IHI Call Days | Call 12

VIRAL-INFLAME:
from unmasking viral triggers to precision medicine for chronic inflammation

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Link to the IHI brokerage platform:

https://bit.ly/47b9D7R

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Challenges and objectives

Problem

Chronic inflammation in autoinflammatory and neuroinflammatory diseases place a massive and growing burden on European healthcare. A significant clinical challenge is that their initial causes remain elusive, and treatments are often limited to broad immunosuppression with variable efficacy.

IHI Objectives

SO1: The causal knowledge gap: A critical mechanistic understanding of how these viral triggers persistently dysregulate the innate immune system to cause pathology is missing.

SO2: The Translational Roadblock: cross-sectoral approach for the integration of fragmented research and innovation efforts.

SO4: The Clinical Precision Deficit: exploiting the full potential of digitalisation and data exchange

Unmet need

This integrated understanding is the essential foundation for developing the precise biomarkers and targeted therapies required to meet profound unmet patient needs and reduce the long-term burden of chronic inflammatory disease in Europe.

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Your approach to solve the problem

Decoding viral drivers of chronic inflammation

The approach:
four-pronged virological approach:

- high-throughput “VirScan”, a serological profiling platform, to retrospectively reconstruct the complete "viro-ome" or lifetime viral exposure history
- state-of-the-art broad spectrum capture technology “VirCapSeq-VERT” for virome determination: viral metagenomics platform
- viral transcriptomics to define active viral replication dynamics
- CELLOseq will enable the analysis of TE expression at unique loci at single-cell resolution

Key Results:

· A curated, multi-omics data commons from autoinflammatory and neuroinflammatory patient cohorts.
· Causal network models linking specific viral triggers (e.g., EBV, endogenous retroviruses) to dysregulated innate immune pathways.
· A validated panel of prognostic and predictive biomarkers (e.g., transcriptomic, serological) for early detection and patient stratification.
· A prioritised list of novel therapeutic targets with in vitro and in vivo proof-of-concept.

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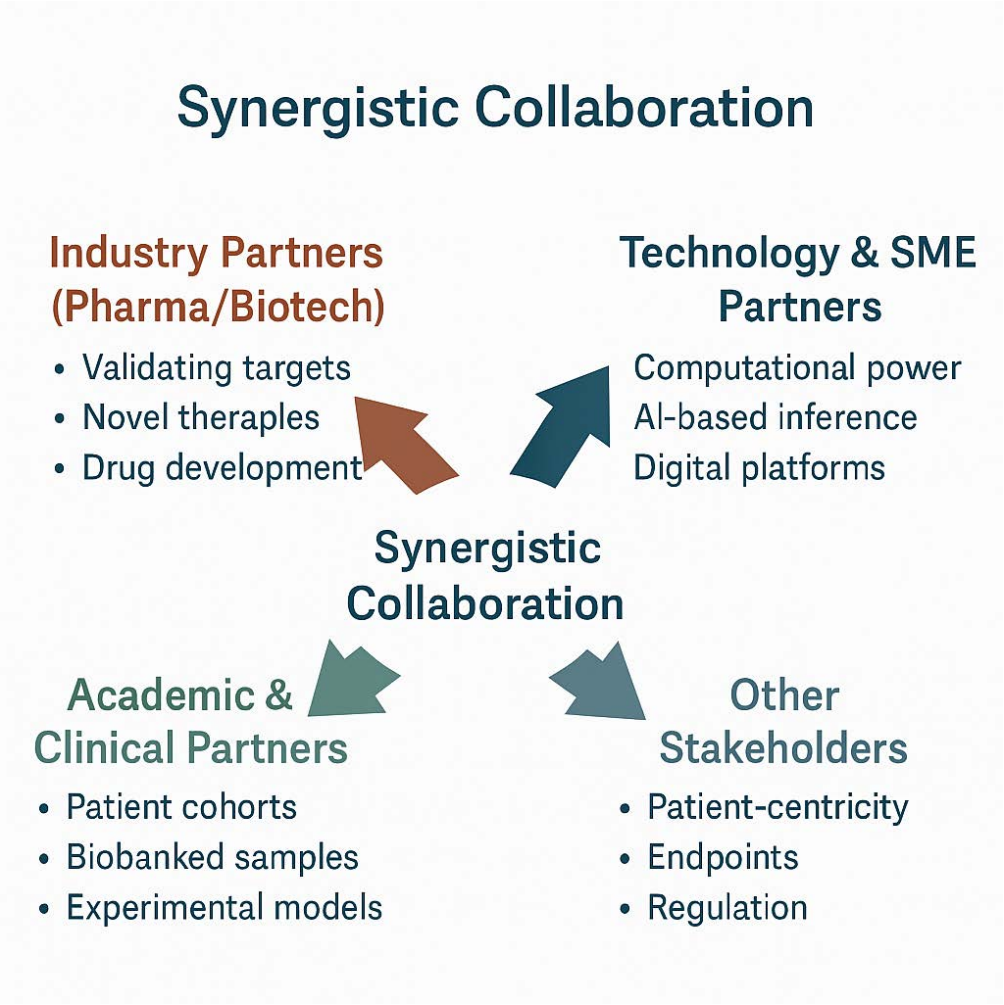
Is your project suitable for IHI?



This synergistic collaboration is perfectly aligned with IHI's mission to accelerate health innovation by breaking down silos and de-risking high-impact translational research.

Outcomes and Impact

Causal network models which will change paradigms for the finding of biomarkers and the development of new therapeutic interventions

Outcomes:

- Improved understanding of disease etiology, enabling a shift from descriptive diagnoses to mechanism-based classification.
- Foundation for new clinical trials for targeted interventions (antiviral, immunomodulatory).
- Development of AI-driven diagnostic/prognostic tools for clinical use.

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Long-term Impact:

- Transformation in the clinical management of chronic inflammatory diseases towards interception and precision medicine.
- Reduction in the socioeconomic burden of these conditions in Europe.
- Strengthened European leadership in digital health and integrative biomedical research.

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Expertise and resources

- Our expertise:

Innate Immunology & Virology

Bioinformatics & Data Science

Clinical Research: Access to initial patient cohorts and biobanks

- we seek partners with:

Pharma/Biotech: Proven experience in antiviral or immunology drug development, biomarker validation, and clinical trial design for inflammatory diseases

Clinical Centres: With large, well-characterised cohorts of patients with autoinflammatory and neuroinflammatory/neurodegenerative diseases, including longitudinal clinical data and bio-samples.

Academic Research Groups: With strong in vitro (e.g., human iPSC-derived brain organoids, immune cell assays) and in vivo capabilities to functionally validate targets and mechanisms

Data-Science SMEs & Tech Providers: Specialising in multi-omics data integration, causal network analysis, and the development of secure, FAIR-compliant data platforms for federated analysis.

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