

MAVENHEALTH



The Metabolic Health Company Augustus 2025

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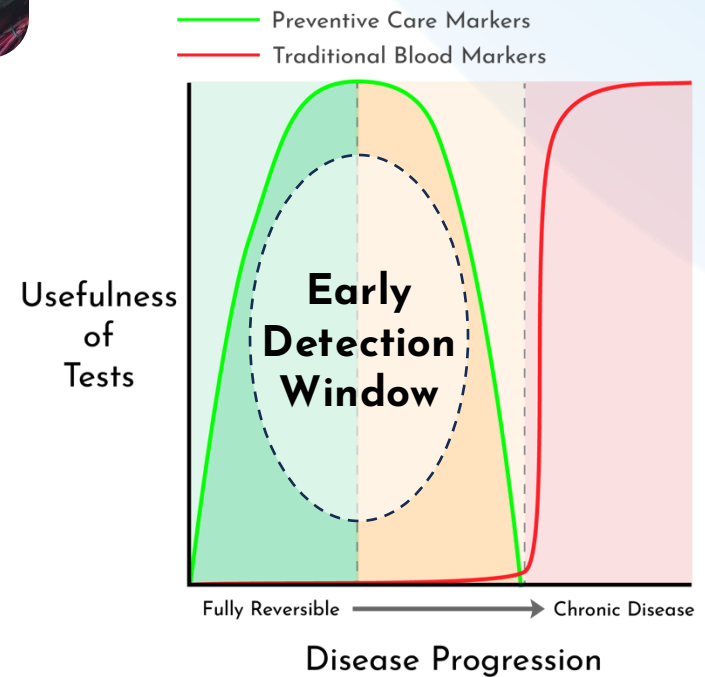
info@futuremedics.nl

The future of preventative care

Your clients want to optimize their health and need personalized support



Our **metabolism** gives us the early warning signs and causes



Early Screening and Tracking for metabolism is Key

Metabolic Health can now be tracked

Classical tests

Limited Information



Glucose



Cholesterol



Blood Pressure

Holistic and preventive tests

Comprehensive & Personalised



Metabolomics - MAVENHEALTH

The modern toolbox to track metabolism



Genetic testing



Current
Status



Relevant
Insights



Tracking



Epigenetic testing



Metabolomics



A new way to look at our metabolism



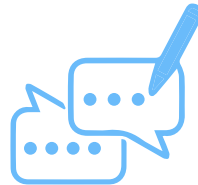
Non-Invasive

Easy to use saliva test.
Pain free.



Relevant Biomarkers

Measure directly the cellular output
& detect areas of metabolic decline



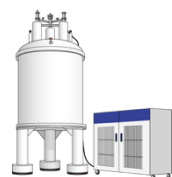
Actionable Advice

Clear dietary and nutritional recommendations
Directly implementable



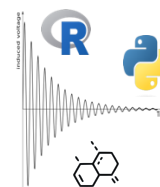
Novel saliva approach

Minimally invasive



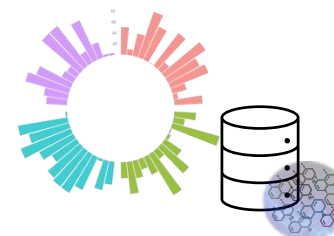
47 saliva metabolites in one measurement

Custom NMR configuration for maximal signal



Automated data processing

Accurate identification & quantification



Data Interpretation

To empower maximal interpretation of metabolic health



Report Generation

Delivering results in a comprehensive format

PCT-patent pending technology



The Metabolic Insights Report

level of information

Quick Insights

Detailed Exploration

The Report Sections

INTRO

METABOLIC STATUS

RECOMMENDATIONS

TEST RESULTS

ANNEX

CONTACT

REPORT

METABOLIC WELL-BEING STATUS

Metabolic health is an important interconnected aspect of our overall health and is related to our risks for diseases, our cognitive function and mood. Maintaining good metabolic health improves quality of life and extends lifespan. The **Metabolic Well-Being Status** provides an overall assessment of your metabolic well-being. It is made of two sections: Maven Health Metabolic Score, Metabolic Insights Panels.

