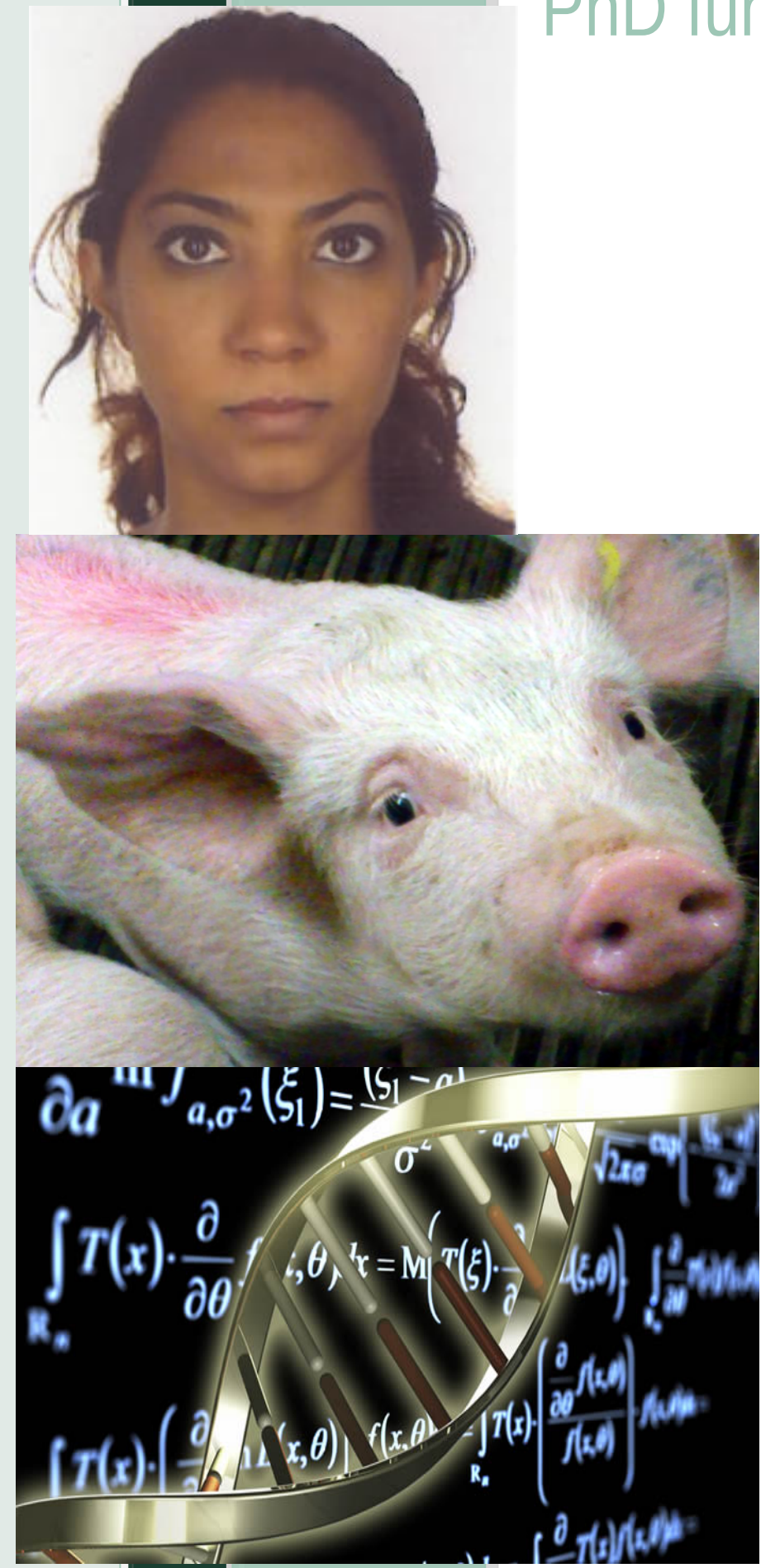


Systems genetics of stress responses in pigs

Valérie SAUTRON – Beginning of the PhD. In November 2013

Supervised by Elena Terenina, Nathalie Villa-Vialaneix and Pierre Mormède

PhD funded by "Région Midi-Pyrénées" and ANR project SusOStress



