

# The Husermet Project – advances in biological knowledge and the next steps

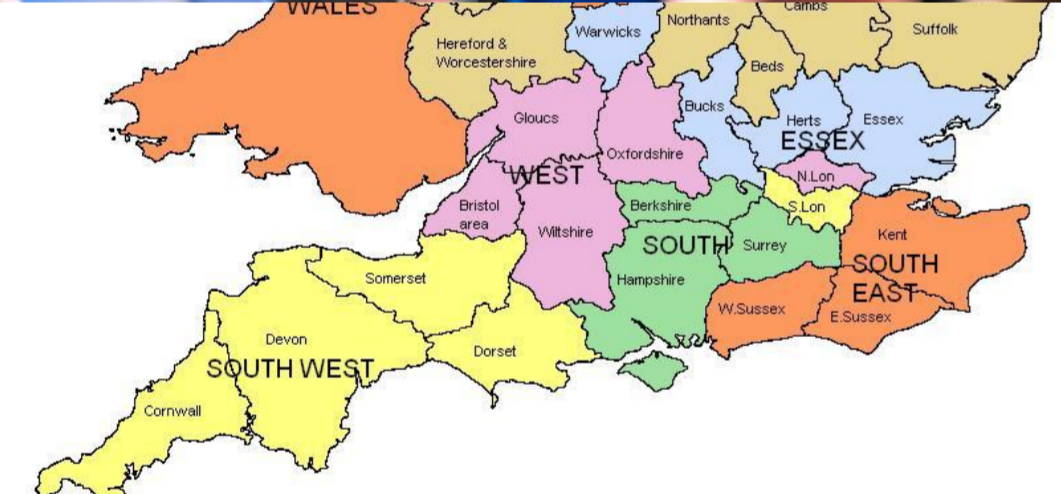
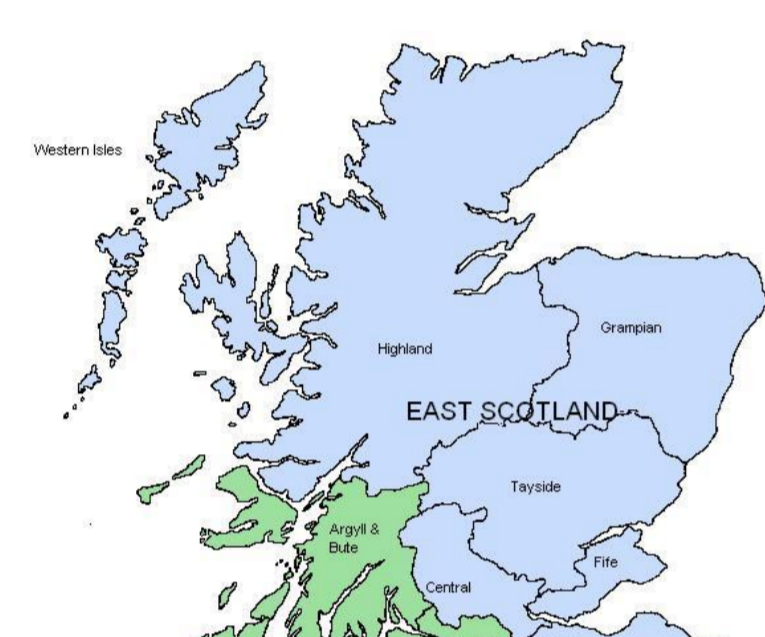
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<http://husermet.org/index.php>

## INTRODUCTION

- The Husermet (HUMAN SERUM METABOLOME) project was funded to characterise the human serum metabolome and to define metabolic biomarkers to be applied in diagnosis and therapeutic monitoring of Ovarian Cancer and Alzheimer's disease.
- The project has provided the collection at multiple sites and biobanking at a single site of many thousands of serum samples from individuals in the UK. These samples were applied for serum characterisation, studies associated with lifestyle and disease risk factors and to provide a resource for future research.
- This was the first large-scale epidemiological study applying integrated mass spectrometry and NMR platforms and untargeted metabolomics to investigate the human population. Of particular biological and medical interest is the investigation of human serum from a large UK population which has provided a mechanism to define changes in human metabolism related to healthy ageing and differences related to disease risk factors including body mass index (BMI), blood pressure (BP) and smoking status.