John Doe

Gender: M

Age: 34

Sample Number: 1

Date of Collection: 03/06/2023

Report Date: 15/06/2023

Maven Health Metabolic Score

The **Maven Health Metabolic Score** is a comprehensive measure of overall metabolic well-being, based on the analysis of 47 salivary metabolites. These metabolites impact on metabolic health has been carefully assessed and weighted to ensure an accurate representation of current metabolic state. The present calculated score reflects an optimal metabolic well-being, suggesting a healthy lifestyle characterized by a balanced diet and consistent physical activity.

90 / 100

Metabolic Insights Panels

Energetic Balance

89 / 100

Optimal metabolic condition for energy

Cognitive Performance

68 / 100

Adequate metabolic condition for cognitive performance

Mental and Emotional Wellbeing

94 / 100

Optimal metabolic condition for mental and emotional well-being

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The overview

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ANALYSIS AND RECOMMENDATIONS

Energetic Balance

This score is based on the analysis of metabolites known to be associated with energy metabolism and energy production. The present calculated score indicates an optimal metabolic condition for energy production and utilization, providing a solid foundation for physical vitality and endurance. This suggests that the current lifestyle and dietary choices are excellently supporting their body's energy needs.

Optimal

Adequate

Improvement Needed

16

8

0

acetic acid, propionic acid, urea, l-glutamic acid, butyric acid, l-glutamine, lactic acid, l-phenylalanine, acetone, l-leucine, taurine, l-histidine, d-glucose, l-valine, succinate, choline, alanine, ascorbic acid

glycine, l-fucose, l-histidine, l-aspartic acid, l-lysine, succinic acid, hypoxanthine, trimethyllysine

Recommendations

Decrease L-Lysine Levels

- Reduce intake of proteins in diet.

Decrease Succinic Acid Levels

- Succinic acid is a potent marker for poor metabolic health.
- High levels of succinic acid may signal a broader need for comprehensive lifestyle changes, including dietary modifications, exercise and weight loss.

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The Insights Panels

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SHORT-CHAIN FATTY ACIDS TEST RESULTS

Short-chain fatty acids (SCFAs) are organic acids that are produced by the gut microbes from dietary fiber. They have various roles in the body and health effects. SCFAs can provide energy for the colon cells, regulate the intestinal barrier, modulate the immune system, and affect the inflammation. They can also influence other organs and tissues, such as the brain, the metabolism, and the epigenetics.

Full Range

Acetic Acid	2158.67µM	918.87	102.99 - 6309.55
Butyric Acid	77.94µM	77.94	6.96 - 392.45
Formic Acid	1893.1µM	1893.1	16.16 - 522.49
Propionic Acid	391.05µM	391.05	6.16 - 1956.75

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All Measured Values

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OUT OF RANGE METABOLITES: DEEP DIVE

L-histidine

L-histidine (CAS 71-00-1) is a nutritionally essential amino acid crucial for protein biosynthesis, plays diverse roles in physiological processes. L-histidine (HIS) stands out for its unique functions, including protein buffering, metal ion chelation, and scavenging reactive oxygen and nitrogen species (Molevsk, 2020).

Dietary intake of histidine appears to correlate with factors beneficial for metabolic syndrome related to obesity. Cross-sectional studies have linked higher histidine intake to a lower prevalence of overweight conditions, reduced BMI, waist circumference, and blood pressure. Additionally, histidine supplementation shows promise in improving insulin resistance and inflammation in overweight and obese individuals (Mora et al., 2020). L-histidine has also been shown to have a positive effect on metabolic health by regulating appetite (Crisafidomene et al., 2018).

In a randomized, double-blind, placebo-controlled crossover study, histidine supplementation demonstrated potential benefits for individuals experiencing high fatigue and sleep disruption scores. After ingesting histidine for two weeks, participants reported reduced fatigue, improved reaction times, enhanced clarity of thought, and increased feelings of alertness (Savolainen et al., 2015).