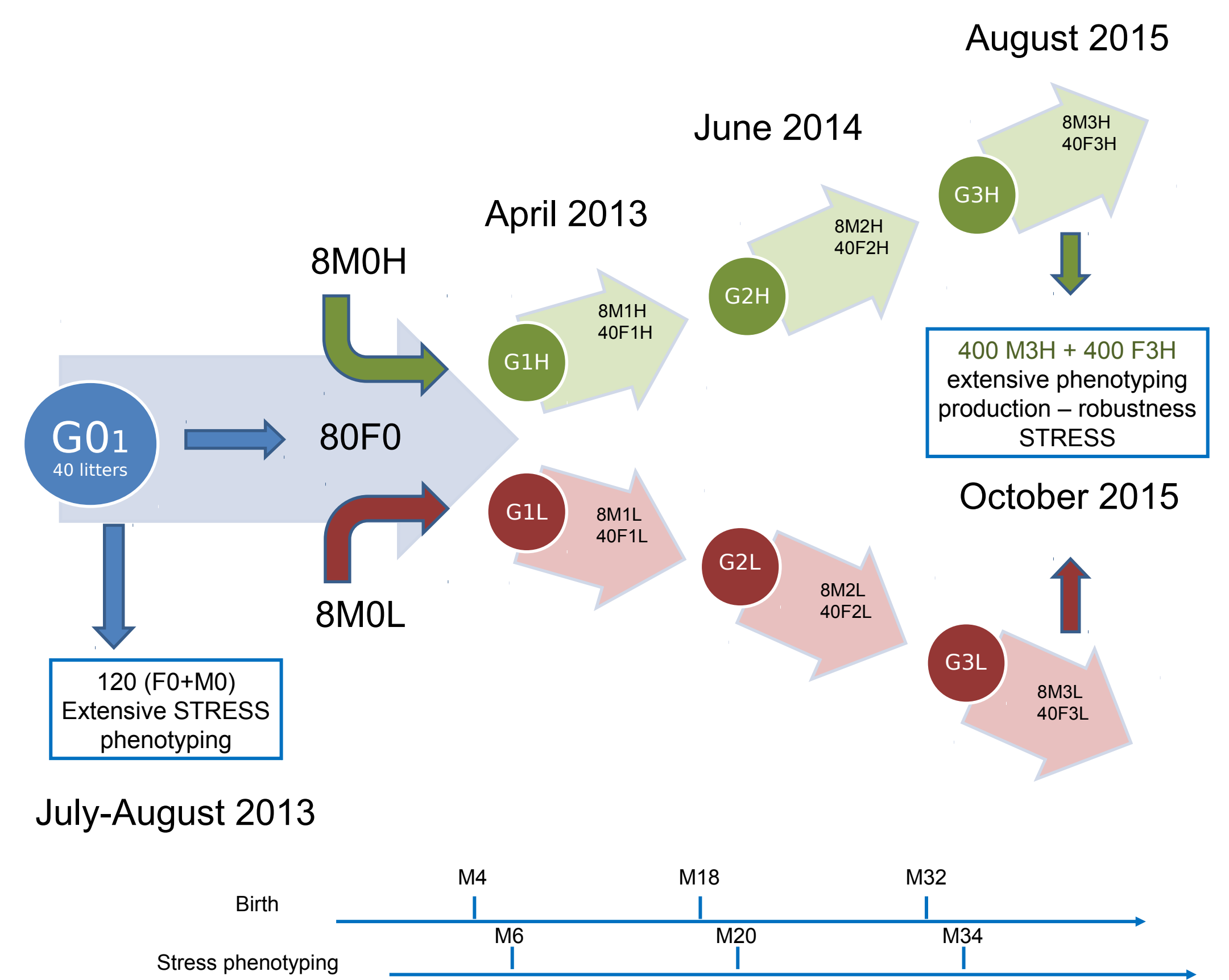
BACKGROUND

Work hypothesis: antagonism between production traits and robustness

→ Study of genetic architecture of stress responses in pigs (hypothalamic-pituitary-adrenocortical axis) for the selection of more robust animals

