Kinetic model: Glycolytic oscillations in a model of a lactic acid bacterium metabolism

- Oscillations within physiologically feasible parameter ranges
- Stoichiometry of the system and its allosterically regulated enzymes can give rise to oscillations

![Graph A](image1)

![Graph B](image2)

![Graph C](image3)

![Graph D](image4)
Kinetic model: Experimental data

- Vmax values LDH, PYK, GAPDH
- Kinetics glnA, arcA
Genome-scale model: Current status

- Steady state metabolite and amino acid levels
  - Wild-type: pH 6.5 not consistent between both runs; pH 7.5, d = 0.15/h: second run not glucose limited
  - $\Delta glnA$: more consistent between runs

  ⇒ Triplicates needed
  ⇒ Flux ± 20% as constraints?

- Model Validation: essential amino acids
Genome-scale model: Next steps

- Validation: $\Delta ldh$, $\Delta glnA$, $(\Delta arcA)$
- Essential genes: protein and gene associations missing in the model
  $\Rightarrow$ how to find information about gene and protein association?
Genome-scale model: Story for publication?

- Validation: $\Delta ldh$, $\Delta glnA$, $\Delta arcA$
- Cysteine and cystine
- GapN
- Comparison of
  - essential amino acids and relation to natural environment
  - strain specific genes
  - pathways and genes involved in virulence
  - transporters