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WELCOME TO THE

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Swiss Multi-Omics Center

INTEGRATED DIGITIZATION OF CLINICAL BIOSPECIMEN COHORTS ON THE MOLECULAR LEVEL

DNA | RNA | Protein | Metabolites | Lipids

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Sandra Goetze, PhD

ETH Zurich

CSO Clinical Proteotype Analysis Center

Swiss Multi-Omics Center (SMOC)

<http://smoc.ethz.ch>

smoc@ethz.ch

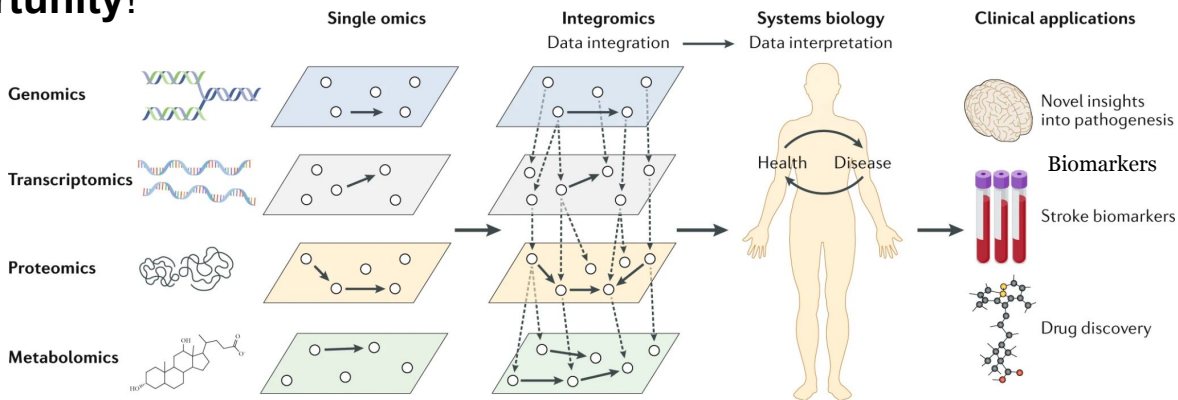
Personalized health builds on the combination of clinical and molecular data

Sample digitization is a necessity!

Clinical samples cannot be regenerated. Turning clinical specimens into searchable and reusable digital biobanks paves the road to retrospective and highly-powered studies.

Sample digitization is an opportunity!

Integrative analyses drive discovery of mechanisms and novel targets.



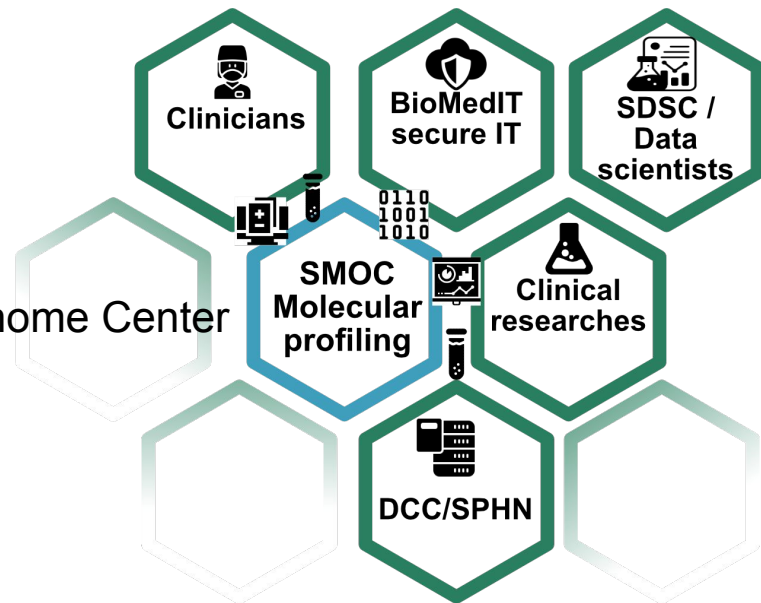
The ETH PHRT Swiss Multi-Omics Center (SMOC)

Mission: Enable multi-omics analyses of clinical samples

- Deliver clinical-grade, population scale, molecular data enriched with expert data analysis
- Democratize access to data (costs, actionability)

Organization: Integration of existing expert units

- **genomics, transcriptomics @ Health 2030 Genome Center**
- **proteomics @ ETH Zürich**
- **metabolomics, lipidomics @ ETH Zürich**
- Tight collaboration and coordination across Centers
- ~10 PIs/Senior Scientists involved in management



