

Matching Day
14/09/2017

***Plateforme MetaToul – MetaboHUB :
Développement des approches
Fluxomiques***

Floriant Bellvert

La plateforme



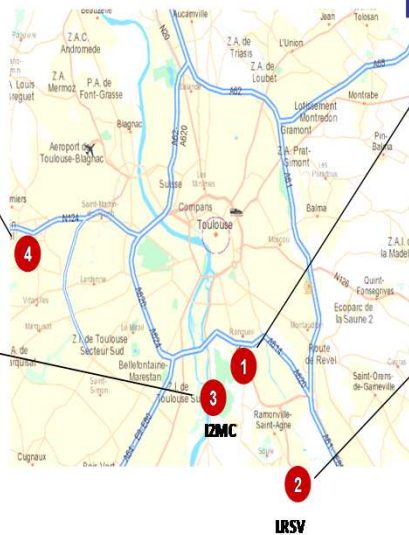
MetaToul- AXIOM

NMR / HRMS fingerprints
Targeted metabolomics



MetaToul- Lipidomics

Targeted metabolomics
Lipids (broad coverage)



MetaToul- Metabolic Networks

Quantitative metabolomics -
Isotopic studies of metabolism -
Fluxomics



MetaToul- Plant II metabolites

Plant secondary metabolites,
Signal compounds, hormones





Stimuler les collaborations et échanges technologiques

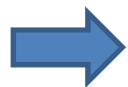
entre équipes du GSO,

Communiquer et (in)former la communauté scientifique sur des aspects technologiques dans le domaine de l'analyse du métabolisme

Promouvoir les expertises et plateformes en lien avec l'étude du métabolisme auprès de la communauté cancer du GSO

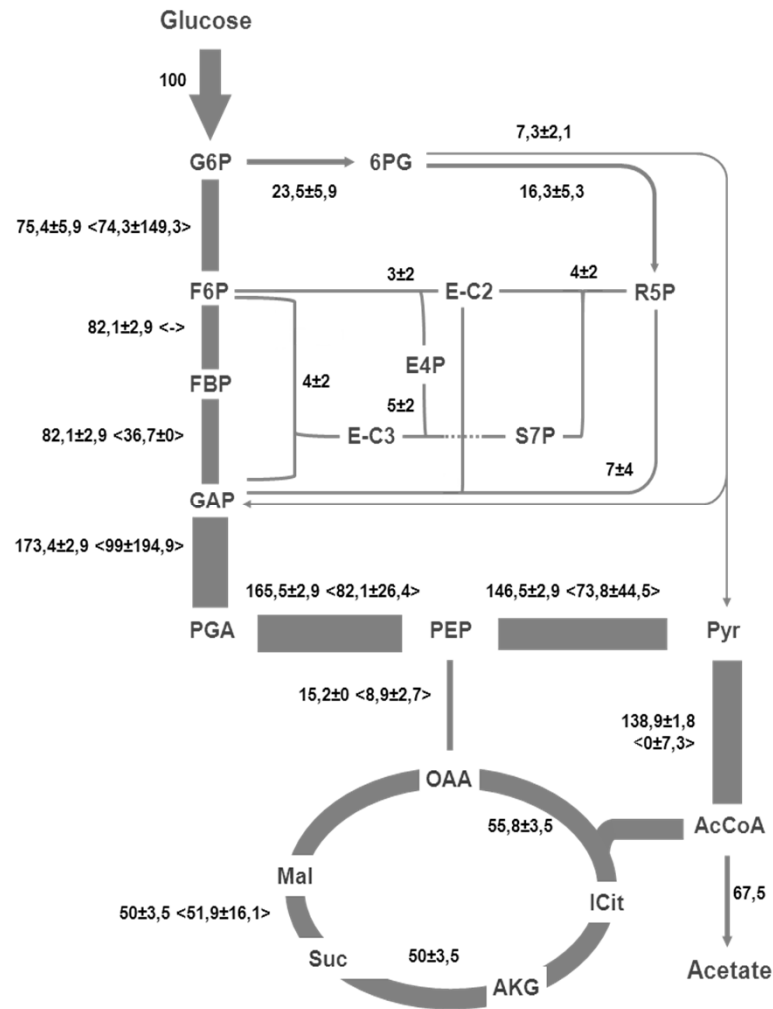
Aider au recrutement et formation de nouvelles compétences à l'interface Métabo-Cancer

