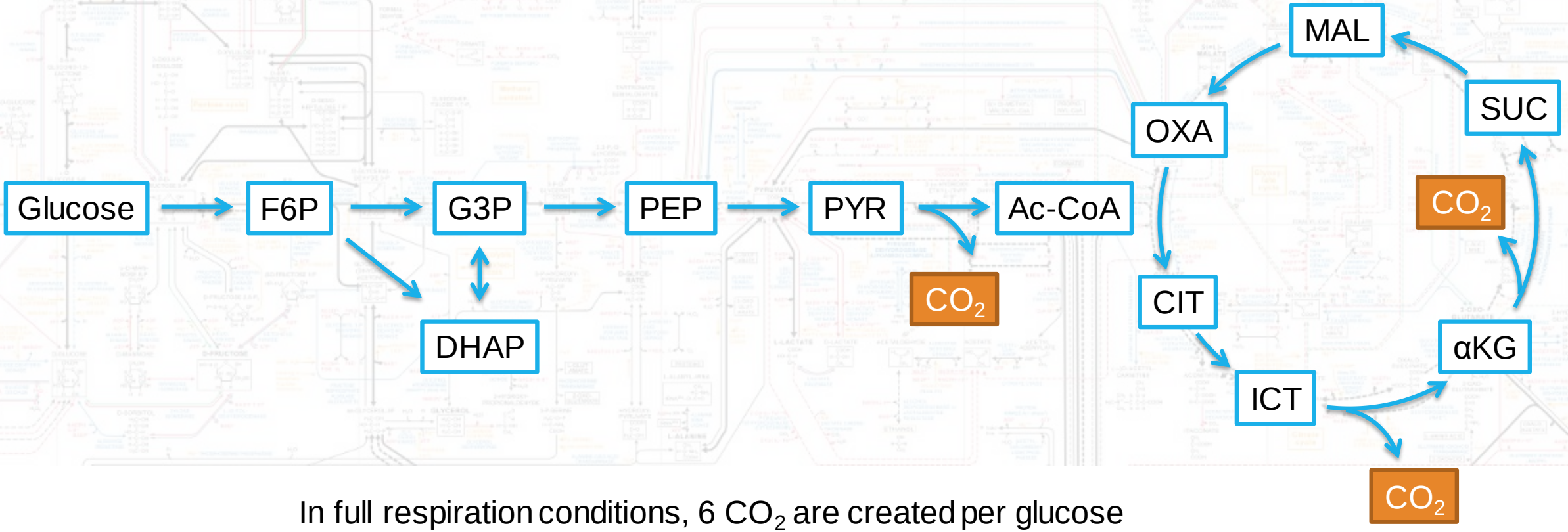
CHANGING WHAT'S POSSIBLE

Carbon-Optimized Bioconversion

Breakout Questions – Day 1

Glycolysis and the TCA cycle waste CO_2



In full respiration conditions, 6 CO_2 are created per glucose
- 1 per 3-C pyruvate to 2-C acetyl-CoA (x2)
- 1 from 6-C isocitrate to 5-C a-ketoglutarate (x2)
- 1 from 5-C α-ketoglutarate to 4-C succinate (x2)

Breakout Session 1 – SynBio/Fermentation

- What metabolic pathways could be optimized to avoid CO_2 evolution, or allow for maximal internal recycling of carbon?
- What does a large scale carbon optimized fermentation process look like?
  - Microbe, Fermentation process, External energy accommodation, Downstream processing
- What products could be made that are attractive for translation?
  - Aim for high volume, low cost, displacing/replacing petrochemicals

Breakout Session 1 – Cell-Free

- What advantages could cell-free systems offer as a bioconversion platform?
  - What bioproducts are best suited for cell-free systems at scale?
- What advantages could cell-free systems offer with respect to optimization of carbon efficiency during bioconversion?
- To what extent can cell-free prototyping be used to develop/test carbon optimization tools for traditional whole-cell fermentation systems?
- What are the barriers to entry to large-scale cell-free bioprocessing?
  - Enzyme stability, Enzyme production, Co-factor generation/regeneration