The ETH PHRT Swiss Multi-Omics Center: Portfolio

PHRT Swiss Multi-Omics Center

PHRT Clinical Omics Centers

Genomics

CGAC
Clinical Genomic
Analysis Center

Proteotyping

CPAC
Clinical Proteotype
Analysis Center

Metabolomics & Lipidomics

CMAC
Clinical Metabolomics
Analysis Center

Measure

Single entry point for digitizing your clinical cohorts at the level of DNA, RNA, Proteins, Metabolites and Lipids

Integrate

Integrated FAST track and DEEP track analysis of multi-omics data

Analyze

Delivering molecular insights supporting publications and clinical decision making

Share

FAIR sharing of primary and derivative data based on ethical consent



GETTING THE MOST OF YOUR CLINICAL SAMPLES

Single entry point for integrated multiomic analysis.



MOLECULAR INSIGHTS INTO CLINICAL COHORTS

Standardised and automated processing of large clinical cohorts.



SAFE DATA STORAGE AND EXCHANGE

Handling of sensitive clinical data according to established [SPHN/BioMedIT](#) guidelines.



CONSULTANCY

We will find together the right strategy for digitizing and analyzing you clinical samples.



FEASIBILITY STUDY

Small scale studies for optimizing clinical cohort experimental design and generating proof of concept data.



SUPPORT WITH GRANT AND PAPER WRITING

We will provide relevant text snippets supporting grants and publications.

One entry point, three centers with expertise across the value chain.
Scalable production and analytics.

Multi-Omic investigation of rare disease led to therapeutic insights

nature metabolism



Article

<https://doi.org/10.1038/s42255-022-00720-8>

Integrated multi-omics reveals anaplerotic rewiring in methylmalonyl-CoA mutase deficiency



Hope for patients with a severe rare disease

By combining the results of multiple molecular analyses, scientists can better diagnose the hereditary disease methylmalonic aciduria. There is also hope with regard to therapy.



UNIVERSITÄTS-

KINDERSPITAL
ZÜRICH

News & views

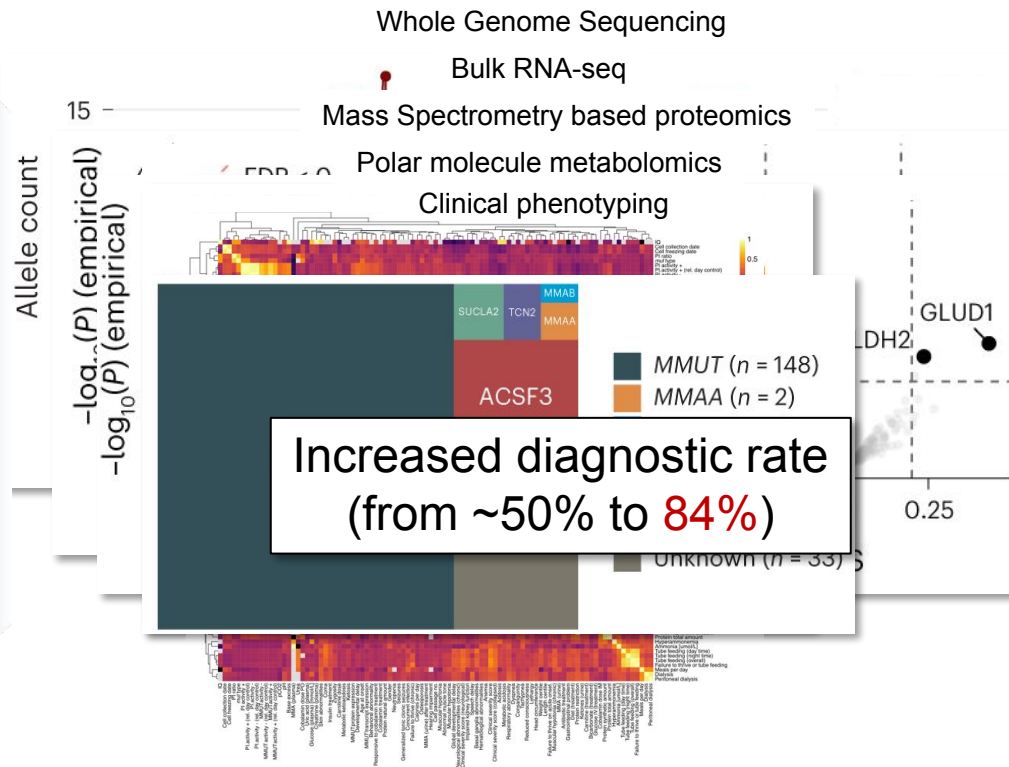
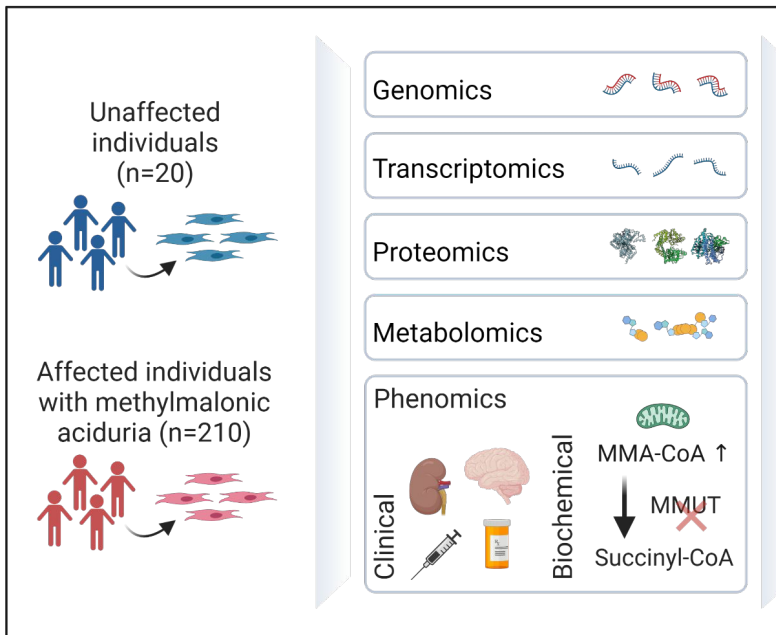
Mechanisms of disease