Comité de pilotage : JE Sarry (CRCT, Toulouse), JC Portais (METATOUL, Toulouse), L Le Cam (IRCM, Montpellier), R Rossignol (Université de Bordeaux)



Analyse des **réseaux métaboliques** par des approches de **Metabolomique** et **Fluxomique** appliquée aux problématique de la recherche sur le cancer

- Gives the distribution of intracellular carbon (& energy) fluxes *in vivo*
- Represents the actual (contextual) activity of the metabolic network



Metabolic network topology

- Identification of (novel) pathways, enzymes
- Linear pathways, cycles, reaction reversibility
- Compartmentation, channeling

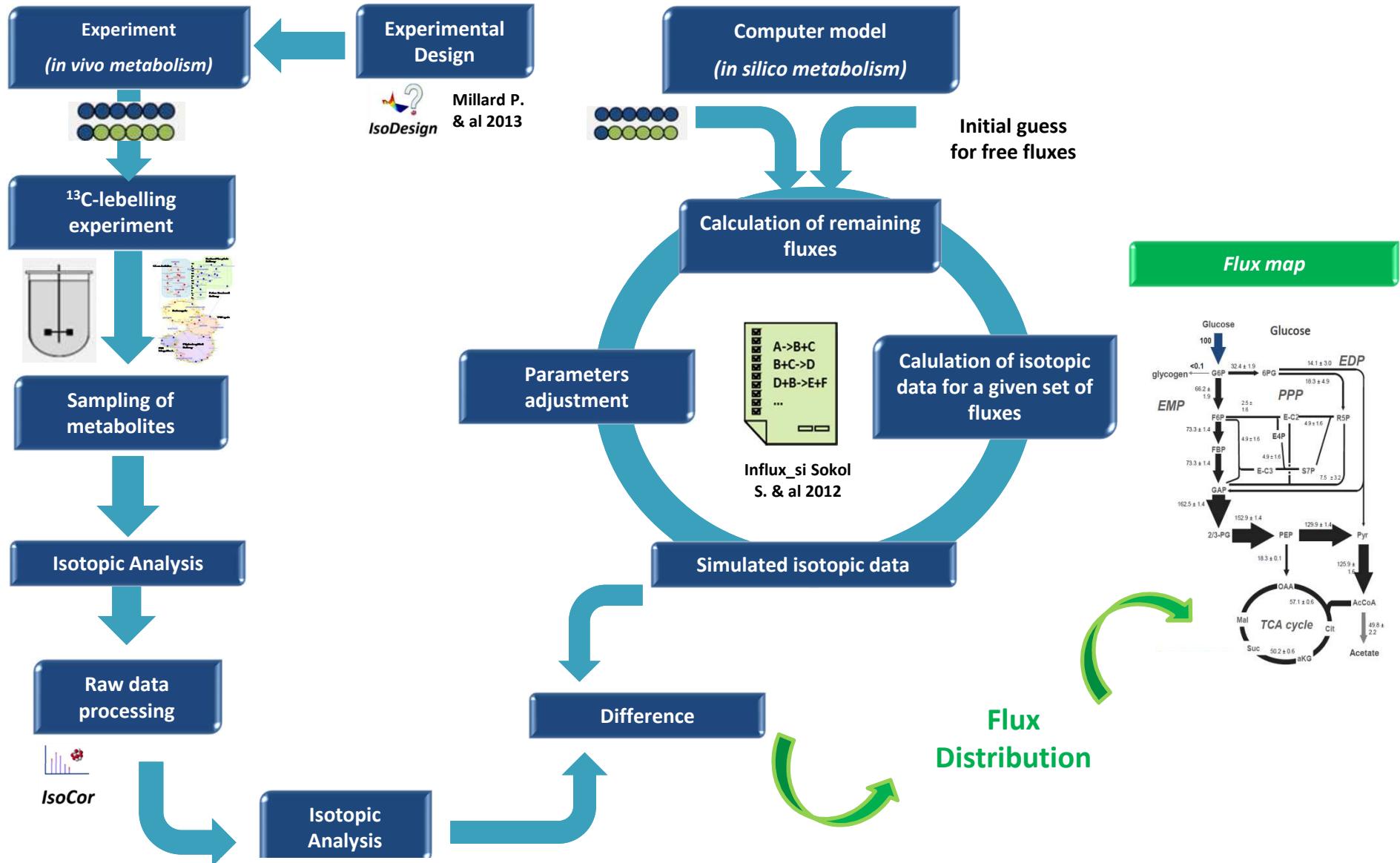
Quantification of pathway activity

- Carbon fluxes
- Energy fluxes (ATP, redox)
- Response to environmental / genetic modifications

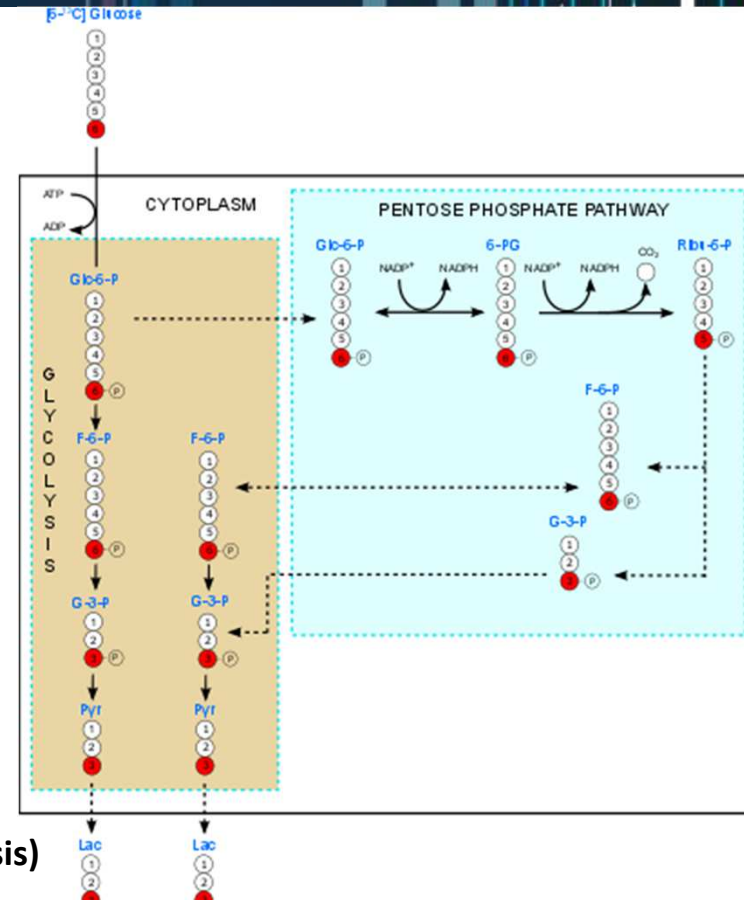
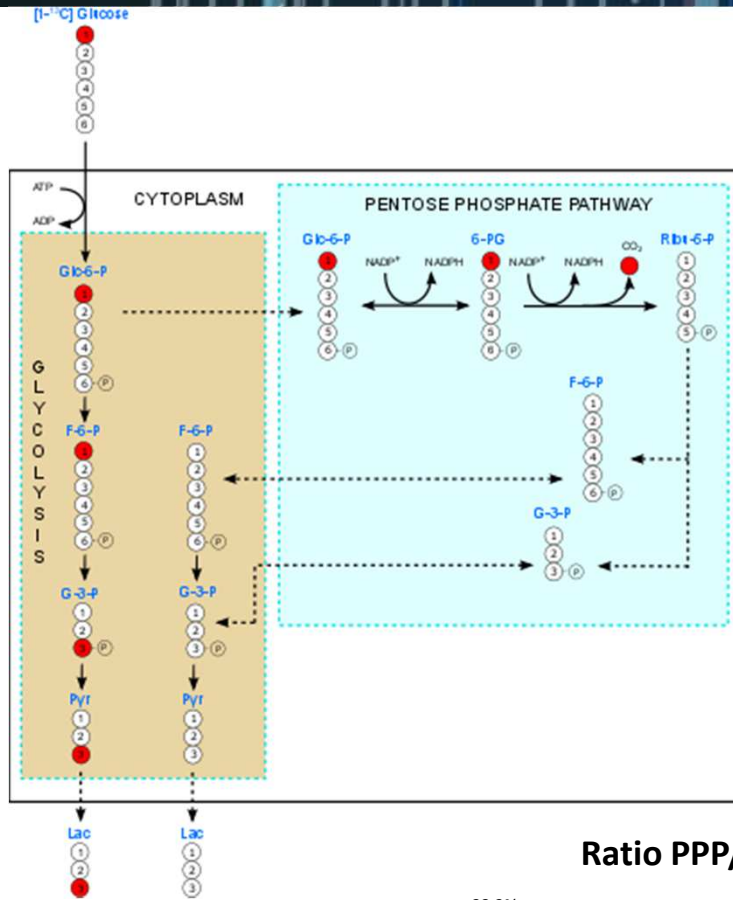
Cancer applications

