

# Six Days High Fat Overfeeding Does Not Alter Whole Body Insulin Sensitivity in Young Healthy Males

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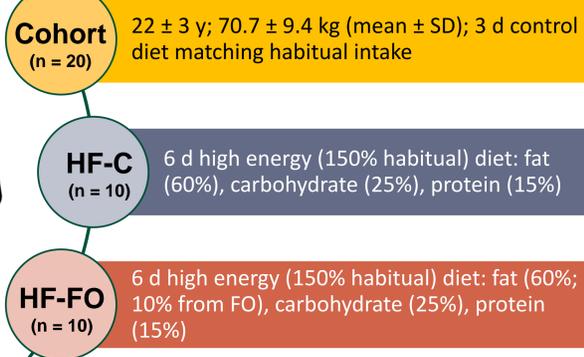
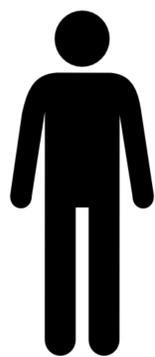


## INTRODUCTION

Extended periods of poor nutrition have been associated with the increasing prevalence of obesity and Type 2 Diabetes in the Western world. Less is known about how shorter periods of overfeeding and high fat consumption influence insulin sensitivity. Moreover, evidence regarding the impact of dietary fat composition on insulin sensitivity in human models of overfeeding is lacking. Therefore, our aim was to investigate the metabolic and molecular mechanisms involved in the maladaptive response to high fat overfeeding, and to establish whether increased fish oil (FO) consumption protects against diet-induced maladaptation in healthy males.

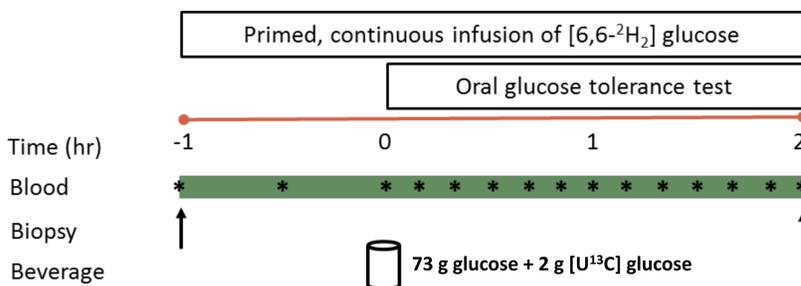
## METHODS

### PARTICIPANTS



Identical trial days were completed immediately before and after the 6 d high fat overfeeding experimental period. Before the first trial day all participants consumed a 3 d control diet.

