

## Research Centre for Healthy and Sustainable Living

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### **Abstract**

*The Research Centre for Healthy and Sustainable Living of the University of Applied Sciences Utrecht aims to enable healthy urban living.*

*According to the latest concept, health entails the capacity to respond resiliently to stressors that disturb homeostasis. In addition, an individual's health benefits from the ability to self-manage and is determined by personalized conditions. One of the derived research challenges is to obtain know-how (biomarkers) and tools (e.g. point-of-care, wearables) to monitor an individual's health condition in daily life.*

*The well-known quotes "you are what you eat" and "sitting is the new smoking" indicate that condition of the oro-gastrointestinal tract and physical activity are pivotal to health. With this popular knowledge, we set out to identify biomarkers to monitor health benefits from nutrition and physical activity. Our first studies with human volunteers aimed at defining which physiological parameters were responsive to a defined stressor. We used exercise performed on a bicycle ergometer as a known stressor and aimed at defining the extent of exercise (defined by Wmax) needed to influence physiological relevant parameters. Young male volunteers executed different exercise protocols of different intensities, ranging from mild (1 h, 50% Wmax) to extensive (1h, 70% Wmax). We measured kinetic changes in blood of various physiological parameters. Changes in for instance blood leukocytes, and various intestinal parameters (e.g. intestinal Fatty Acid Binding Protein, iFABP) indicated that responses depend on the extent of physical activity. In addition, changes were influenced by an unhealthy condition, which was deprivation of water intake during exercise. Data indicates that responses to exercise can be induced by a milder exercise protocol, and that responses depend on health condition. This suggests that*

*the exercise model can also be used to test health in less fit individuals such as elderly or individuals with lower condition (e.g. chronic patients).*

*We are now interested to assess how responses to exercise differ by age, gender and life style. Our next research goals are therefore to: -evaluate the initial selection of biomarkers in specific patient-groups and; -how these biomarkers are influenced by the condition of the oro-gastrointestinal tract, e.g. via nutrition.*

**Keywords:** *bionmarkers; health; point of care; wearables*

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