- Metabolic reprogramming
- Stratification
- Pharmacology, drug targeting

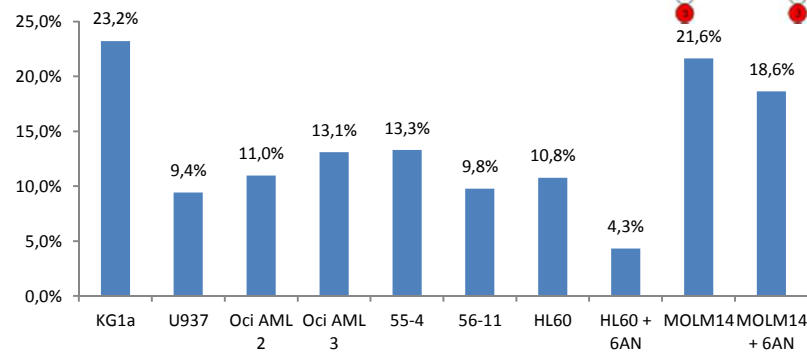
13C Fluxomics



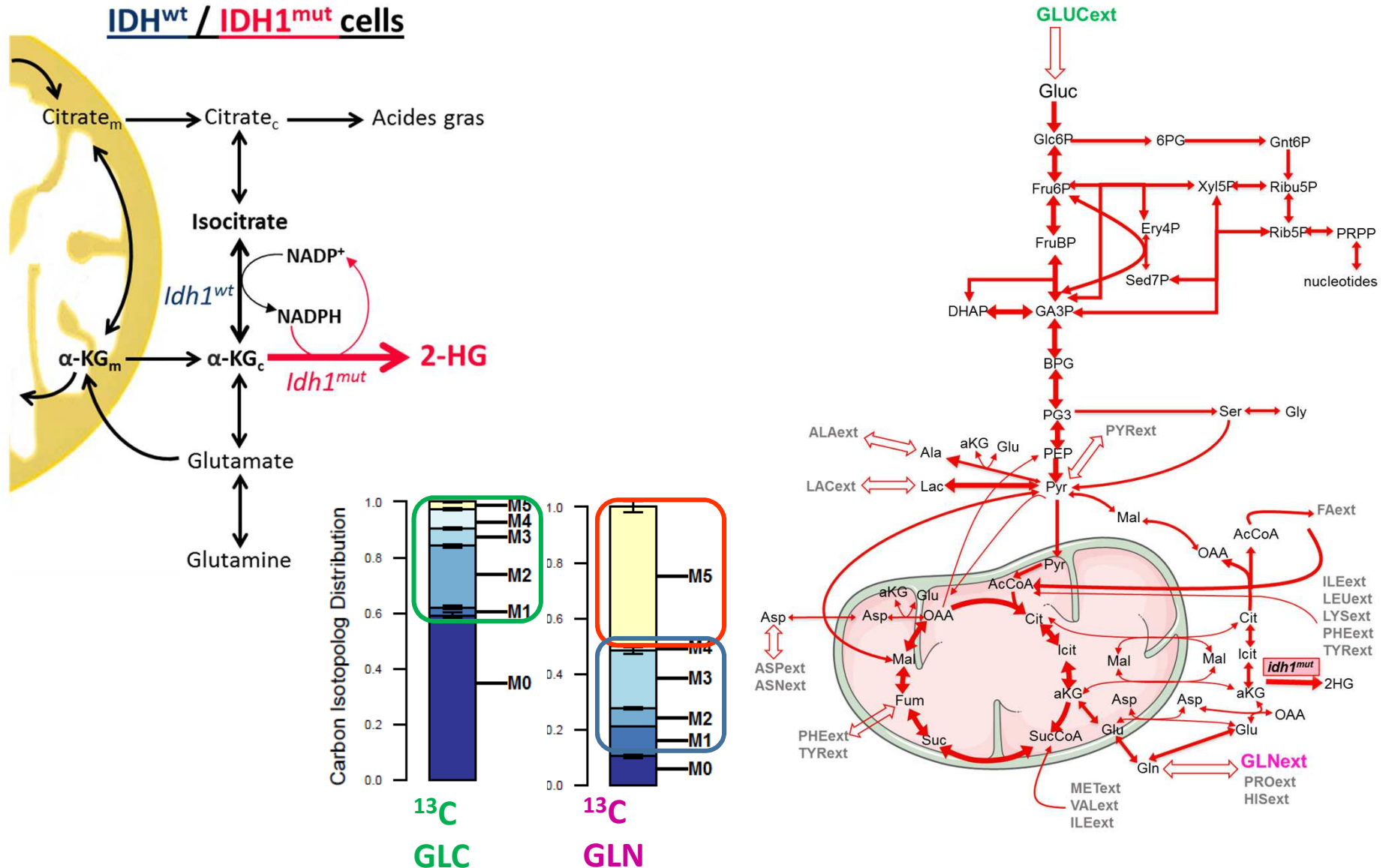
NMR : Glycolysis vs PP Pathway



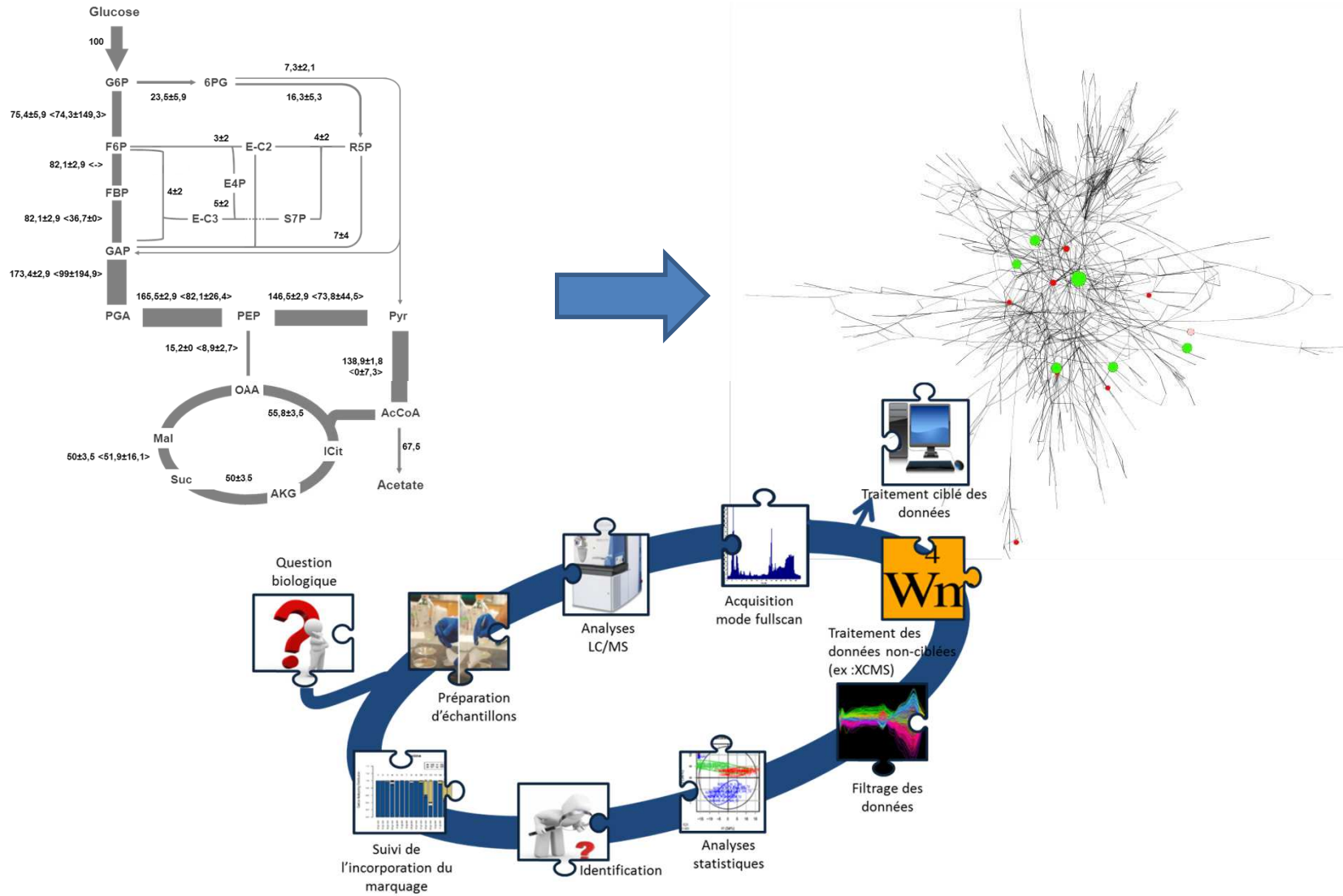
Ratio PPP/(PPP+Glycolysis)



