GLOBAL METABOLOMICS AS A TOOL FOR BIOMARKER DETECTION

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INTRODUCTION

The metabolome in the body is influenced by a variety of factors, such as diet, age, gender and genetics, but also by exercise. Exercise metabolism refers to the biochemical and physiological changes that occur in the body during physical exercise.

The aim of this study was to identify biochemical biomarkers for exercise by detecting physiological changes in the metabolome that are associated with exercise.

METHODS

The starting point of the study was an already established LC-MS/MS method for the metabolome analysis, as well as the sample preparation of Dried Blood Spot.

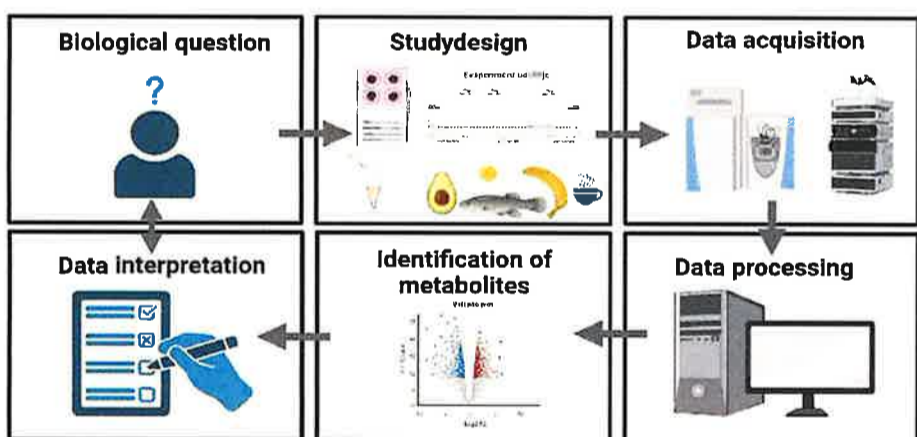A global metabolomics workflow was followed to conduct the experiment.

Figure 1: *Global metabolomics workflow.*

A study design was created that indicated the time point at which participants were to take the blood samples, when they were to undergo the intense training, and when meals were to be consumed.
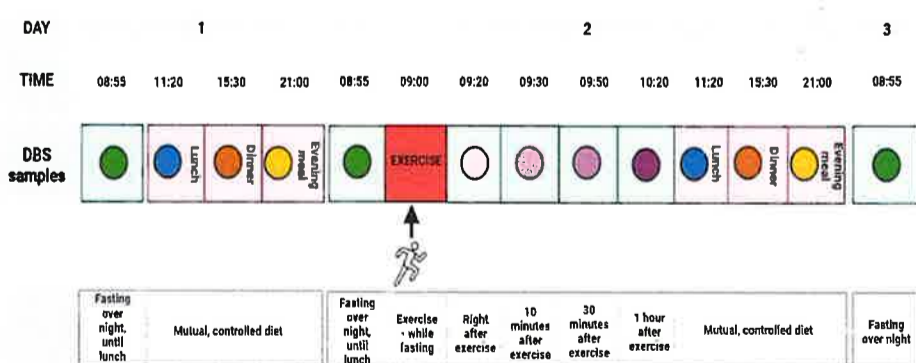

Figure 2: *The study design that includes the collection of DBS-samples at thirteen different time points over a period of three days, marked with different color-coded circles.*