Anaplerosis in action

Pamela Sara E. Head & Charles P. Venditti

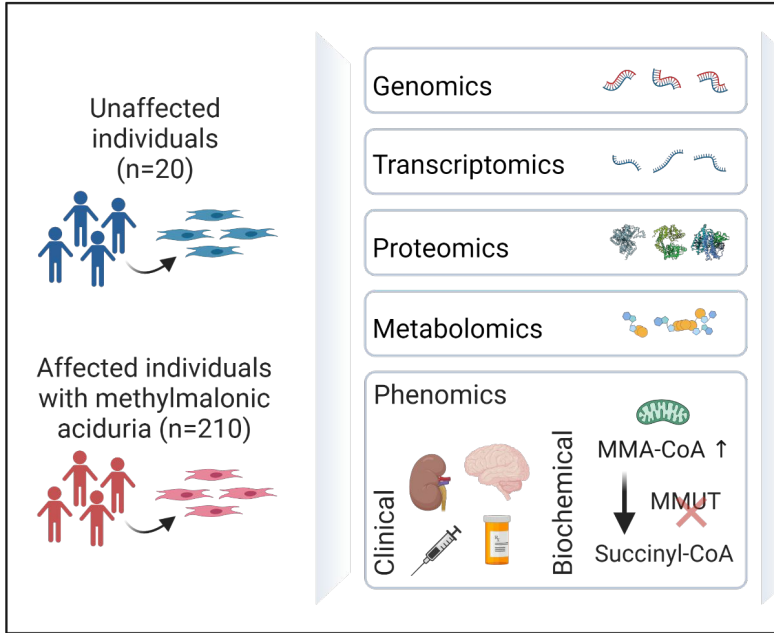
Investigation of multi-omic changes and their effects on regulation of metabolic pathways confirm anaplerotic deficiencies in methylmalonic acidemia, strengthening the need for future therapies aimed at replenishing intermediates of the tricarboxylic acid cycle.

