

# Analytical methods to measure kinetics of fermentation of non-digestible carbohydrates inside the human gut

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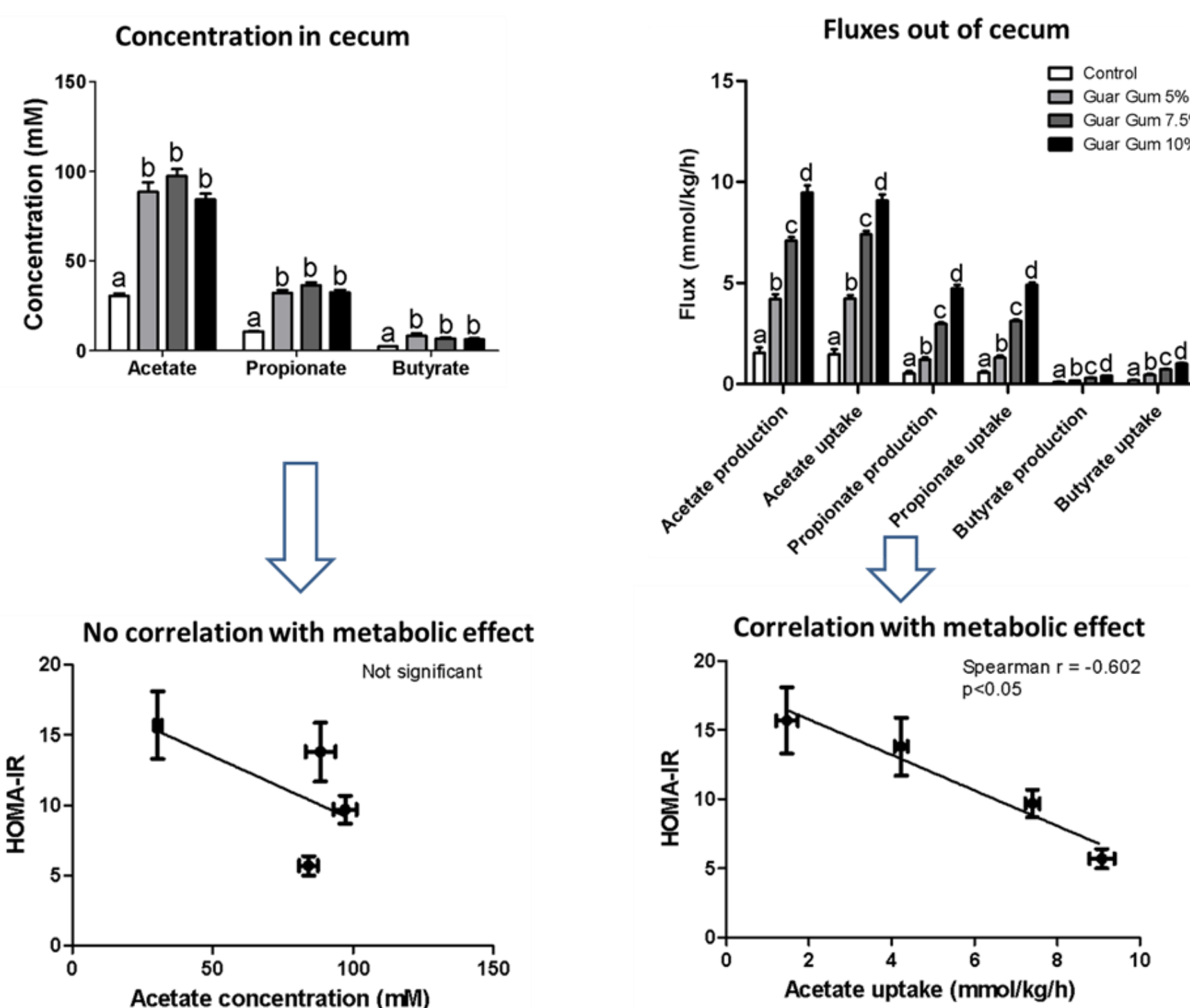
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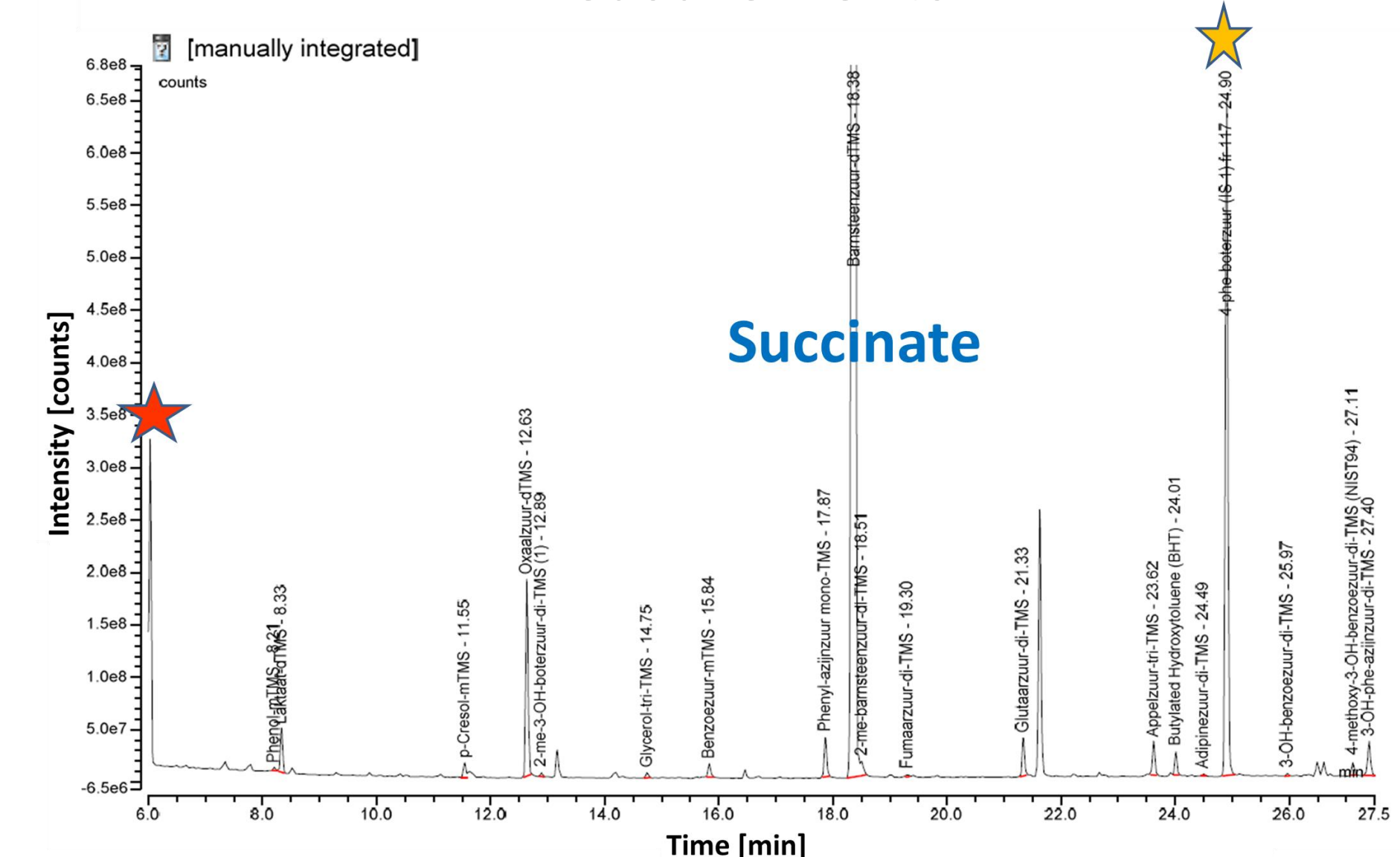
## INTRODUCTION

Consumption of non-digestible carbohydrates (NDC) has been linked to many health benefits, however detailed knowledge of the exact fate and impact of NDC in the intestinal tract is lacking. NDC can be used as substrates for gut microbiota producing short chain fatty acids (SCFAs) among other metabolites. In mice only the uptake *flux* from the intestine, but not the *concentrations* of SCFAs, correlated with improvements of the metabolic syndrome (1). In humans, the access to this inner world was until now almost impossible. The IntelliCap system allows simultaneous investigation of changes in host metabolism, dynamics of the gut microbiota and NDC fermentation.