RESULTS

Several metabolites have been identified as potential biomarkers as a result of exercise, as shown in the figures below.
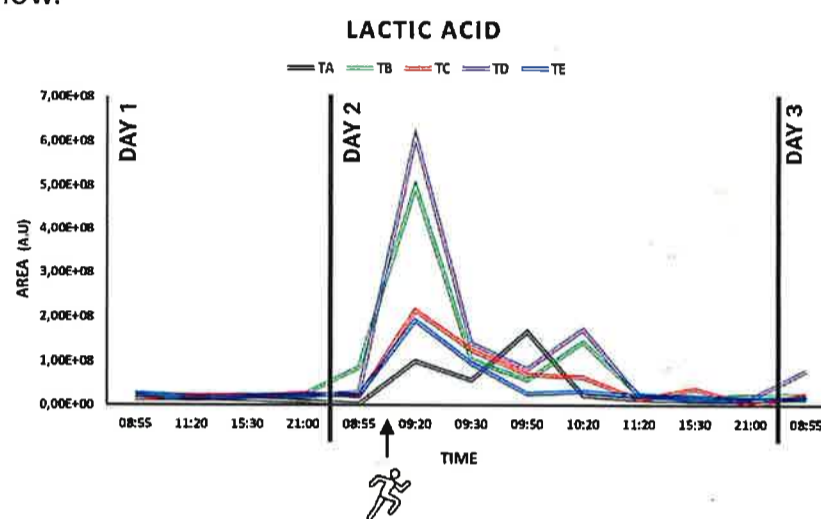

Figure 3: *Measured peak area of lactic acid in samples from five participants, taken over three days. The graphs show an increase in the samples taken after exercise.*
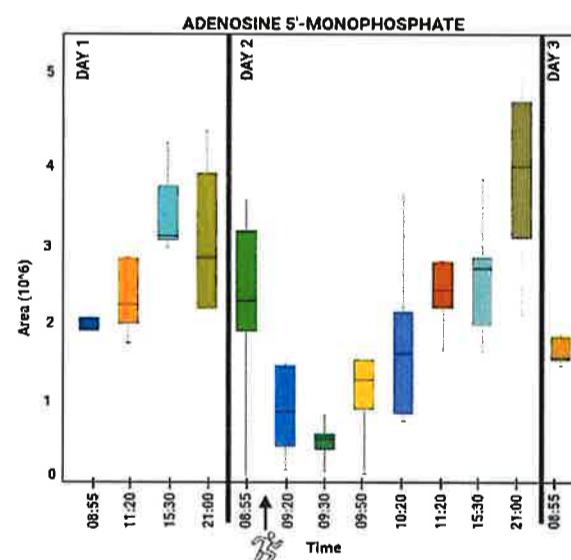

Figure 4: *Box whisker plot showing the measured peak area of AMP from five participants taken over three days. The plot demonstrates a decrease in the samples after exercise.*
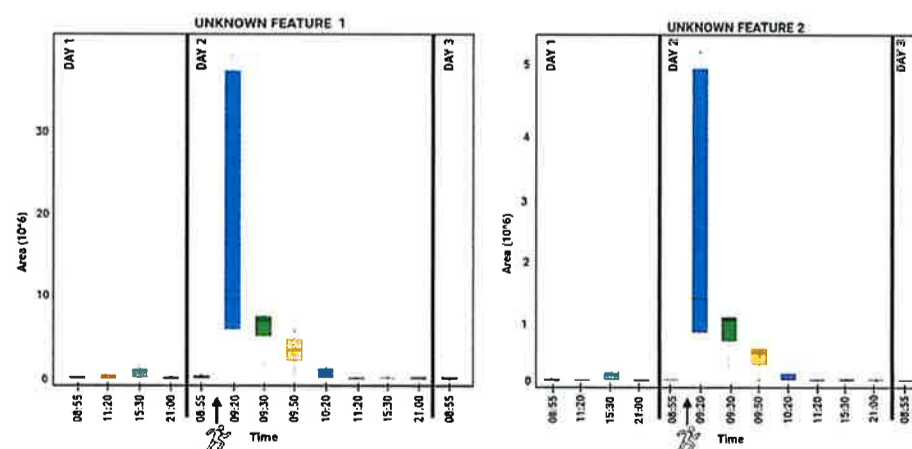

Figure 5: *Box whisker plot of unknown feature 1 and unknown feature 2 from an originally unknown compound. The plot shows a significant increase immediately after exercise, followed by a gradual decrease.*

CONLUSION

Several metabolites were identified as potential biomarkers, including AMP and lactic acid. Additionally, one unknown compound with two features was detected, which could potentially be a biochemical signature for exercise metabolism. Other metabolites, that showed a metabolic change associated with exercise, were also identified, such as hypoxanthine, taurine and phenylalanine.