Integrated multi-omics analysis in methylmalonic aciduria

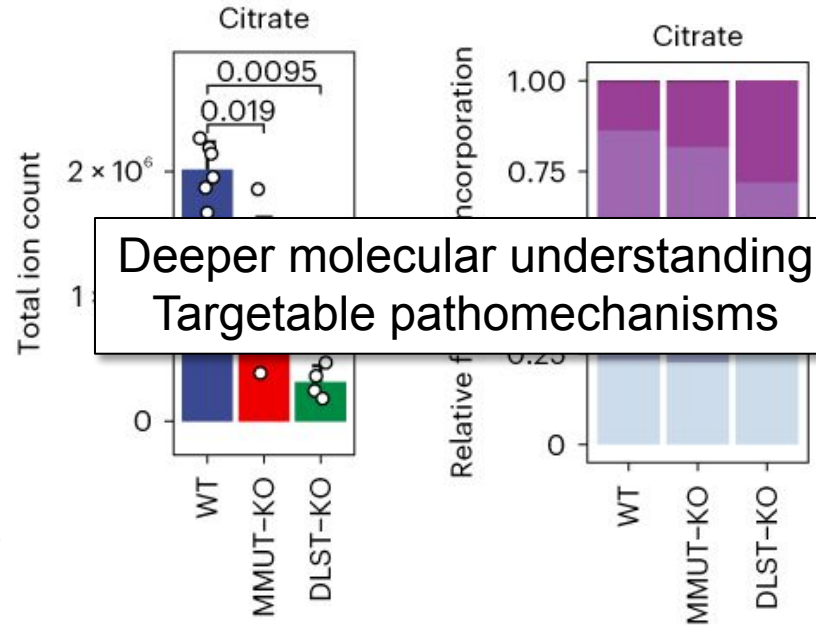


Forny, P., Bonilla, X., Lamparter, D., Shao, W., Plessl, T., Frei, C., Bingisser, A., Goetze, S., van Drogen, A., Harshman, K., Pedrioli, P.G.A., Howald, C., Poms, M., Traversi, F., Bürer, C., Cherkaoui, S., Morscher, R.J., Simmons, L., Forny, M., Xenarios, I., Aebersold, R., Zamboni, N., Rättsch, G., Dermitzakis, E.T., Wollscheid, B., Baumgartner, M.R., Froese, D.S., 2023. *Nature Metabolism*.

Integrated multi-omics analysis in methylmalonic aciduria



Disturbed TCA Metabolism



Deeper molecular understanding
 Targetable pathomechanisms

Forny, P., Bonilla, X., Lamparter, D., Shao, W., Plessl, T., Frei, C., Bingisser, A., Goetze, S., van Drogen, A., Harshman, K., Pedrioli, P.G.A., Howald, C., Poms, M., Traversi, F., Bürer, C., Cherkaoui, S., Morscher, R.J., Simmons, L., Forny, M., Xenarios, I., Aebersold, R., Zamboni, N., Rättsch, G., Dermizakis, E.T., Wollscheid, B., Baumgartner, M.R., Froese, D.S., 2023. *Nature Metabolism*.

The ETH PHRT Swiss Multi-Omics Center in the Swiss Health Ecosystem

Catalyst for

translation of basic science into clinics

longitudinal multi-omics

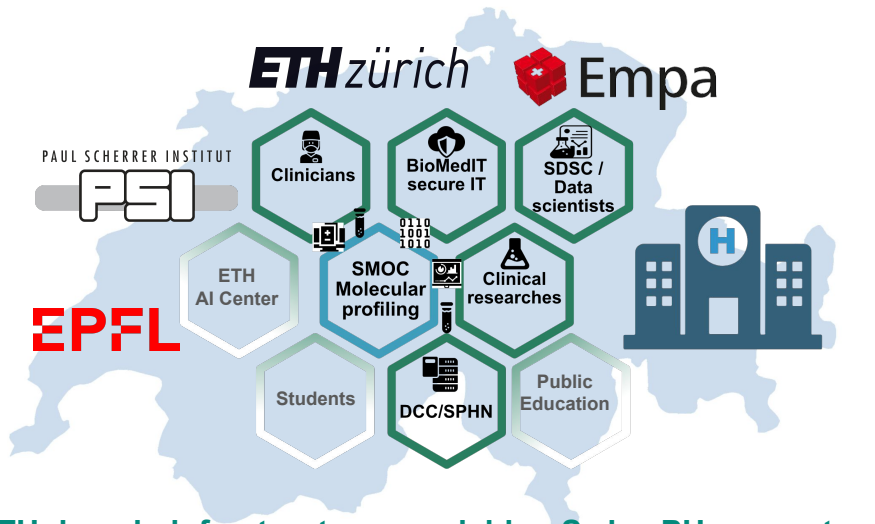
interventional trials

mechanistic and functional understanding of disease

new predictive diagnostics

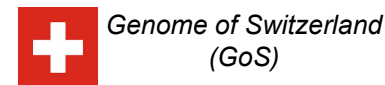
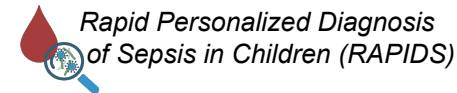
novel treatment approaches

Digital Switzerland Strategy & BFI-Botschaft 25–28



ETH domain infrastructure nourishing Swiss PH ecosystem

Enabler of



Building on the strategic investments made by the SFA-PHRT and SPHN initiatives to establish a sustainable infrastructure for deep human molecular analysis.



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“Turning clinical specimens into searchable and reusable digital biobanks drives the development of multimodal data analysis technologies supporting clinical decision-making in Switzerland”.

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