



# MAVENHEALTH



**The Metabolic Health Company**

Augustus 2025

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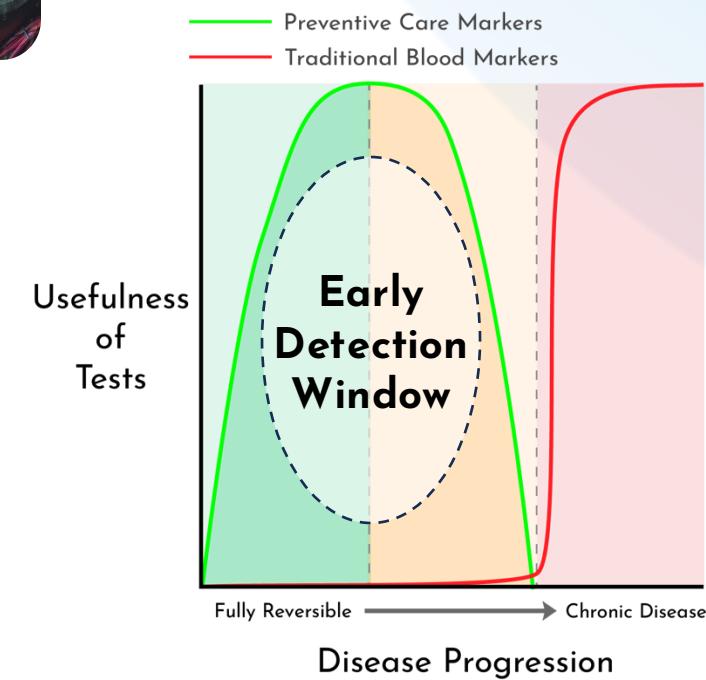
[info@futuremedics.nl](mailto:info@futuremedics.nl)

# 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



	Current Status	Relevant Insights	Tracking
Genetic testing		✗	✗
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



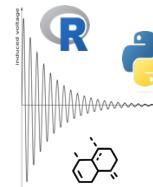
### Novel saliva approach

Minimally invasive



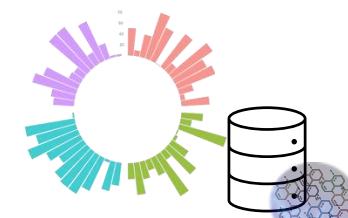
### 47 saliva metabolites in one measurement

Custom NMR configuration for maximal signal



### Automated data processing

Accurate identification & quantification



### Data Interpretation

To empower maximal interpretation of metabolic health

PCT-patent pending technology



### Report Generation

Delivering results in a comprehensive format

# The Metabolic Insights Report

## Quick Insights



[INTRO](#) [METABOLIC STATUS](#) [RECOMMENDATIONS](#) [TEST RESULTS](#) [ANNEX](#) [CONTACT](#) 

### 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: 54 Sample Number: 1 Date of Collection: 03/08/2023 Report Date: 15/08/2023

#### Maven Health Metabolic Score

**90 / 100**

The Maven Health Metabolic Score is a comprehensive measure of overall metabolic well-being, based on the analysis of multiple metabolites. The score provides a quick snapshot on metabolic health, but it is only a simplified and weighted score to provide an accurate representation of overall metabolic state. The present calculated score reflects on optimal metabolic well-being, suggesting a healthy lifestyle characterized by a balanced diet and consistent physical activity.

**Metabolic Insights Panels**

Panel	Score	Description
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

[INTRO](#) [METABOLIC STATUS](#) [RECOMMENDATIONS](#) [TEST RESULTS](#) [ANNEX](#) [CONTACT](#) 

### ANALYSIS AND RECOMMENDATIONS

#### Energetic Balance

**89 / 100**

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 the body's energy needs.

