

Personalized Nutrition through the measurement of new blood biomarkers and metabolomic signatures: A sub-study of the EFFORT trial

Team: Prof. Philipp Schuetz & Prof. Zeno Stanga for the EFFORT trial investigators; ETH Functional Genomics Center (Prof. Bernd Wollscheid & Prof. Ralph Schlapbach; ETH: Swiss Federal Institute of Technology, Zurich)

Recognition: The Swiss Society of Clinical Nutrition supports the project

Contact information: Prof. Dr. med. P. Schuetz, Head of General Internal Medicine, Kantonsspital Aarau, Switzerland, Email: Schuetzph@gmail.com



Description of the initiative

- The term “personalized medicine” relates to the observation that not all patients show the same response to medical therapies. While some patients may show a marked benefit from nutritional therapy, other patients may have no benefit or may even suffer harm from nutritional support.
- Whether or not a patient benefits from nutritional therapy, may relate to illness-specific factors (e.g., comorbidities, acute vs. chronic course) or patient-specific factors (e.g., age and gender).
- Our hypothesis is that specific new biomarkers and metabolomic signatures allow us to identify patients that will, or will not, benefit from nutritional therapy (improved outcome) .
- Knowledge of such parameters and markers would help us to implement a tailored nutritional therapy more individually and would give a strong scientific basis for nutritional support planning in the future

Planned activities & deliverables

- We recently completed the **E**ffect of early nutritional support on **F**railty, **F**unctional **O**utcomes and **R**ecovery of malnourished medical inpatients **T**rial (EFFORT) (*Schuetz P et al, Lancet 2019*).
- EFFORT is a randomized-controlled trial, which has included 2028 patients in eight Swiss hospitals with available biobank samples. EFFORT has shown significant outcomes at 30 days: reduction in severe complications (NNT 25) and mortality (NNT 37), increased body function and increased quality of life.
- The large population size of EFFORT and the diversity in medical diagnosis as well as comorbidities of included patients offer the opportunity to study distinct effects of nutritional therapy on patient’s outcomes in subgroups of patients based on biomarkers and metabolomic signatures.
- Ongoing multidisciplinary collaborations between clinical investigators and experts for metabolomic and proteomic markers from the Functional Genomic Center at the ETH in Zurich, will allow us to do a “from bench-to bedside” research approach, with the overall goal to improve nutritional patient care.
- Using a metabolomic approach, we will phenotype patients based on their blood samples and investigate whether single markers or signatures exist, which predict treatment response to nutritional support, thus influencing nutritional policy. This knowledge can be shared & transferred in many countries.

Resources & enablers

- Funded by the Swiss National Foundation, we have already gathered a large biobank for all patients included in EFFORT and have funds for the measurement of blood and metabolomic markers.
- We have also secured an ongoing multidisciplinary collaboration with the ETH Zurich regarding the measurement of different metabolomic markers (Labs. of Prof. Wollscheid & Prof. Schlapbach).
- With the MNI grant we plan to fund PhD students for 1 year helping with the logistics, analysis and interpretation of results. Further, to help promoting and diffusing knowledge (training & education).

Results /outcomes & expected impact

- The EFFORT trial has provided strong evidence for optimal malnutrition management. The concept rest on a systematic nutritional screening of medical inpatients on hospital admission, followed by a nutritional assessment as well as early initiation of adequate nutritional support in at-risk patients.
- Within this preplanned sub-analysis, using a biobanking approach and a strong research collaboration with a leading partner for metabolomic research (ETH Zurich), we expect to further advance the concept of “personalized nutrition” and better understand the physio-pathological mechanisms of action explaining how nutrition exerts its effects on disease recovery in specific patients and illnesses.
- Having such a large patient’s sample with diversity in medical diagnosis and comorbidities, is a unique opportunity to look at blood markers as predictors for treatment response, which in turn could have a strong positive effect on use of nutrition in the future (“nutrition for the right patient at the right time”).
- With the expected results, we aim to come up with criteria for which patient’s nutrition support offers the most benefit, which could then be included in an evidence-based assessment algorithm in the future
- The multicenter design with few exclusion criteria in the main EFFORT trial as well as the high study quality make the findings generalizable. We thus expect our outcomes to have a strong impact on nutritional patient care at both national and international levels.
- The results will enable us to develop new and innovative strategies to implement and advance tailored nutritional care, “personalized nutrition”, in clinical practice in a broad population .