Introduction
This research focuses on the production of renewable chemicals, specifically the amino acid L-serine, directly from CO$_2$ using engineered cyanobacteria. The serA gene was mutated to deregulate feedback inhibition caused by L-serine. Additionally, the eamA serine/cysteine transporter gene was introduced to export the amino acid from the cell, reducing possible toxicity or degradation. So far, this has not been enough, and further modifications are required.

Current Results
- IPTG induces serA$, FR$, ATC induces eamA exporter
- No visible growth defect
- No quantifiable L-serine titer detected using HPLC
- More metabolic engineering is necessary

Biosynthesis of L-Serine

Current Work
- Test A0730 in E. coli with ilvA deletion to check for isoleucine production
- E. coli with ilvA deletion can grow in LB but not 0.4% glucose
- Remove ilvA from the newly engineered PCC 7002 strain

Future Work
- Test new exporters (thr$E$ and SerE) as alternatives to eamA
- Introduce a serB and serC operon in case of tight regulation by native genes
- Delete and/or repress the degradation genes ilvA and glyA to increase titers
- Track other metabolites in the pathway like 2-HGA

References