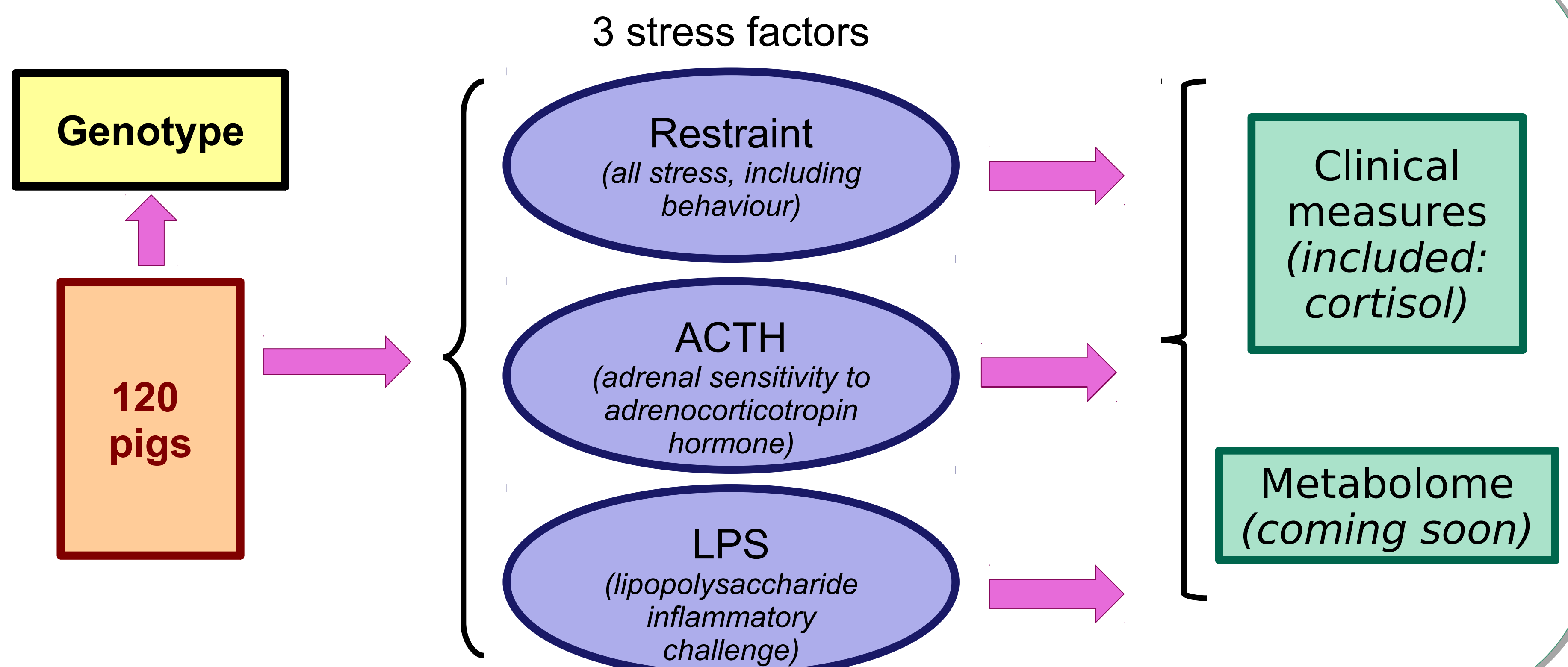
OBJECTIVES

- Data integration
- Biological model of stress responses (prediction of the most effective levers for genetic selection)
- Focus on G0 population (heterogeneous regarding stress responses)
- Validate the model on G3 population



Divergent selection for corticotrope activity (High and Low lines)

