Breath Biopsy® of Elite Runners Engaging in Exhaustive Exercise

1 Human Integrative and Environmental Physiology Laboratory Mayo Clinic, 200 First St. SW, Rochester, MN 55905, USA;
2 École Nationale des Sports de Montagne, site de l’École Nationale de Ski et d’Alpinisme, Chamonix, France;
3 Ultra Sport Science Foundation, 109 Bd de l’Europe, 69310 Pierre-Bénite, France;
4 Owlstone Medical, 183 Cambridge Science Park, Milton Road, Cambridge CB4 0GJ, UK.

1. Background and Objectives

Exhaustive exercise, typified by ultra-marathon running, represents an extreme activity that triggers unique physiological responses. An enhanced study design also provides an opportunity to identify and study markers of injury. In this study, we focused on changes occurring in the respiratory system during the 2019 Ultra-Trail du Mont-Blanc (UTMB) ultra-marathon. The aim of this study was to identify potential biomarkers of exhaustive exercise by characterizing VOCs that differ in abundance between samples collected before and after an ultra-marathon.

2. Methods

Breath Biopsy samples were collected and analyzed before and after the race using the Owlstone Breath Sampler (Figure 2). This device was employed to assess their origins and interpret their significance in a wider biological context.

3. Results

Across all samples, 411 different VOCs were identified, with 187 significantly different post-race samples. These changes were compared to VOCs detected in the Breath Biopsy HRAM Library of VOCs.

4. Conclusions

Several (10/63) were assigned molecular identities on the basis of comparison to the Breath Biopsy HRAM Library of VOCs. Additionally, the super abundant peak was tentatively identified as acetic acid. This finding supports the use of VOCs to compare new samples to VOC markers of physiological stress and inflammation specific to the respiratory system.

5. References


Further Resources

Breath Biopsy Products & Services owlstonemedical.com/products
Lipid peroxidation as a source of VOCs on breath owlstonemedical.com/lipid-peroxidation

owlstonemedical.com