## SAMPLE COLLECTION AND STORAGE, DATA ACQUISITION AND DATA STORAGE/INTERPRETATION



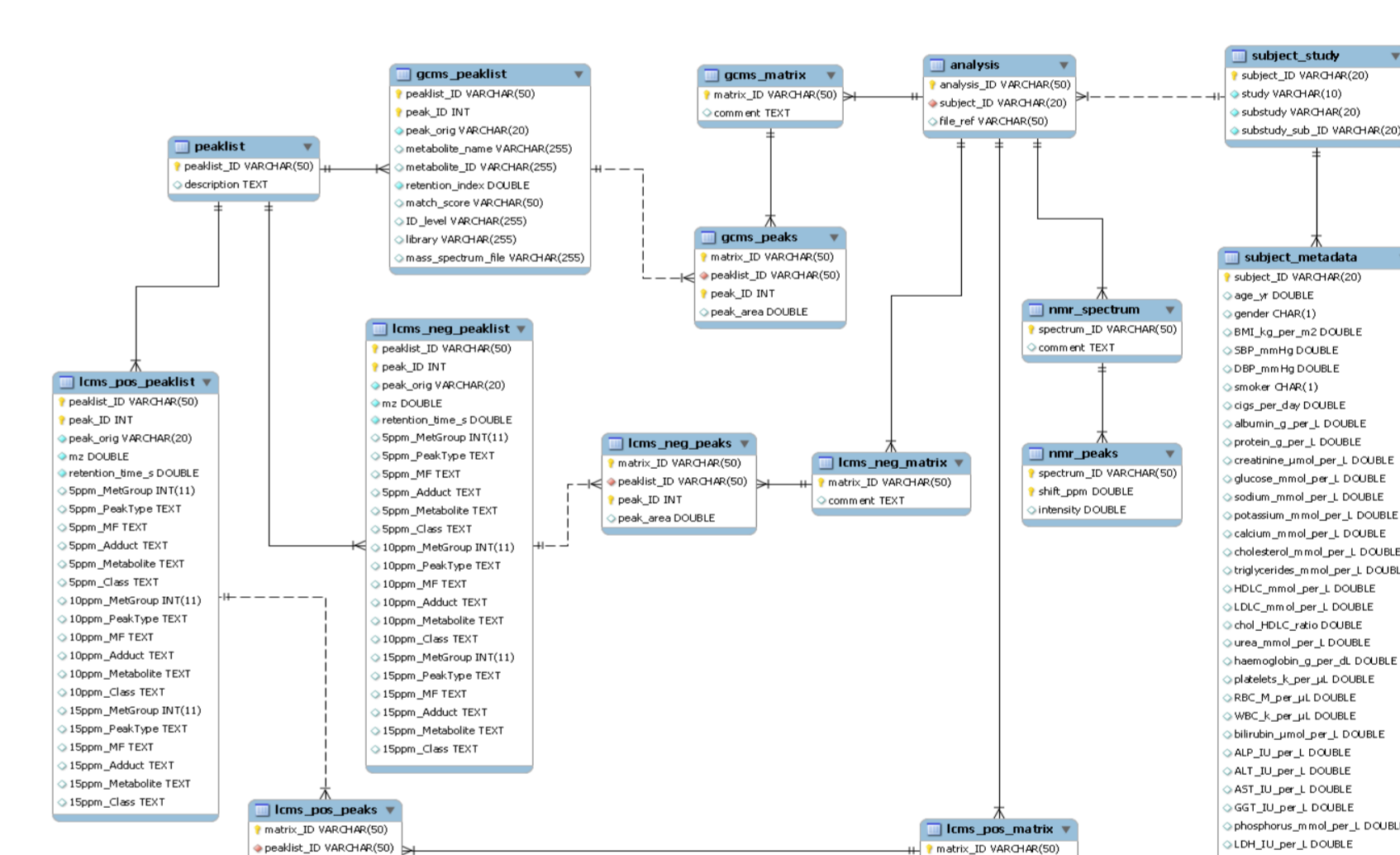
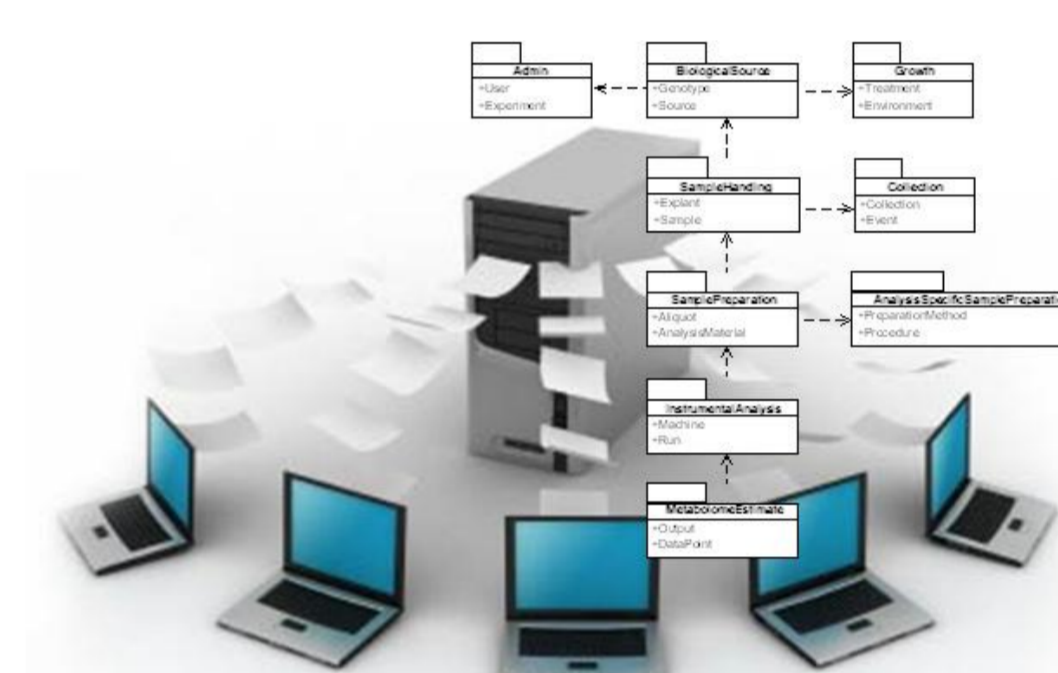
**SAMPLES COLLECTED FROM GREATER THAN 3000 SUBJECTS FROM THE UK POPULATION**