Succinic acid

Succinic acid (CAS 100-15-6) is a dicarboxylic acid, that plays multifaceted roles in biological processes. In living organisms, it manifests as an anion, succinate, essential for ATP production and serves as a signalling molecule reflecting of the cellular metabolic state. Succinate generation occurs within mitochondria through the tricarboxylic acid (TCA) cycle, with contributions from both host and microbiota, primarily through anaerobic fermentation.

Research suggests that higher succinate levels correlate with increased visceral adipose tissue, triglycerides, and diastolic blood pressure, particularly in metabolically unhealthy individuals (Chana-Petrie et al., 2021). Moreover, elevated succinate levels have been observed in individuals with diabetes and animal models of the disease, suggesting a potential link between succinate and insulin resistance, disturbed glucose metabolism, and related conditions (Fernandez-Velazco et al., 2024).

Under normal physiological conditions, succinate does not accumulate significantly. However, metabolic stress, hypoxia, or alterations in mitochondrial composition can lead to a sharp rise in succinate concentrations (Atallah et al., 2022). Changes in succinate were coincident with correlating changes in the microbiome, highlighting succinate as a microbiota-derived metabolite relevant to cardiovascular disease risk (Serrero et al., 2018).

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The Metabolite Deep Dive

METABOLIC INSIGHTS REPORT DEEP INTERPRETATION

REPORT

INTERPRETATION

Metabolic Insights Interpretation for CHB000039

Overall Score: 66/100 (benchmark 88)

Overall, this is a reasonable score, with the most focus needed on energetic balance. Check sample collection timing and meal intake to verify sample quality.

1. Energetic Balance: 60/100 - (benchmark 89)

Amino acids - Overall good levels, but low glycine and alanine. Glycine plays a key role in antioxidant support, protein synthesis, and immune function. Assess diet and consider increasing glycine intake through foods such as gelatin, poultry, and fish.

Energetic Efficiency - High glucose, possibly due to a recent high-carbohydrate meal before testing. However, other markers like lactic acid, pyruvic acid, and succinic acid are in optimal range, suggesting good energy metabolism.

Microbiome metabolism - SCFA levels are overall good, but butyric acid is slightly low. Increasing fiber intake with foods like oats, legumes, and vegetables may help.

Observation - High acetone and high glucose together is an unusual finding. Verify whether the test was taken too soon after a high-carb meal.

2. Cognitive Performance: 77/100 - (benchmark 77)

The cognitive performance score meets the benchmark but may reach optimal levels with a boost in L-tyrosine. L-tyrosine plays a key role in neurotransmitter synthesis and can be increased through foods like eggs, dairy, lean meats, and nuts.

3. Emotional Wellbeing: 76/100 - (benchmark 76)

Emotional wellbeing meets the benchmark but may reach optimal levels with increased L-fucose. L-fucose, linked to immune modulation and cellular communication, can be increased through foods like seaweed, mushrooms, and dairy.

Summary and Recommendations:

Overall, the main areas to focus on are glycine intake for metabolic support and timing of sample collection to ensure accurate glucose readings.

- Dietary Recommendations
 - Increase glycine-rich foods (e.g., bone broth, poultry, fish) to support antioxidant capacity and protein synthesis.
 - Boost fiber intake (e.g., oats, legumes, vegetables) to improve butyrate levels for microbiome health.

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The Interpretation Guide

Functional Interpretations On System and Pathway Level

System/Macro-level

- ✓ Carbohydrate management (glucose, lactate, succinate , ...)
- ✓ Protein intake (total amino acids, specific amino acids, ...)
- ✓ Gut Health (acetate, butyrate, propionate, fucose, ...)

Pathway/Micro-level

- ✓ Waste management (urea cycle, aspartate, glutamate, ...)
- ✓ Folate and vitamin B12 (formic acid, ...)
- ✓ Methylation pathways (choline, sarcosine, glycine, ...)
- ✓ Oxidative stress (allantoin, hypoxanthine, methylguanidine, ...)
- ✓ Neurotransmitter Synthesis (L-tyrosine, L-phenylalanine, ...)