### TRIAL DAY



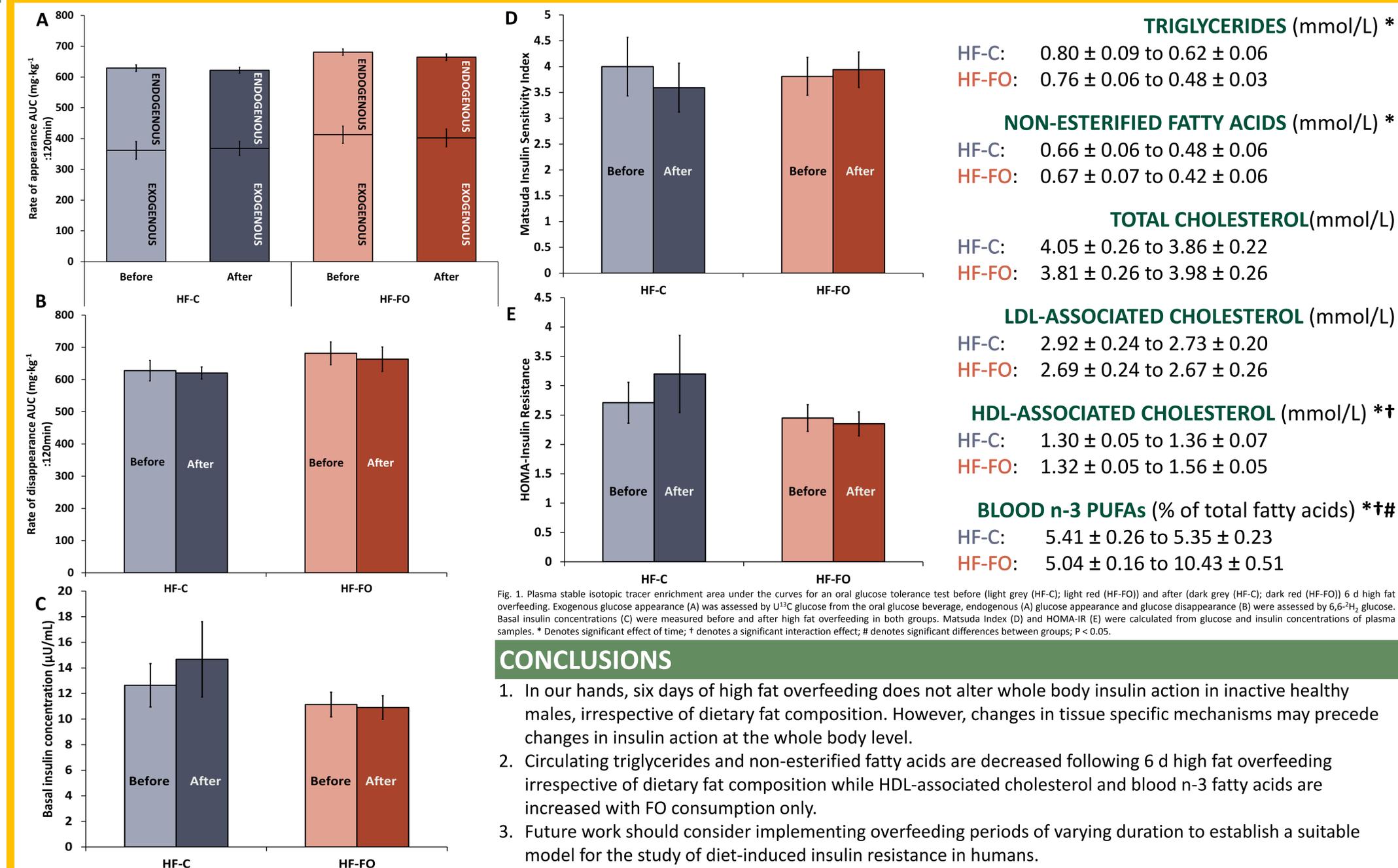
### ANALYTICAL METHODS

Plasma glucose kinetics were assessed using dual-isotopic tracer methodology (6,6-<sup>2</sup>H<sub>2</sub> and U<sup>13</sup>C glucose) by chemical ionisation-GCMS. Blood fatty acid profiling was by GCMS. Plasma glucose and lipid concentrations were assessed using an ILab automated analyser with insulin concentration measured by ELISA.

### STATISTICAL ANALYSES

Differences over time (before and after high fat overfeeding) and between groups (HF-C vs. HF-FO) were assessed by two way repeated measures ANOVAs. Statistical significance was set at P < 0.05.

## RESULTS



## CONCLUSIONS

1. In our hands, six days of high fat overfeeding does not alter whole body insulin action in inactive healthy males, irrespective of dietary fat composition. However, changes in tissue specific mechanisms may precede changes in insulin action at the whole body level.
2. Circulating triglycerides and non-esterified fatty acids are decreased following 6 d high fat overfeeding irrespective of dietary fat composition while HDL-associated cholesterol and blood n-3 fatty acids are increased with FO consumption only.
3. Future work should consider implementing overfeeding periods of varying duration to establish a suitable model for the study of diet-induced insulin resistance in humans.

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