhanced for detecting critical disease imbalances

Digital Health & ICT: AI-driven platforms for integration and sharing ensuring scalability & user ease across Europe

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Outcomes and Impact

Unprecedented Resource: A comprehensive, high-resolution, multi-scale metal distribution atlas of the human body - unveiling new horizons for personalised medicine.

Step-Changes in Healthcare: Collaborating with biotech, pharma, imaging & digital health sectors to turn MATLAS insights into new classes of diagnostics & therapeutics for personalised interventions.

Increased Competitiveness: Placing Europe as a leader pioneering advancements in diagnostics, therapeutics and digital health through metallomics innovation.

Patient Benefits: Enable early detection, effective personalised treatments & improved health outcomes in diseases like cancer, neurodegeneration, metabolic and cardiovascular disorders.

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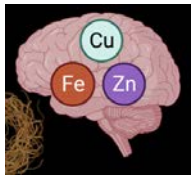
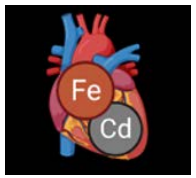
Applications in TREM MATLAS

Cancer Therapy: Mapping manganese distributions to predict tumor radiation response for personalised radiotherapy.



Neurodegenerative Disorders: Identifying copper imbalances in the brain for early biomarkers in conditions like Alzheimer’s and Wilson’s disease.



Cardiovascular Health: Elucidating iron and copper's role in oxidative stress for new targets in heart disease and stroke prevention.

Infection Control: Exploring zinc and iron dynamics to enhance immune response and develop strategies to limit pathogen survival.

Personalised Exposomics: Assessing the impact of toxic metals like lead and mercury on human health, providing insights for targeted prevention and mitigation.

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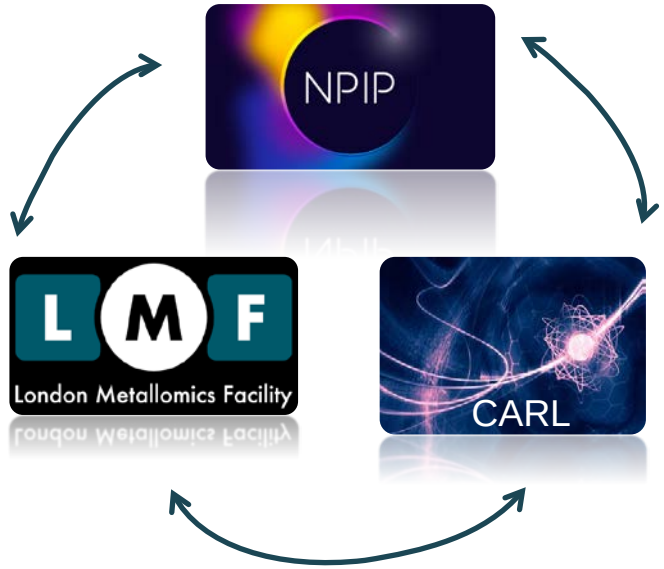
Expertise and Resources

We have:

- **Academic Partners:** King's College London with unique *multiscale facilities* (LMF, CARL, NPIP) part of Euro-BioImaging ERIC
- **Proven Track Record:** Expertise in metal biology, radiochemistry, and advanced imaging, backed by established European research collaborations.



We are looking for:

- **Industry Partners:** Biotech, pharma, medical imaging, digital health sectors to co-develop diagnostics, therapeutic applications, and AI-driven data platforms.
- **Funding & Resource:** Co-investment to drive this initiative forward with expertise in scaling up clinical applications across Europe.

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