Maven Health's Core Team



Christopher Wall, PhD

Co-CEO & CSO

First to describe a link between cholesterol metabolism and mitochondria
Pharmacist | PhD Cellular metabolism



Kevin Hof, MSc

Co-CEO & CTO

Built data algos to scale RoomPriceGenie's product worldwide
MSc Med. biotechnology | 3+ yrs. data science



Key-opinion leaders



Hon. Prof Bernd Diehl

World leader quantitative
Nuclear Magnetic Resonance



Prof Patrick Giraudeau

World leader NMR
metabolomics



Advisors



Dr S. Anghel

Dir. regulatory affairs



Prof R. Gruetter

In-vivo metabolism
expert



Ass. prof. Sofia Moco

Metabolomics expert



Our mission is to provide everyone with accessible,
affordable and personalized metabolic health insights

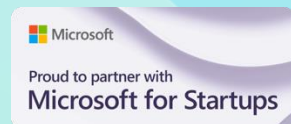
MAVENHEALTH



We look forward working with Executive Health Management

Maven Health
Swiss engineering with Dutch roots

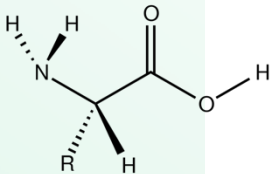
Proudly supported by



Our library covers several categories of metabolites

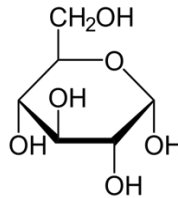
Amino acids (AA & BCAA)

alanine
aspartate
glutamate
glycine
histidine
isoleucine
leucine
lysine
phenylalanine
proline
sarcosine
taurine
threonine
tyrosine
valine



Sugars & glucose metabolism

fucose
galactose
glucose
glutamine
lactate
pyruvate
succinate
sucrose
xylose

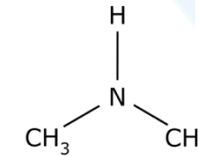


Miscellaneous

dimethyl sulfone
acetone
ethanol
methanol
urea

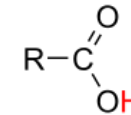
Amines

dimethylamine
hypoxanthine
methylamine
Trimethylamine



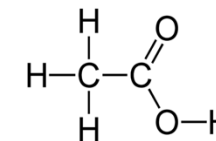
Organic Acids

4-hydroxyphenyllactate
5-aminopentanoate
Ascorbic acid



Short-Chain Fatty Acids

acetate
butyrate
formate
propionate



Use-case example

Maven Health Metabolic Score



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Metabolic Insights Panels

Energetic Balance



Adequate metabolic condition for energy

Cognitive Performance



Optimal metabolic condition for cognitive performance

Mental and Emotional Wellbeing



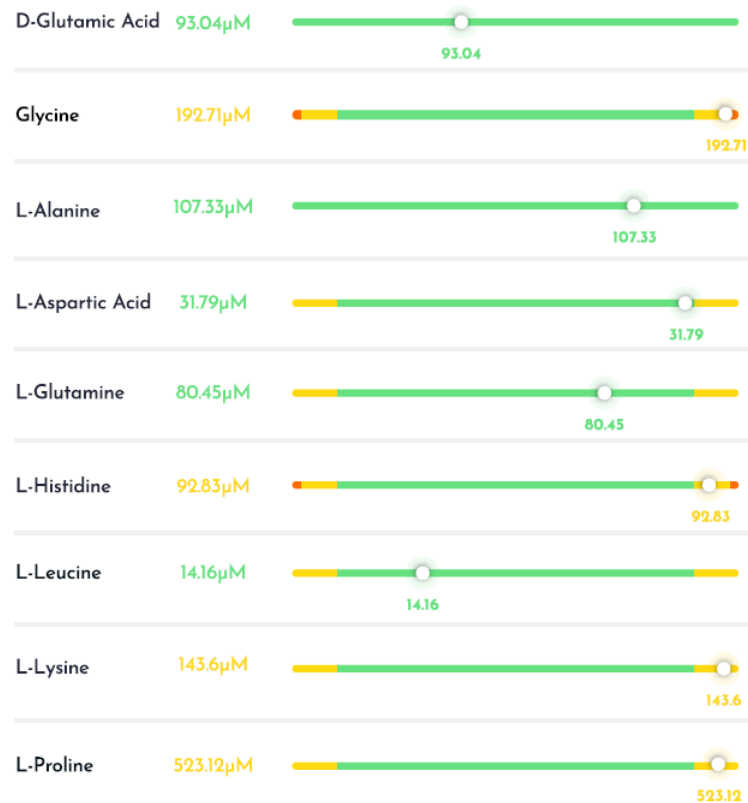
Optimal metabolic condition for mental and emotional well-being