Optimal: 18, Adequate: 6, Improvement Needed: 0

Optimal: 18, Adequate: 6, Improvement Needed: 0

Acetic acid, propionic acid, urea, *l*-glutamate, *l*-butyrate, *l*-phenylalanine, octanoate, *l*-isoleucine, taurine, Hemeo, *d*-glucose, *l*-valine, succinate, choline, alkanone, ascorbic acid

**Recommendations**

- Decrease *l*-Lysine Levels
- Decrease Succinic Acid Levels

• Reduce intake of protein in diet.

• 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

level of information

The Report Sections

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### SHORT-CHAIN FATTY ACIDS TEST RESULTS

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

Full Range

Metabolite	Value	Range
Acetic Acid	2138.87 $\mu$ M	120.99 - 6509.53
Butyric Acid	77.94 $\mu$ M	6.90 - 592.43
Formic Acid	389.14 $\mu$ M	16.18 - 522.49
Propionic Acid	391.05 $\mu$ M	0.16 - 195.73

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All Measured Values



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### OUT OF RANGE METABOLITES: DEEP DIVE

#### L-histidine

**1524  $\mu$ M**

L-histidine (CAS 71-00-1), 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 (Helelek, 2020).

Dietary intake of histidine appears to correlate with factors beneficial for metabolic syndrome related to L-histidine. 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 (Mous et al., 2020). L-histidine has also been shown to have a positive effect on metabolic health by regulating leptin (Dincolantonio et al., 2016).

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 (Suzukawa et al., 2015).

**Scuccinic acid**

Scuccinic acid (CAS 110-15-6) is a dicarboxylic acid, that plays multifaceted roles in biological processes. In living organisms, it manifests as an on/off switch, essential for ATP production and serves as a signalling molecule reflective of the cellular metabolic state. Succinate generation occurs within mitochondria through the tricarboxylic acid (TCA) cycle, with contributions from both host and microbiome, primarily through anaerobic fermentation.

Scuccinate levels are often elevated in various diseases, including metabolic, liver, and muscle disorders, and diabetic blood pressure. 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 (Fernández-Vebeda et al., 2024).

Under normal physiological conditions, succinate does not accumulate significantly. However, metabolic stress, hypoxia, or alterations in microbiome composition can lead to a sharp rise in succinate concentrations (Atalay et al., 2022). Changes in succinate were coincident with underlying changes in the metabolism, highlighting succinate as a microbiome-derived metabolite relevant to cardiovascular disease risk (Savina et al., 2019).

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The Metabolite Deep Dive

## Detailed Exploration

[METABOLIC INSIGHTS REPORT DEEP INTERPRETATION](#)

### 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, sulphur amino acid, and enzyme function. Assess diet and consider increasing glycine intake through eggs, poultry, and beans.

**Energetic Efficiency -** High glycine, possibly due to a recent high-carbohydrate meal before testing. However, other markers like *l*-threonine, *l*-proline, and *l*-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 octanoate 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 meat, 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 is 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 activity and protein synthesis.
  - Boost fibre 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



**EPFL**



**Kevin Hof, MSc**

Co-CEO & CTO

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



**WAGENINGEN**  
UNIVERSITY & RESEARCH

## Key-opinion leaders



**Hon. Prof Bernd Diehl**  
World leader quantitative  
Nuclear Magnetic Resonance

**SPECTRAL  
SERVICE**



**Prof Patrick Giraudeau**  
World leader NMR  
metabolomics

**Nantes  
Université**

## Advisors



**Dr S. Anghel**  
Dir. regulatory affairs



**Prof R. Gruetter**  
In-vivo metabolism  
expert



**Ass. prof. Sofia Moco**  
Metabolomics expert

**VU** VRIJE  
UNIVERSITEIT  
AMSTERDAM

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



**EPFL**

Swiss  
Healthcare  
Startups

Future of  
Health Grant

**FIT**  
fondation  
pour l'innovation  
technologique

**founderful** Campus

**VENTURE KICK**

**s2s Ventures**

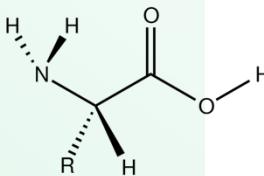
**DAYONE**



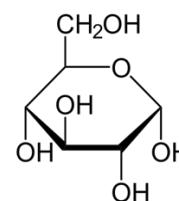
# Our library covers several categories of metabolites

