



HAL
open science

Metabolic adjustments of normal and overweight subjects during overfeeding revealed by metabolomics

Jean-Louis J.-L. Sébédio, Béatrice Morio, Jean-Francois Martin, Emilie Chanseaume, Maude Alligier, Christophe Junot, Bernard Lyan, Yves Y. Boirie, Hubert Vidal, Martine Laville, et al.

► To cite this version:

Jean-Louis J.-L. Sébédio, Béatrice Morio, Jean-Francois Martin, Emilie Chanseaume, Maude Alligier, et al.. Metabolic adjustments of normal and overweight subjects during overfeeding revealed by metabolomics. 105. AOCs Annual Meeting and Expo, American Oil Chemists' Society (AOCS). USA., May 2014, San Antonio, United States. hal-02742068

HAL Id: hal-02742068

<https://hal.inrae.fr/hal-02742068>

Submitted on 3 Jun 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Metabolic adjustments of normal and overweight subjects during overfeeding revealed by metabolomics

Jean-Louis Sébédio^{1,2,3}, Beatrice Morio^{1,2}, Jean-François Martin^{1,2,3}, Emilie Chansaume^{1,2,3}, Maud Alligier^{5,6}, Christophe Junot⁴, Bernard Lyan^{1,2,3}, Yves Boirie^{1,2}, Hubert Vidal^{5,6}, Martine Laville^{5,6}, Blandine Comte^{1,2}, Estelle Pujos-Guillot^{1,2,3}

(1)- INRA, UMR 1019, UNH, CRNH Auvergne, F-63000 Clermont-Ferrand, France; (2)- Clermont Université, Université d'Auvergne, Unité de Nutrition Humaine, BP 10448, F-63000 Clermont-Ferrand, France; (3)- INRA, UMR 1019, Plateforme d'Exploration du Métabolisme, UNH, F-63000 Clermont-Ferrand, France; (4)- CEA-LEMM, F-91191 Gif sur Yvette cedex; (5)- Institut National de la Santé et de la Recherche Médicale Unit 1060, CarMeN Laboratory and Centre Européen Nutrition Santé, Lyon 1 University, F-69600 Oullins, France; (6)- Centre de Recherche en Nutrition Humaine (CRNH) Rhône-Alpes, Centre Hospitalier Lyon-Sud, F-69310 Pierre Bénite, France.

The purpose of the present work was to compare early changes in metabolic status of male free living overweight (OW) and lean subjects (NW) during a moderate weight gain, using a metabolomic approach.

Nineteen lean and 19 overweight male volunteers were submitted to a lipid-enriched overfeeding protocol. Metabolic explorations, as well as plasma and urine metabolomic profiles acquired using UPLC-MS, were determined along 8 weeks to compare metabolic trajectories and identify early changes in metabolic processes.

Urinary metabolomic profiles during overfeeding evidenced differences in metabolic trajectories between groups, characterized by an increase over time of short-, medium-chain acylcarnitines, and bile acids in OW. For most of the anthropometric, metabolic parameters and plasma metabolomics data, the two phenotypes were discriminated but the time-course evolution of all subjects was similar. Plasma abundances of unsaturated lysophosphosphatidylcholines decreased over time more importantly in NW while those of the saturated isomers increased in both groups.

These findings not evidenced with classical parameters, indicate a differential response to overfeeding in urine metabolomes, suggesting different nutrient metabolic fate with weight status. Subtle metabolic changes, mostly related to inflammation and difference in β -oxidation indicate a lower metabolic flexibility of OW subjects facing weight gain induced by overfeeding.