Algal biotechnology research at The University of Manchester

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**Metabolism engineering by transcription factors**

Identifying transcriptional responses to metabolic changes

**Chlamydomonas transcription factor PSR1 as a lipid and starch regulator**

- **Over-expressing PSR1** – validating a transcriptional engineering approach
- 60% increase in starch in over-expression lines

Bioprospecting for extremophile microalgae

PM01 – A Copper tolerant C. acidophila strain

Pigment characterisation by Raman spectroscopy

Control (pH 3) + 2 mM Cu (pH 3)

PM01 Copper uptake

0.0 0.1 0.2 0.3 0.4 0.5
0 0.5 1.0 1.5
Added Cu (mM)

Cellular Cu (pg cell⁻¹)

unwashed EDTA washed
Developing stress tolerant algae strains

Understanding stress response pathways and programmed cell death

- Heat
- Light stress
- Pathogens
- Salinity
- Oxidative stress (e.g. H$_2$O$_2$)

Reactive oxygen species

Programmed cell death

Down-regulating the cell death pathway

24 hours after H$_2$O$_2$ treatment

Wild type $\times$ kd line

Non-stress conditions

Biomass productivity (mg l$^{-1}$ d$^{-1}$)

Pittman lab:
Thomas Driver, Amirul Bin Ariffin, Javiera Ziehe Moreira, Helena Davies, Oscar Aguinaga Vargas, Stefano Idugboe, Owen McIntosh
(Former algae projects lab members) Amit Bajhaiya, Peter Bickerton, Andrew Dean, Clare Edmonds, Aniefon Ibuot, Adam Moolna, Olumayowa Osundeko, Zinnia Trehan, Rachel Webster

Algae Projects Collaborators:
Prof Roy Goodacre (University of Manchester, Chemistry)
Dr Patrick Gallois, Dr Anil Day (UoM, Life Sciences);
Prof Jon Lloyd (UoM, Environmental Sciences)
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