Cancer cell Flux Map



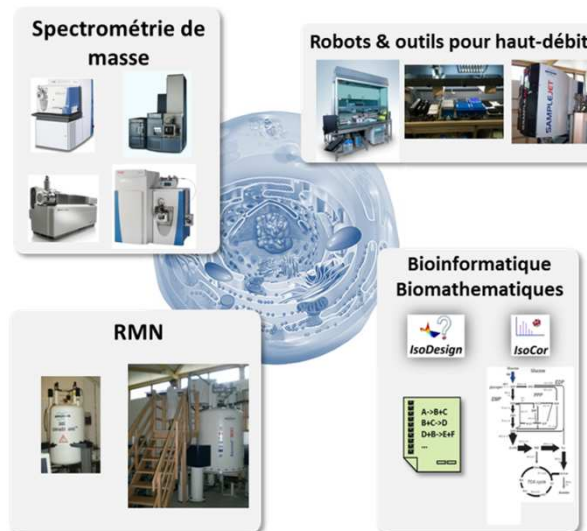
Untargeted isotopic profiling



Adaptation et développement des approches fluxomique pour l'analyse du métabolisme des cellules cancéreuses.

Mise à disposition des outils et des méthodologies pour l'ensemble de la communauté

Appréhender l'hétérogénéité cellulaire : Développement des approches métabolomique « single cell »



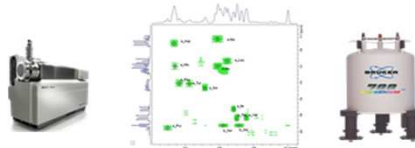
Merci de votre attention

Experimental strategies



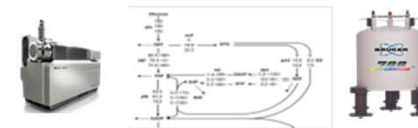
Appropriate experimental & sampling methods
 ^{13}C -labelling experiments

Network identification



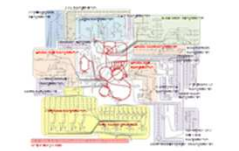
- Metabolomics : large-scale identification of metabolites
- ^{13}C -Metabolomics: identification of metabolic pathways

Quantification of network activity



- Quantitative Metabolomics : pools
- ^{13}C -Fluxomics: actual rates of reactions

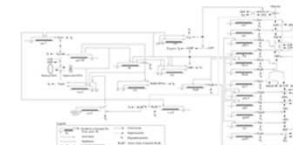
Metabolic reconstruction



Genome-scale metabolic model of *M. extorquens*

Network reconstruction from genome annotation & biochemical information
Metabolic pathway analysis

Modelling & Simulation



Metabolic models (flux calculations or predictions)
Integrative models combining metabolic and regulatory networks