DATA

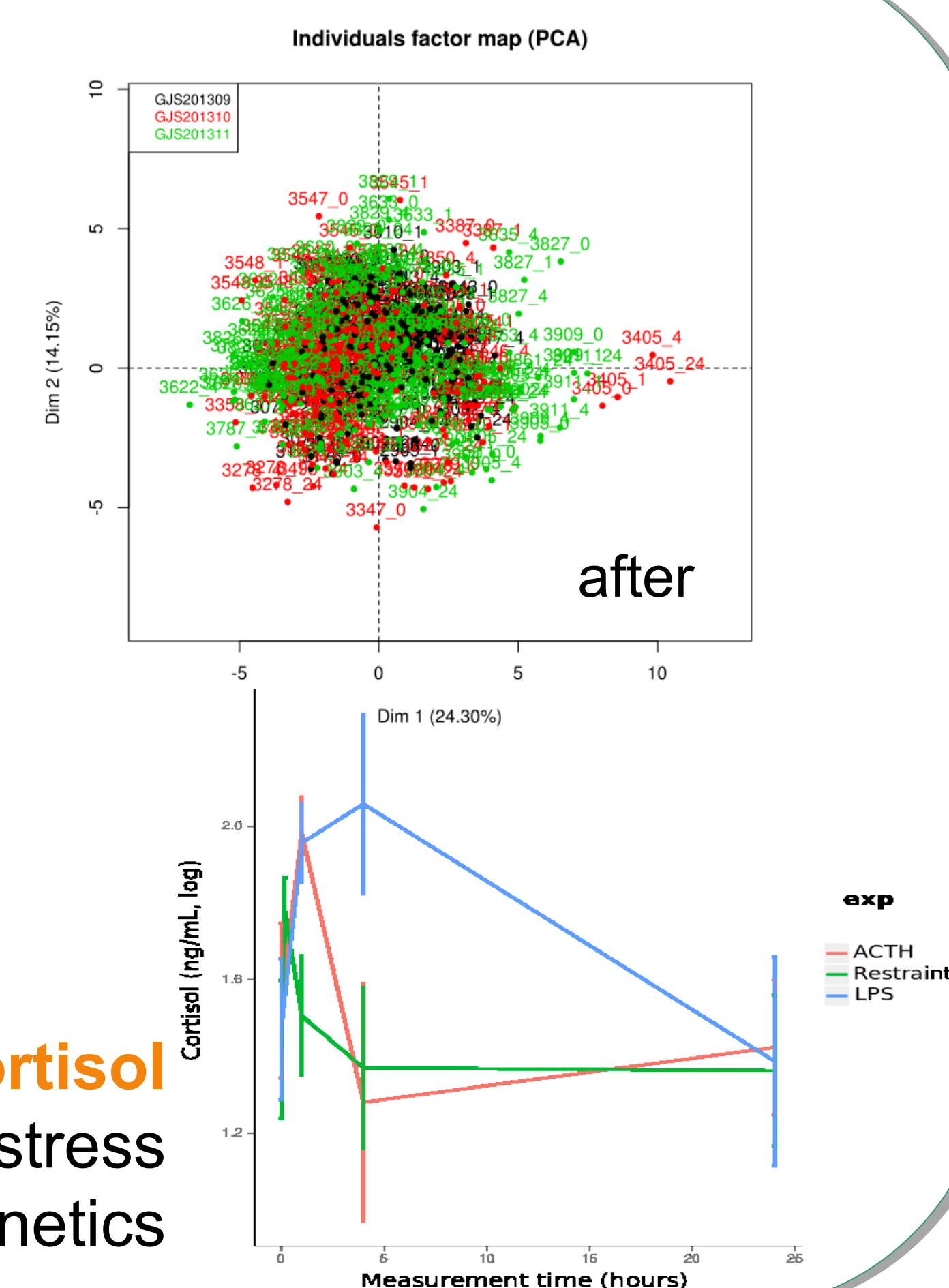