- 53 year-old male.
- Low amount of activity.
- High protein diet.
- Period of high stress and high workload.

1. Energetic balance score room for improvement.
2. Cognitive Performance good.
3. Mental & Emotional Wellbeing good.

Look into the metabolic profile

High load of amino acids.



Good levels of SCFA



Very high lactate/pyruvate ratio



Interpretations & Recommendations

Recommend lower GI foods.

High glucose indicates high GI diet or suboptimal energy utilisation.
More efficient mitochondria, through exercise



Recommendations

Decrease Glucose Levels

- Elevated fasting glucose may signal poor metabolic health.
- Overall metabolic health improvement via comprehensive lifestyle changes including, weight loss, exercise and dietary modifications.

Decrease Succinic Acid Levels

- Succinic acid is a potent marker for poor metabolic health.
- High levels of succinic acid may signal a broader need for comprehensive lifestyle changes, including dietary modifications, exercise and weight loss.



Increase activity levels

High succinic acid indicates poor metabolic health. Could indicate sub-optimal mitochondrial functioning. Confirmed by high lactate/pyruvate ratio.

Decrease L-Isoleucine Levels

- Reduce intake of protein in diet and use of protein supplements.
- BCAAs (l-isoleucine, l-leucine, l-valine) are important indicators of metabolic health. High levels of multiple BCAAs may signal a broader need for comprehensive lifestyle changes beyond merely reducing protein consumption including, weight loss, exercise and dietary modifications.

Decrease L-Valine Levels

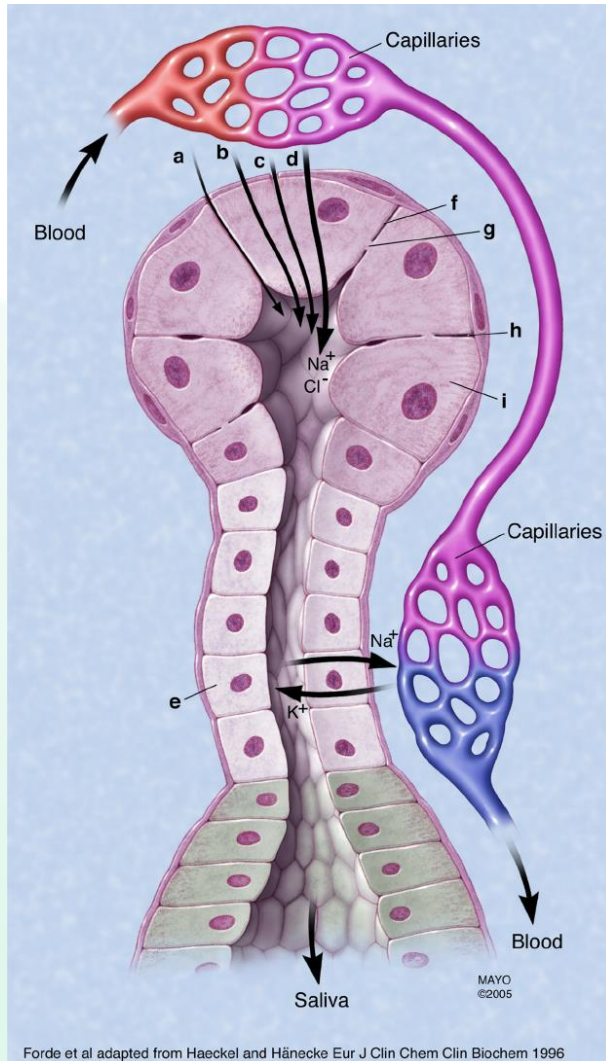
- Reduce protein intake.
- BCAAs (l-isoleucine, l-leucine, l-valine) serve as important indicators of metabolic health. High levels of multiple BCAAs may signal a broader need for comprehensive lifestyle changes beyond merely reducing protein consumption including, weight loss, exercise and dietary modifications.



