Systems Biology Research Symposium
Oral Presentation Session

Grand Ballroom
Tuesday, June 5th
7:00-8:30pm

Top-Down Systems Biology of Metabolic Supersystems: From Personalized Healthcare to Molecular Epidemiology

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Post-genomic technologies are being widely applied to improve the understanding of adverse drug reactions and the molecular basis of human disease. Metabonomics is an approach that enables multivariate profiling of the integrated metabolic responses of complex systems to patho-physiological stress, and so involves understanding the way the whole metabolic regulatory system varies with interventions thus providing complementary information to genomics and proteomics (1). With the growing desire to apply systems biology tools to understanding human disease processes at the both the individual and population level where massive cohorts need to be investigated, it is necessary to use analytical and statistical methods that report on *whole system state* non-invasively (2). The complexity of human physiological systems is also enhanced by extensive transgenomic interactions and co-metabolic processes involving the gut microflora (3). These gut micro-organisms have a highly influential role in co-regulation of human and animal physiology and influence both host biochemistry and determine both metabolic phenotypes and disease risk at the individual (4) and population (5) level. Furthermore such host-microbial interactions may be engineered or druggable (5) As such top-down systems modelling of metabolic phenotype variation can give deep insights into both personalised and public healthcare problems (6,7).

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4. Clayton, T.A. Nicholson, J.K. et al (2006) **Nature 440 (20)** 1073-1078.
5. Wei, J. Li, H. Zhao, L and Nicholson J.K. (2008) **Nature, Reviews Drug Discovery. 7 (2)** 123-126.
6. Holmes, E Nicholson J.K. et al (2008) **Nature 453** 396-399.
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