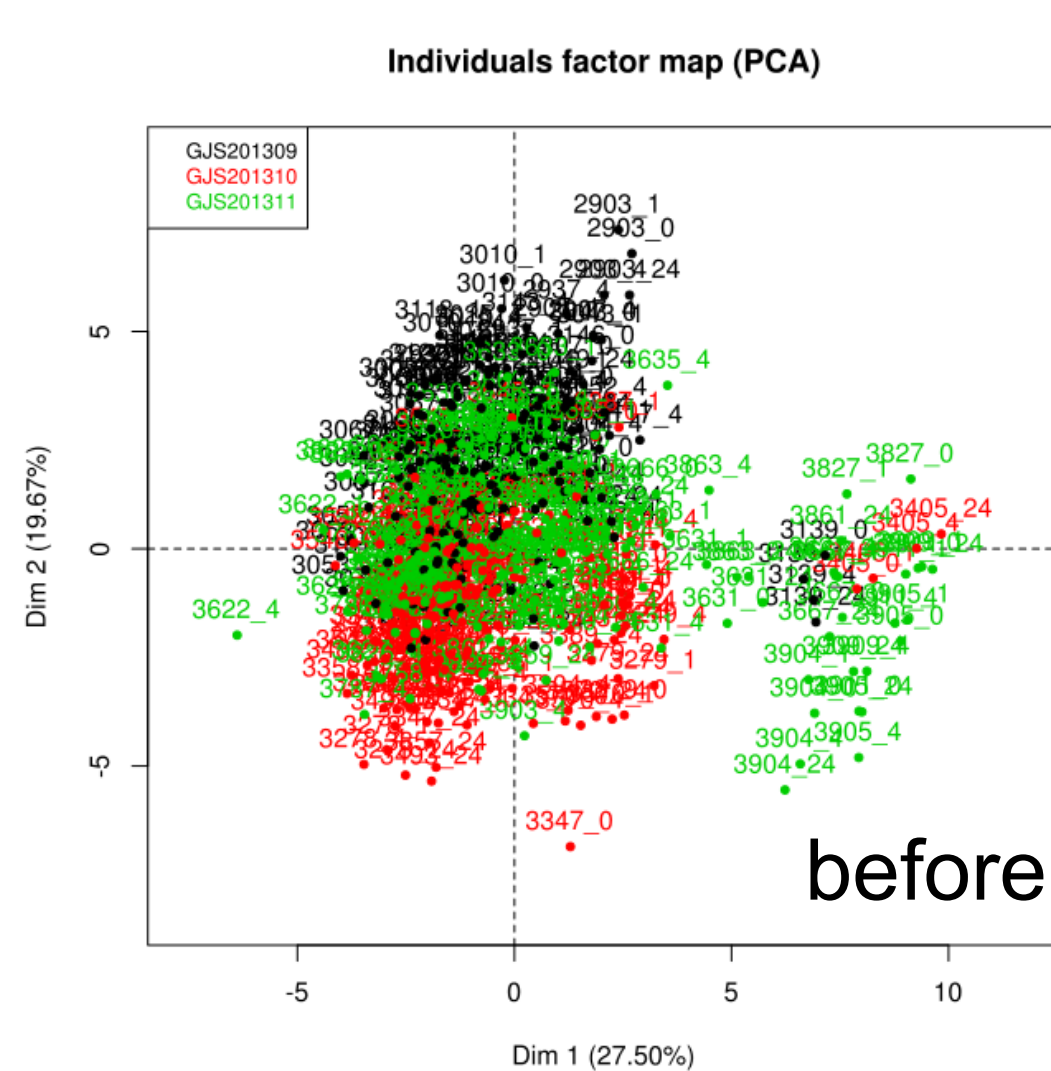