Consider reducing protein supplementation.

High BCAA's are good in an active lifestyle. In sedentary lifestyle produces radical waste products.
In general, all amino acids are high.

Saliva is a great diagnostic matrix



Salts
Lipids
Hormones
Metabolites
Proteins
Cells
DNA

Constituents

Water (99%)

Slightly acidic (pH 6.0 to 7.0)

Proteins (0.3%)

Inorganic substances (0.2%)

Abundant biofluid

Production in range of 1 to 1.5 liters daily

Highly vascularized glands

876 metabolites in saliva

“mirror of the blood”

Metabolomics has proven predictive potential

nature
medicine

Metabolite profiles and the risk of developing diabetes

Thomas J Wang¹⁻³, Martin G Larson^{3,4}, Ramachandran S Vasan^{3,5}, Susan Cheng^{2,3,6}, Eugene P Rhee^{1,7,8}, Elizabeth McCabe^{2,3}, Gregory D Lewis^{1,2,8}, Caroline S Fox^{3,9,10}, Paul F Jacques¹¹, Céline Fernandez¹², Christopher J O'Donnell^{2,3,8}, Stephen A Carr⁸, Vamsi K Mootha^{8,13,14}, Jose C Florez^{8,13}, Amanda Souza⁸, Olle Melander¹⁵, Clary B Clish⁸ & Robert E Gerszten^{1,2,8}

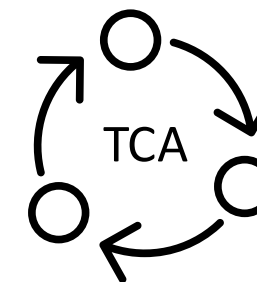


AMINO ACID

Isoleucine
Leucine
Valine
Tyrosine
Phenylalanine

Prediction of Gestational Diabetes through NMR Metabolomics of Maternal Blood

Joana Pinto,[†] Lara M. Almeida,[†] Ana S. Martins,[†] Daniela Duarte,[†] António S. Barros,[‡] Eulália Galhano,[§] Cristina Pita,[§] Maria do Céu Almeida,[§] Isabel M. Carreira,^{||} and Ana M. Gil*,[†]



Pyruvate
Glucose
Lactate
Alanine
Proline

Saliva contains relevant biomarkers

Research evidence on salivary metabolites clinical value

Investigated metabolites as biomarkers

Changes in Salivary Amino Acid Composition During Aging

SHOJI TANAKA¹, MAMORU MACHINO¹, SAYOKO AKITA¹, YOSHIKO YOKOTE² and HIROSHI SAKAGAMI³

NMR analysis of the human saliva metabolome distinguishes dementia patients from matched controls†

João Figueira,^a Pär Jonsson,^b Annelie Nordin Adolfsson,^c Rolf Adolfsson,^c Lars Nyberg^d and Anders Öhman^{*a}

Global Metabolomic Analysis of Human Saliva and Plasma from Healthy and Diabetic Subjects, with and without Periodontal Disease

Virginia M. Barnes¹, Adam D. Kennedy³, Fotinos Panagakos¹, William Devizio¹, Harsh M. Trivedi¹, Thomas Jönsson³, Lining Guo³, Shannon Cervi², Frank A. Scannapieco^{2*}

¹ Colgate Palmolive Technology Center, Piscataway, NJ, United States of America, ² Metabolon, Durham, NC, United States of America, ³ Department of Oral Biology, School of Dental Medicine, University at Buffalo, State University of New York, Buffalo, NY, United States of America



