Escher-FBA problems

1) Alternate pathways Page 77-78 (using *gly_ppp_model.json*)

1. Set glucose uptake (EX_glc__D_c) to -1 mM/L
2. Allow unlimited oxygen uptake (EX_o2_c).
3. Determine atp, co2, hydrogen (h), and lactate (lac__L) production when only upper glycolysis is used (G6PDH2r is knocked out)
4. Determine atp, co2, hydrogen, and lactate production when only pentose phosphate pathway is used (PGI is knocked out)

2) P/O Ratio Page 109-110 (using *gly_ppp_tca_etc_model.json*)

1. Set glucose as sole carbon substrate
2. compute the P/O ratio (ATPS4mi flux/ (CYOOm2i flux * 2)) when only using FADH2 as electron donor (FADH2ETC). This can be done by knocking out NADH2_u10mi.
3. Compute P/O ratio when only using NADH as electron donor (NADH2_u10mi). This can be done by knocking out FADH2ETC.
4. Repeat the above with glucose + lactate as sole substrates when allowing both NADH and FADH2 as electron donors.

3) Gluconeogenic substrates Similar to page 100 (using *core_model.json*)

1. Compute maximum glycogen (EX_glygn2_c) yield of 3 carbon substrates (yield = EX_glygn2_c / uptake rate of substrate).
2. Repeat above computations under aerobic conditions (EX_o2_c is knocked out).

All possible substrates are aligned on the left side of the map. You can use http://bigg.ucsd.edu database to find the full name of model reaction/metabolite IDs.