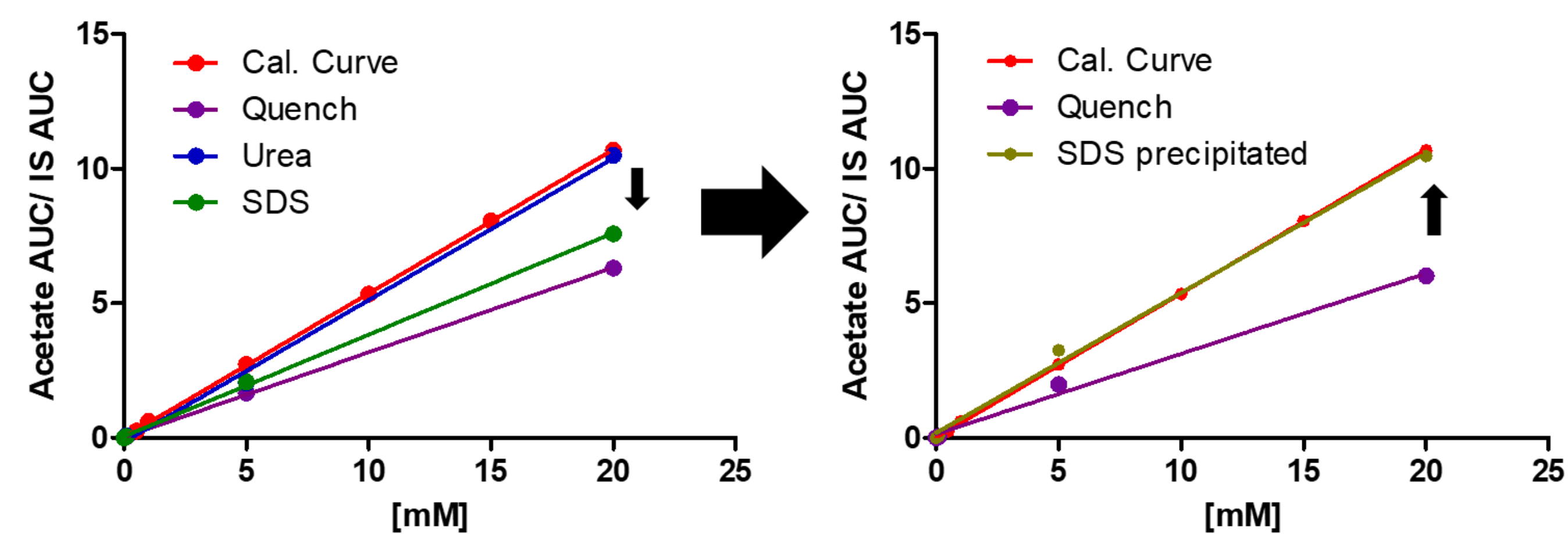
***In vivo* SCFAs fluxes, and not concentrations, correlate with amelioration of the metabolic syndrome (1).**