## Amino acids (AA & BCAA)

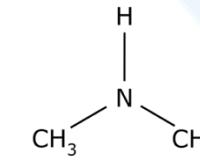
alanine  
aspartate  
glutamate  
glycine  
histidine  
isoleucine  
leucine  
lysine  
phenylalanine  
proline  
sarcosine  
taurine  
threonine  
tyrosine  
valine



## Sugars & glucose metabolism

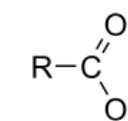


fucose  
galactose  
glucose  
glutamine  
lactate  
pyruvate  
succinate  
sucrose  
xylose



dimethylamine  
hypoxanthine  
methylamine  
Trimethylamine

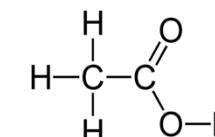
## Organic Acids



4-hydroxyphenyllactate  
5-aminopentanoate  
Ascorbic acid

## Miscellaneous

dimethyl sulfone  
acetone  
ethanol  
methanol  
urea



## Short-Chain Fatty Acids

acetate  
butyrate  
formate  
propionate

# Use-case example

## 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.

## 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

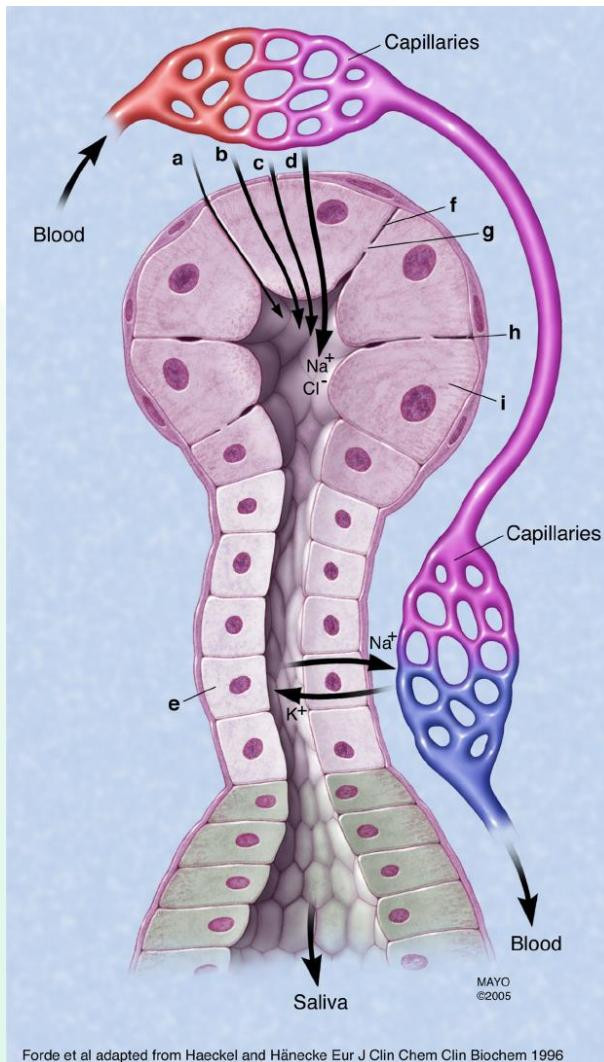
- Reduce protein intake.
- BCAAs (l-isoleucine, l-leucine, l-valine) serve as important indicators of metabolic health. High levels of multiple BCAAs may signal a broader need for comprehensive lifestyle changes beyond merely reducing protein consumption including, weight loss, exercise and dietary modifications.