**SAMPLES BIOBANKED AT THE UNIVERSITY OF MANCHESTER – AVAILABLE FOR FUTURE COLLABORATIVE PROJECTS**

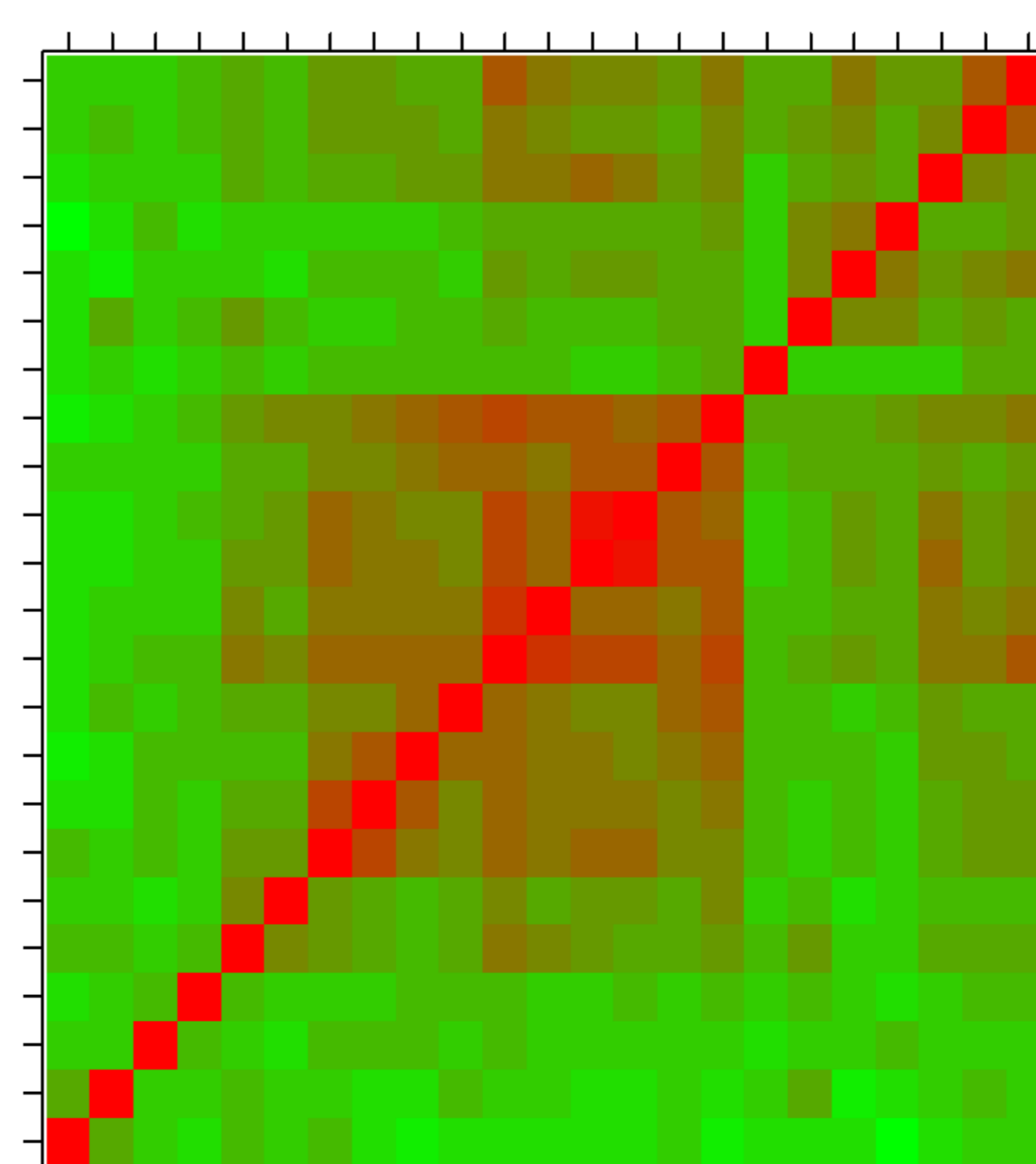
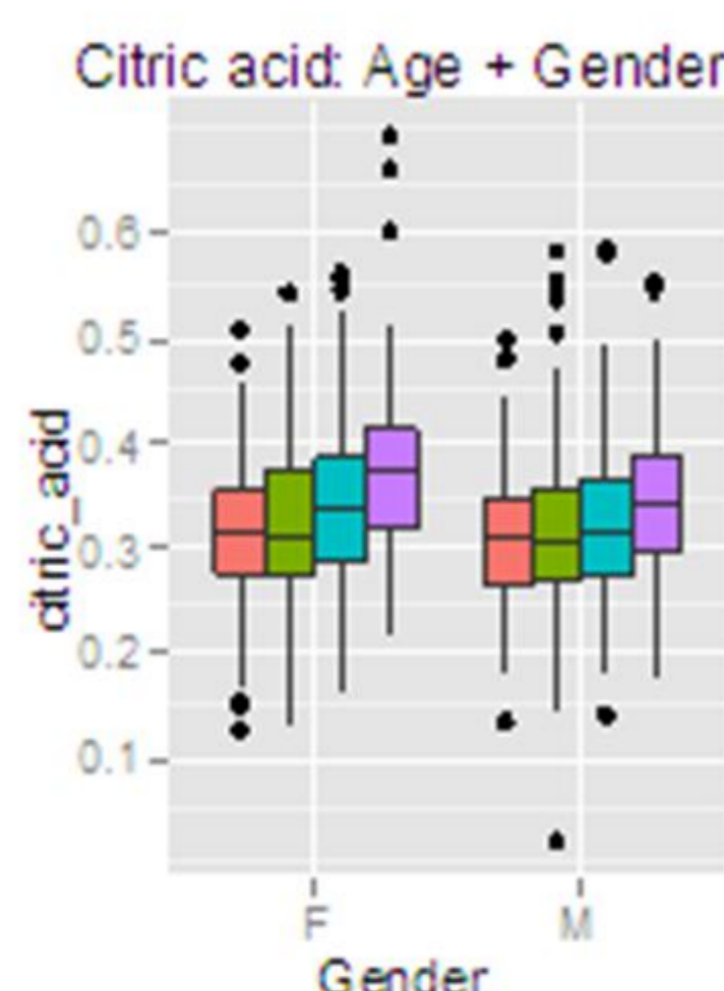
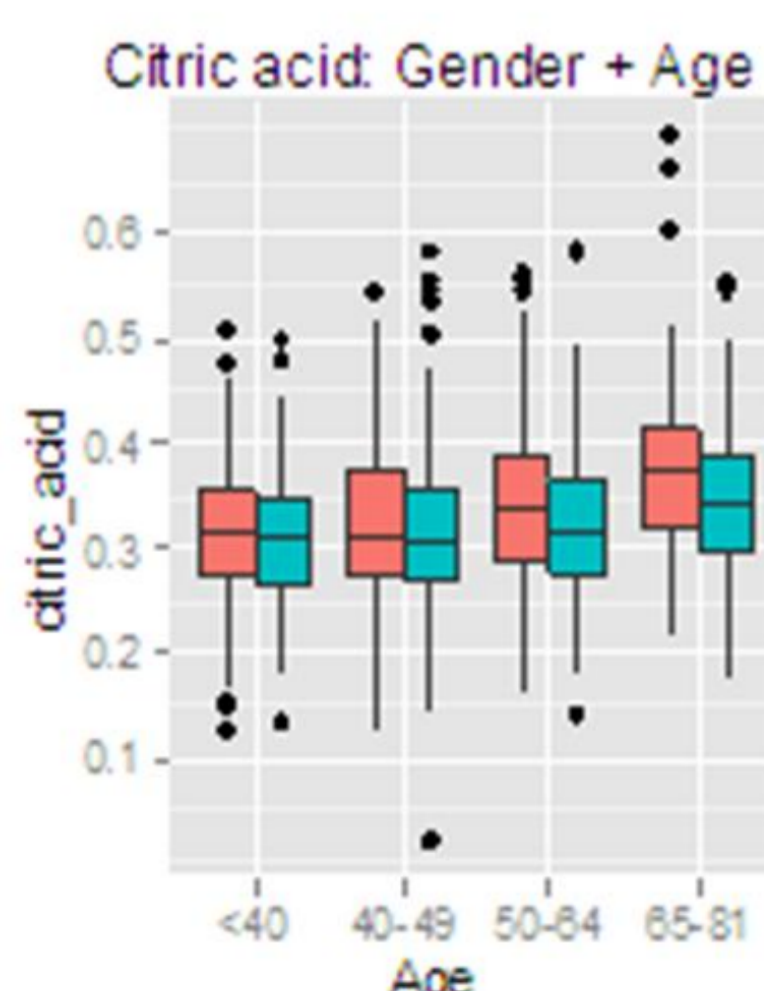


