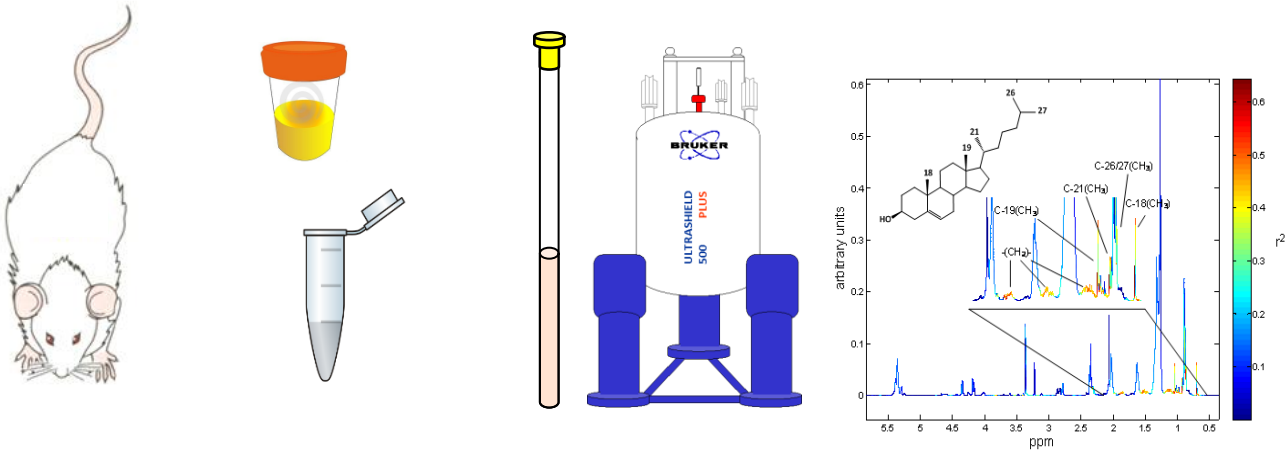
***Urine metabolite profiling** in animal models is highly relevant since it allows simultaneous monitoring of up to several tens of metabolites in the same analysis. Thus, it represents a superb opportunity in the global assessment of the metabolic status in health and disease .*



Principle

Simultaneous identification and relative quantization of up to several tens metabolites in human or mouse/rat urine extracts using ^{1}H-NMR spectroscopy. **Proton nuclear magnetic resonance** may detect metabolites which are present at high concentrations (greater than **10 µM**).

Easy and Fast Sample Treatment/ High-throughput Analysis

200-400 µl of urine are mixed with 200 µl of disodium/dihydrogen phosphate buffer.

Wide range of metabolites covered

Urine		
1-Methylnicotinamide	Cysteine	N,N-Dimethylglycine
2-Hydroxybutyrate	Cytidine	N-Acetylglycine
2-Oxoglutarate	Cytosine	N-Acetyltyrosine
4-Hydroxyphenylacetate	Deoxyuridine	N-Nitrosodimethylamine
4-Hydroxyphenyllactate	Dimethylamine	N-Phenylacetylglycine
Acetate	Fumarate	Pyroglutamate
Acetoacetate	Glucarate	Succinate
Alanine	Gluconate	Taurine
Allantoin	Glycine	Trans-Aconitate
Betaine	Glycolate	Trigonelline
Choline	Glycylproline	Trimethylamine N-oxide
Cinnamate	Hippurate	Tryptophan
Cis-Aconitate	Kynurenine	Tyrosine
Citrate	Lactate	Urea
Creatine	Malate	π-Methylhistidine
Creatinine	Maleate	

** The identification of the above list of metabolites will depend on the metabolic or pathologic status of the study samples as well as the quality of the extraction.*

Data Analysis:

^{1}H-NMR spectra identification and interpretation. Semi-quantization of metabolites identified. Basic univariate statistical test. Use of advanced statistical, chemometric, multivariate and artificial intelligence algorithms to handle high-troughput metabolomics data sets and turn them into useful clinical information (PCA, PLS-DA, ANNs). Identify metabolic relationships, mechanism, functions and pathways in the experimental data and mapping of relevant pathways.

Advantages:

Semi-quantitative results, low cost per sample, high-throughput analysis.

Wide range of applications:

Phenotyping of genetically modified animals; Toxicology (drug toxicity and pre-clinical drug candidate safety assessment); Biomarker Discovery; Clinical studies (Diagnose and therapeutic efficacy); Monitoring of diet-related health phenotyping.

References:

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Samino, S. et al., Biochimie. 2013; 95(4):808-816.

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