## 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



## 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

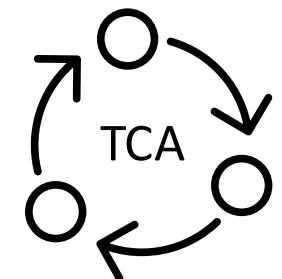
Thomas J Wang<sup>1-3</sup>, Martin G Larson<sup>3,4</sup>, Ramachandran S Vasan<sup>3,5</sup>, Susan Cheng<sup>2,3,6</sup>, Eugene P Rhee<sup>1,7,8</sup>, Elizabeth McCabe<sup>2,3</sup>, Gregory D Lewis<sup>1,2,8</sup>, Caroline S Fox<sup>3,9,10</sup>, Paul F Jacques<sup>11</sup>, Céline Fernandez<sup>12</sup>, Christopher J O'Donnell<sup>2,3,8</sup>, Stephen A Carr<sup>8</sup>, Vamsi K Mootha<sup>8,13,14</sup>, Jose C Florez<sup>8,13</sup>, Amanda Souza<sup>8</sup>, Olle Melander<sup>15</sup>, Clary B Clish<sup>8</sup> & Robert E Gerszten<sup>1,2,8</sup>



Isoleucine  
Leucine  
Valine  
Tyrosine  
Phenylalanine

## Prediction of Gestational Diabetes through NMR Metabolomics of Maternal Blood

Joana Pinto,<sup>†</sup> Lara M. Almeida,<sup>†</sup> Ana S. Martins,<sup>†</sup> Daniela Duarte,<sup>†</sup> António S. Barros,<sup>‡</sup> Eulália Galhano,<sup>§</sup> Cristina Pita,<sup>§</sup> Maria do Céu Almeida,<sup>§</sup> Isabel M. Carreira,<sup>||</sup> and Ana M. Gil<sup>\*,†</sup>



Pyruvate  
Glucose  
Lactate  
Alanine  
Proline

# Saliva contains relevant biomarkers



## Research evidence on salivary metabolites clinical value

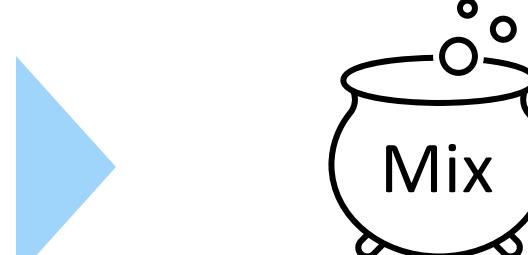
### Changes in Salivary Amino Acid Composition During Aging

SHOJI TANAKA<sup>1</sup>, MAMORU MACHINO<sup>1</sup>, SAYOKO AKITA<sup>1</sup>, YOSHIKO YOKOTE<sup>2</sup> and HIROSHI SAKAGAMI<sup>3</sup>

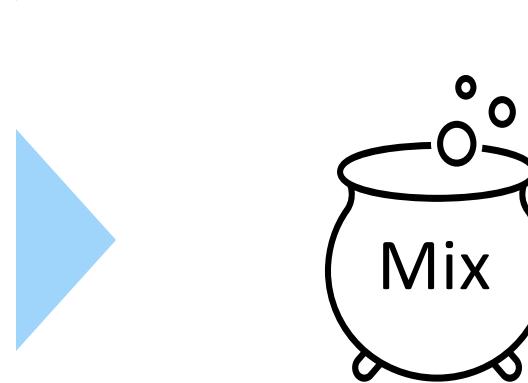
## Investigated metabolites as biomarkers