EXPERIMENTAL DESIGN

- 120 *Large White* pigs
- 3 groups
- 4 (or 5) measurement points (0h, (10min), 1h, 4h, 24h)
- 52.5 % Female
- 28 Families

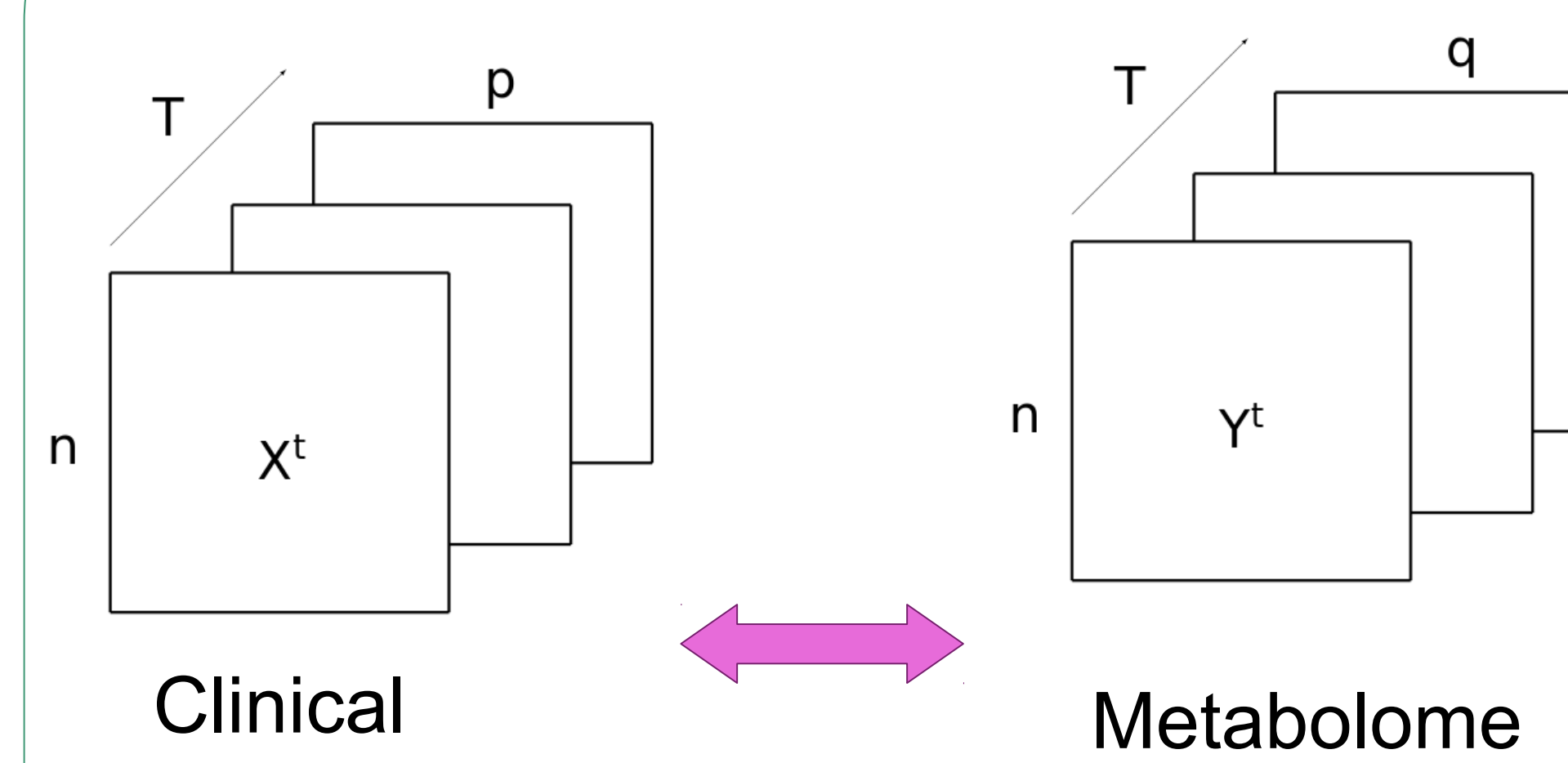
SELECTED EXPLORATORY ANALYSIS

Clinical biology normalization (quantile normalization)



Increase in response to all stress factors with varying kinetics

METHODOLOGICAL DEVELOPMENT

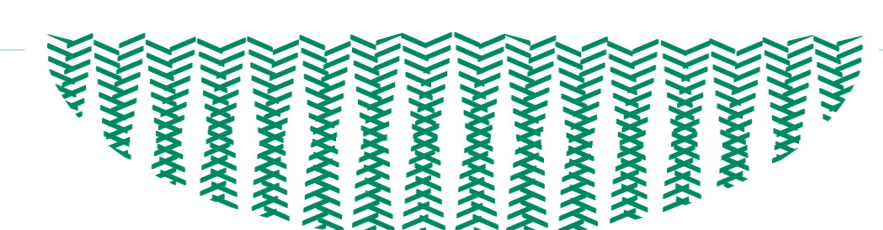


Longitudinal CCA

Similar to DPCA (Bouroche, 1975)

PERSPECTIVES

- **Biological measures and metabolomic data integration**
- **Methodology development:** studying relationships between two datasets (i.e.: metabolome and blood cell analysis) taking the longitudinal nature of the data into account
- **Comparison** of several approaches to find a common space of representation for all time steps (scaling effect depending on time, optimization among the time-dependant subspaces...)
- High dimensionality handled by a **regularized approach** (sparsity under study)



ALIMENTATION AGRICULTURE ENVIRONNEMENT