**SAMPLES STUDIED APPLYING MULTI-PLATFORM UNTARGETED METABOLOMICS AND CLINICAL BIOCHEMISTRY ASSAYS**



**ALL DATA COMPILED IN A MySQL OPEN SOURCE RELATIONAL DATABASE MANAGEMENT SYSTEM. THIS DATABASE WILL BE MADE PUBLICLY AVAILABLE. UNIVARIATE/MULTIVARIATE DATA ANALYSIS APPLIED TO METABOLOMIC AND CLINICAL CHEMISTRY DATA**

## DATA INTERPRETATION EXAMPLES



The relationship of Body Mass Index (BMI) with the concentration of specific metabolites has been shown applying univariate, multivariate and correlative analysis

BMI shows similar metabolite class changes for females and males

Areas of metabolism/classes of metabolites related to BMI include:

- Ubiquinone biosynthesis pathway (linked to obesity)
- Dipeptides
- Glycerophosphocholines and the related lysophosphocholines

- Serum concentration of citrate increase with age
- However, the change observed is greater for females compared to males
- Changes in citrate are age and gender related
- Increased cellular respiration via acetyl-CoA may lead to increased citrate production (in the mitochondria)
- Anti-aging cosmetics contain citric and hydroxy citric-acid derivatives (Patent No. JP2007254387-A and JP8175965-A)