Glycine  
Lysine  
Glutamate



Acetate  
Dimethyl sulfone  
Glycerol  
Histamine  
Propionate



1,5-anhydroglucitol  
Glucose  
 $\alpha$ -hydroxybutyrate

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

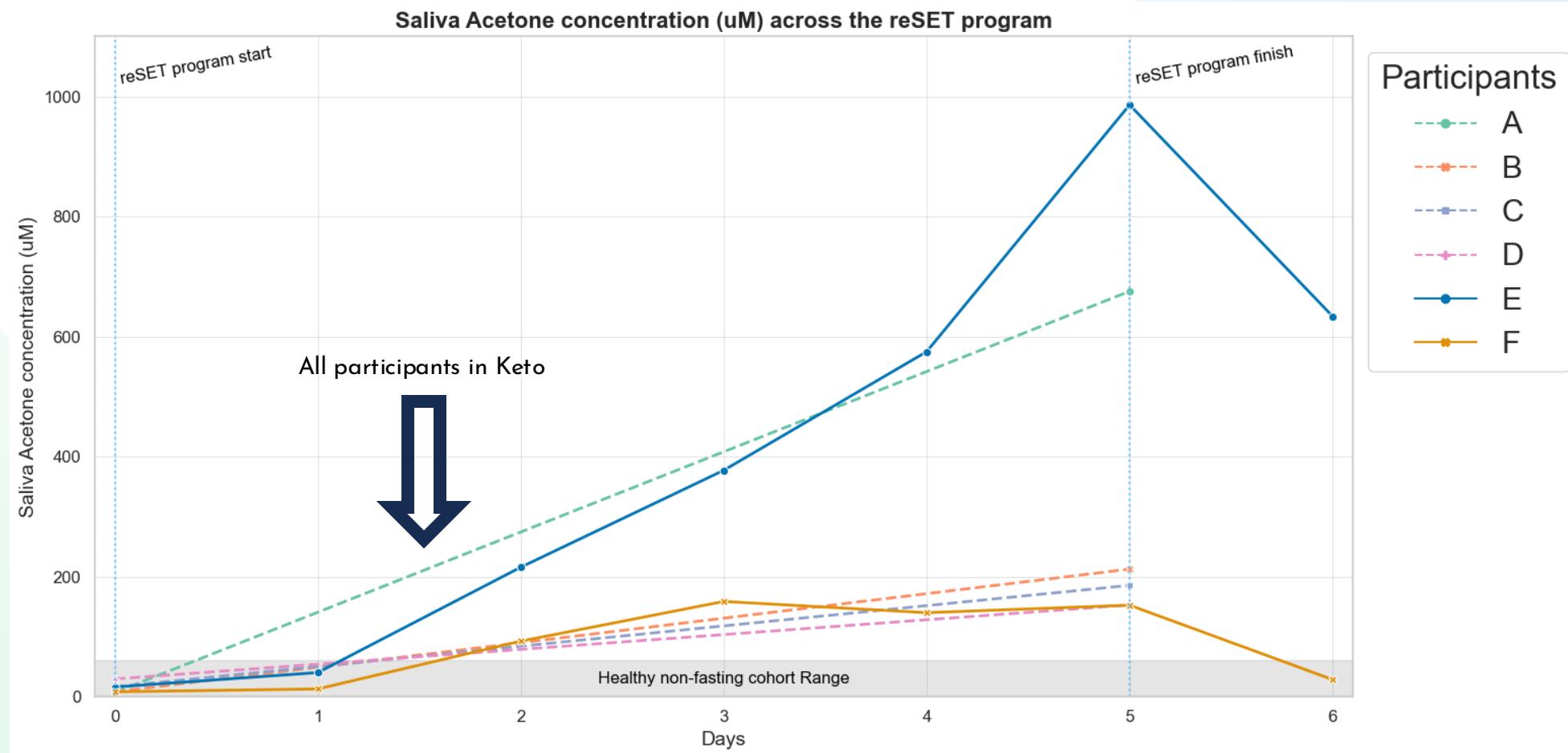
João Figueira,<sup>a</sup> Pär Jonsson,<sup>b</sup> Annelie Nordin Adolfsson,<sup>c</sup> Rolf Adolfsson,<sup>c</sup> Lars Nyberg<sup>d</sup> and Anders Öhman<sup>\*a</sup>

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

Virginia M. Barnes<sup>1</sup>, Adam D. Kennedy<sup>3</sup>, Fotinos Panagakos<sup>1</sup>, William Devizio<sup>1</sup>, Harsh M. Trivedi<sup>1</sup>, Thomas Jönsson<sup>3</sup>, Lining Guo<sup>3</sup>, Shannon Cervi<sup>2</sup>, Frank A. Scannapieco<sup>2\*</sup>

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

# Use cases - Ketogenesis & Acetone



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