## Optimization of the organic acids (OAs) concentration measurements.

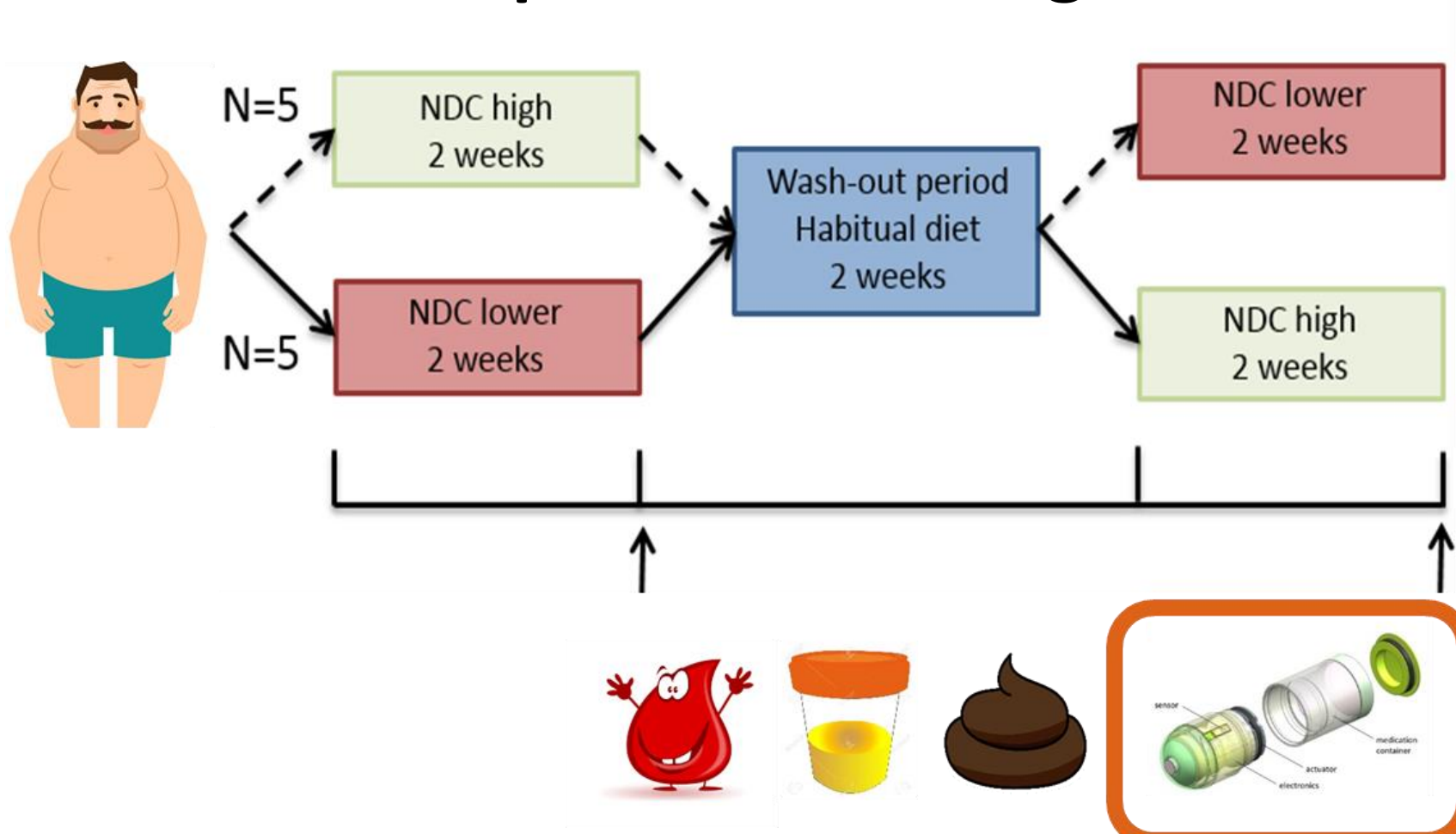


## Developing a quench for microbial enzyme inhibition and DNA preservation, and SCFAs measurements

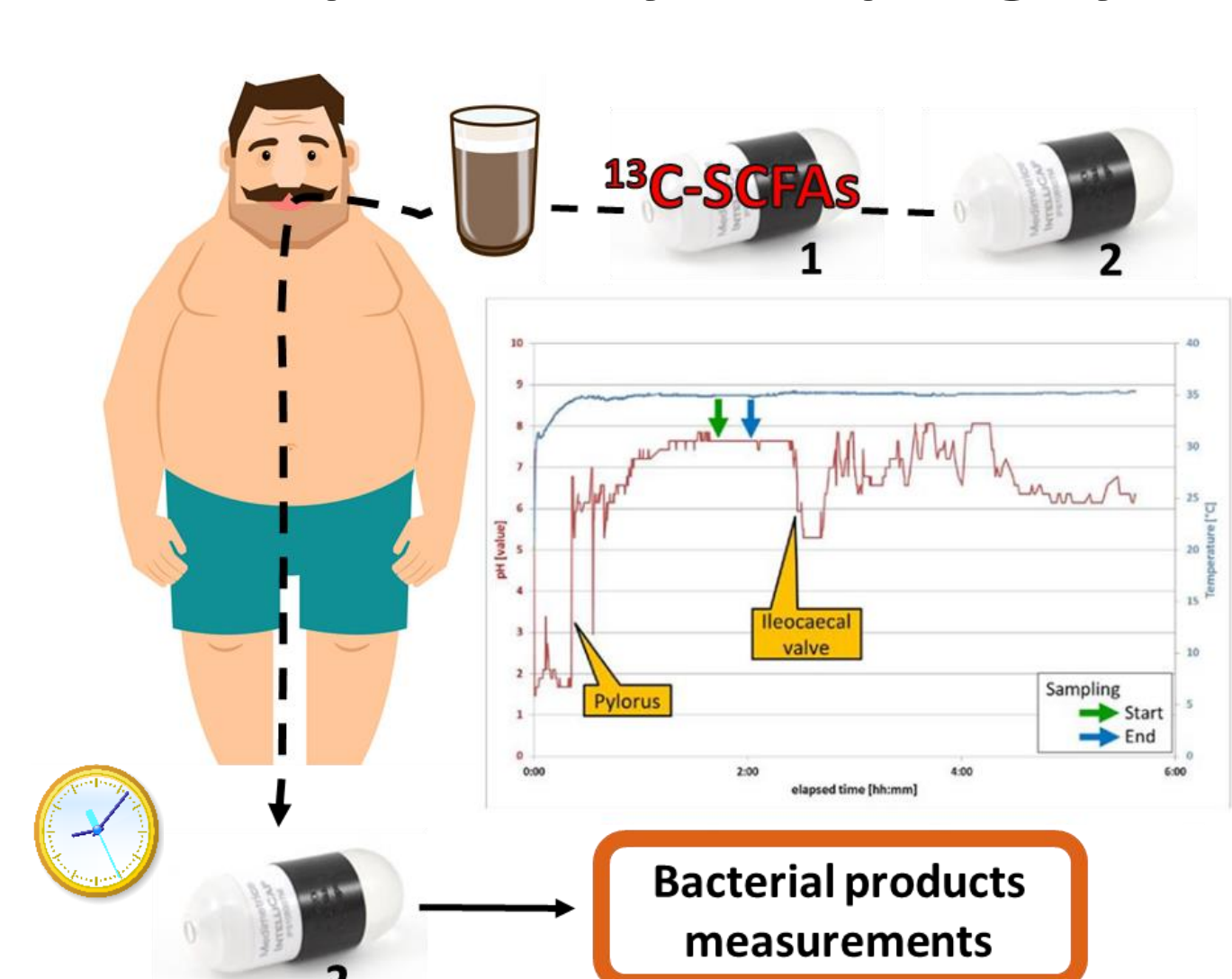


## APPROACH

### Schematic representation of the proposed experimental design.

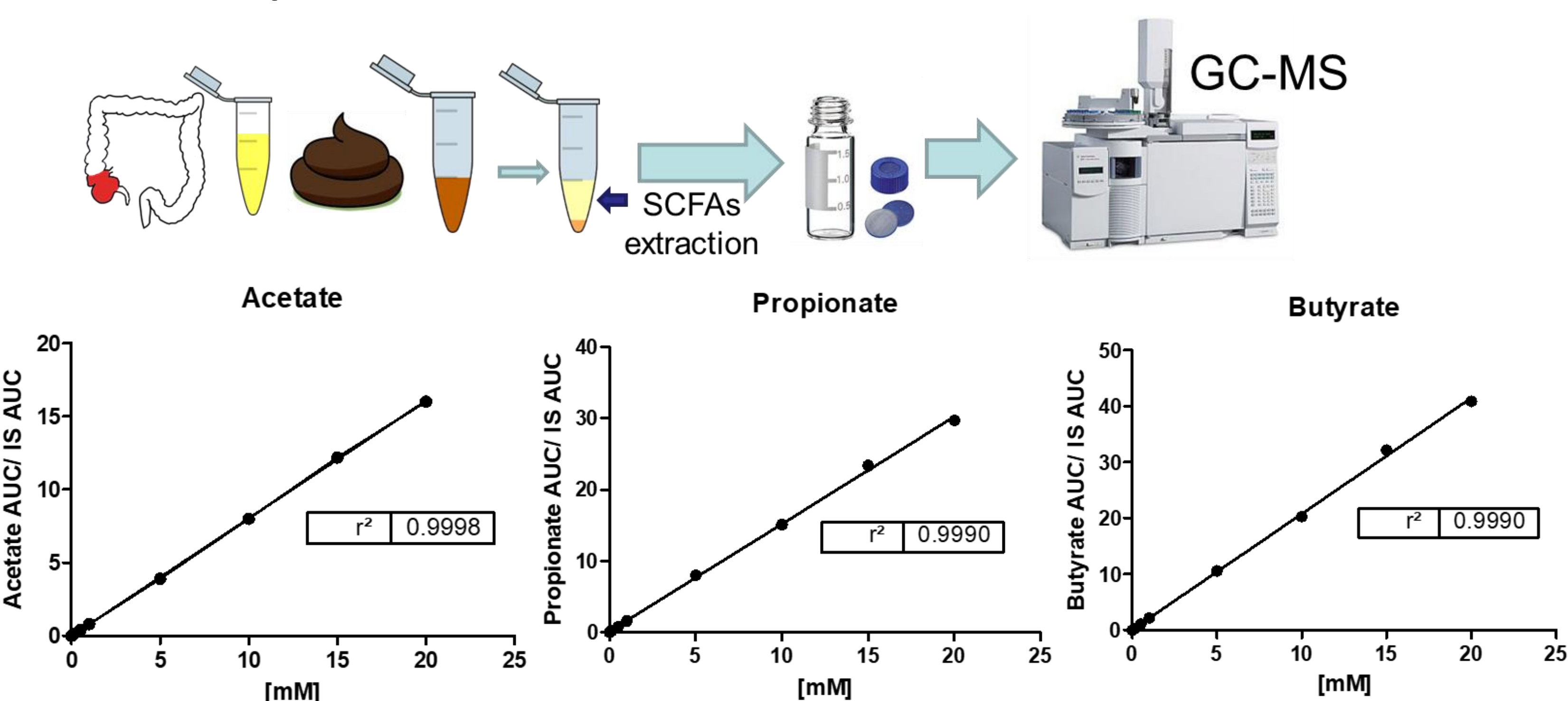


### IntelliCap delivery/sampling system



## RESULTS

### Optimization of the SCFAs concentration measurements.



## CONCLUSIONS

The analytical protocols to measure highly volatile SCFAs and OAs have been optimized for very small volumes of sample.

### What is next?

- To develop protocols to measure bile acids, amino acids and lipids in different types of samples.
- To combine protocols to measure SCFAs, OAs and bile acids using the same extraction procedure.

(1) den Besten G, Havinga R, Bleeker A, Rao S, Gerding A, van Eunen K, Groen AK, Reijngoud DJ, Bakker BM. The short-chain fatty acid uptake fluxes by mice on a guar gum supplemented diet associate with amelioration of major biomarkers of the metabolic syndrome. PLoS One. 2014 Sep 9;9(9):e107392. doi: 10.1371