AMINO ACID

Glycine
Lysine
Glutamate

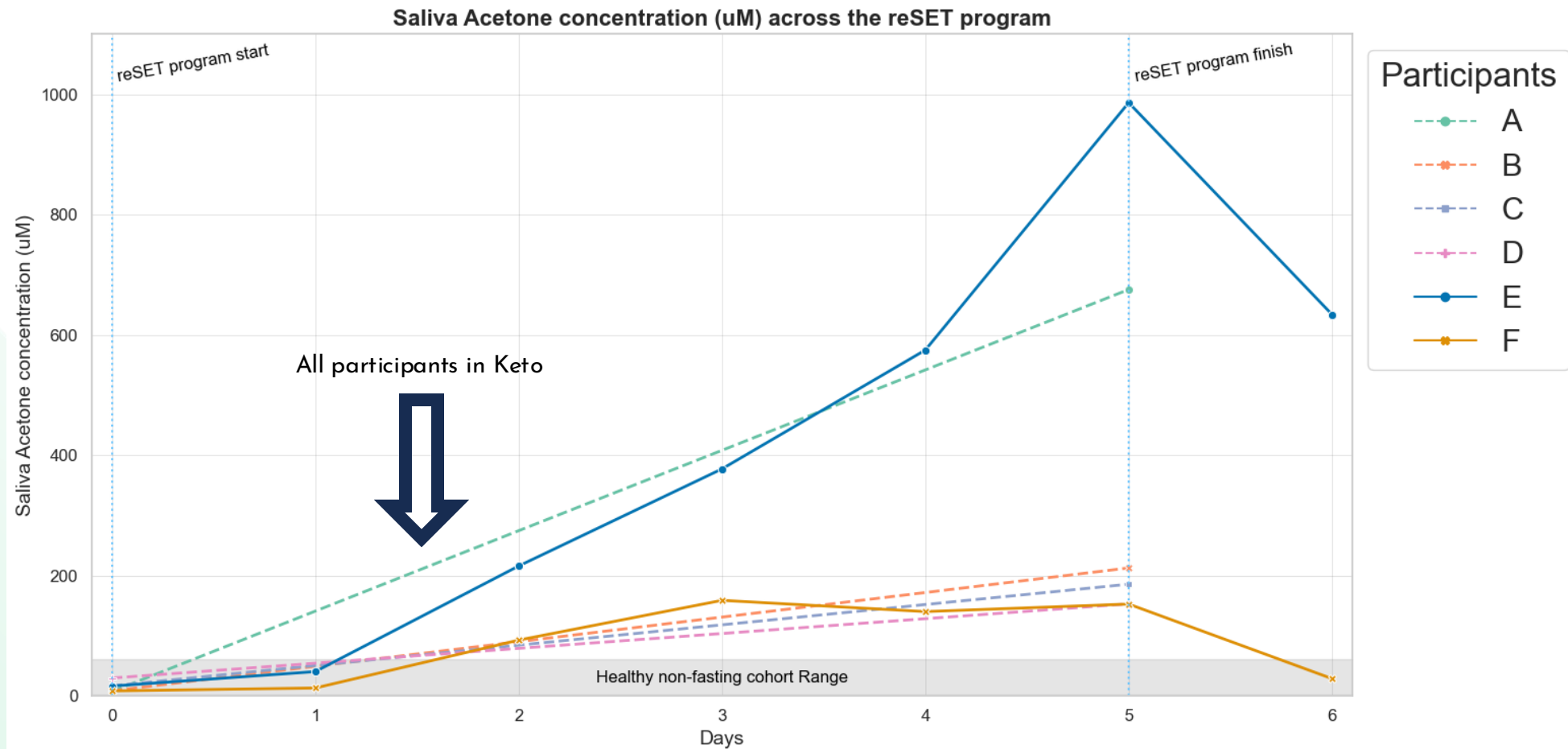


Acetate
Dimethyl sulfone
Glycerol
Histamine
Propionate



1,5-anhydroglucitol
Glucose
 α -hydroxybutyrate

Use cases - Ketogenesis & Acetone



*2024; White paper: <https://www.biorxiv.org/content/10.1101/2024.12.29.630652v1>