

Using Microalgae as a Platform to Study

Culture Techniques

Isolation of an Intracellular Product (oil)

Conversion of Extracted Oil to Biodiesel

BIOMAN 2013

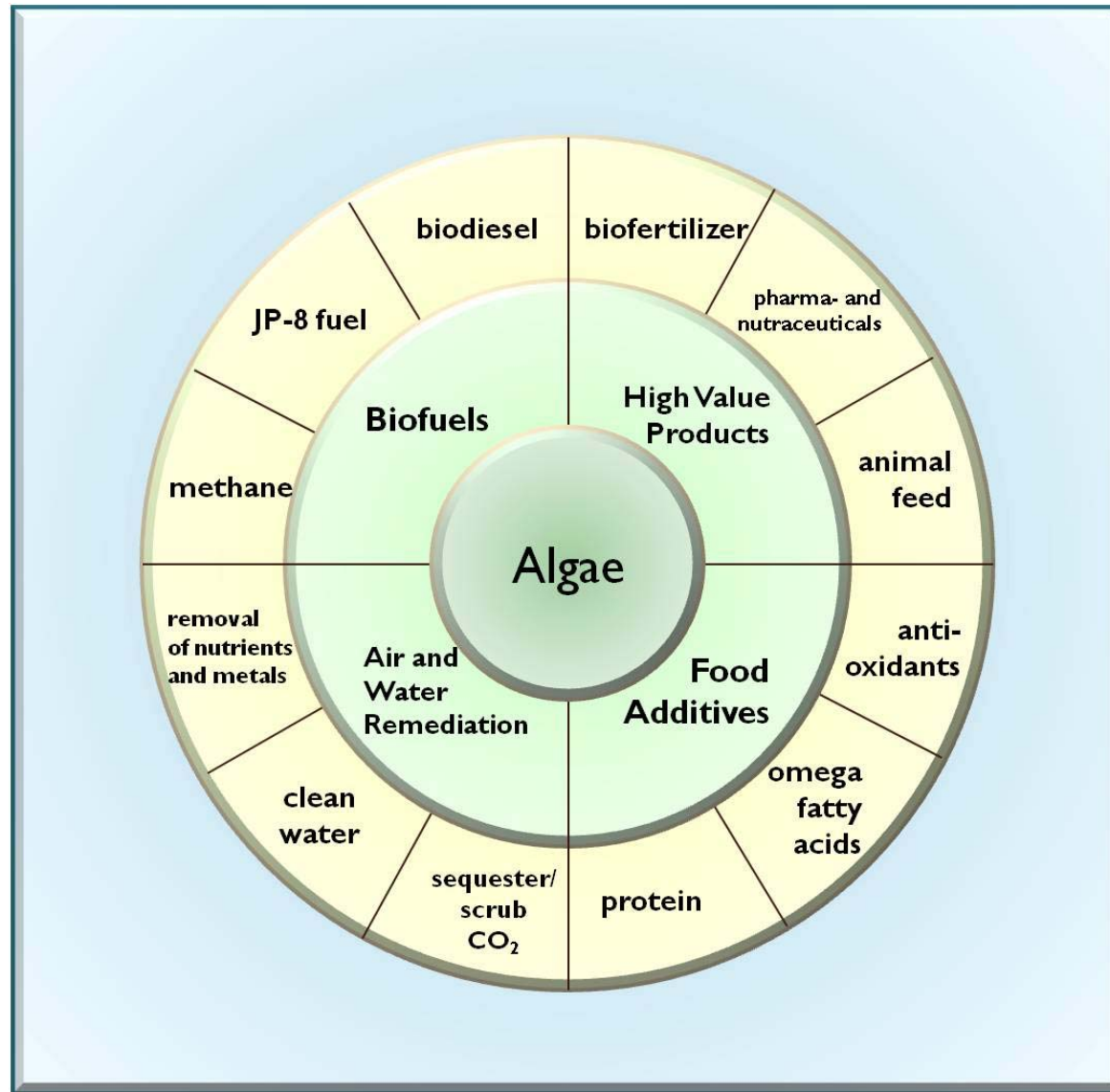
Intermediate Track

Rhykka Connelly

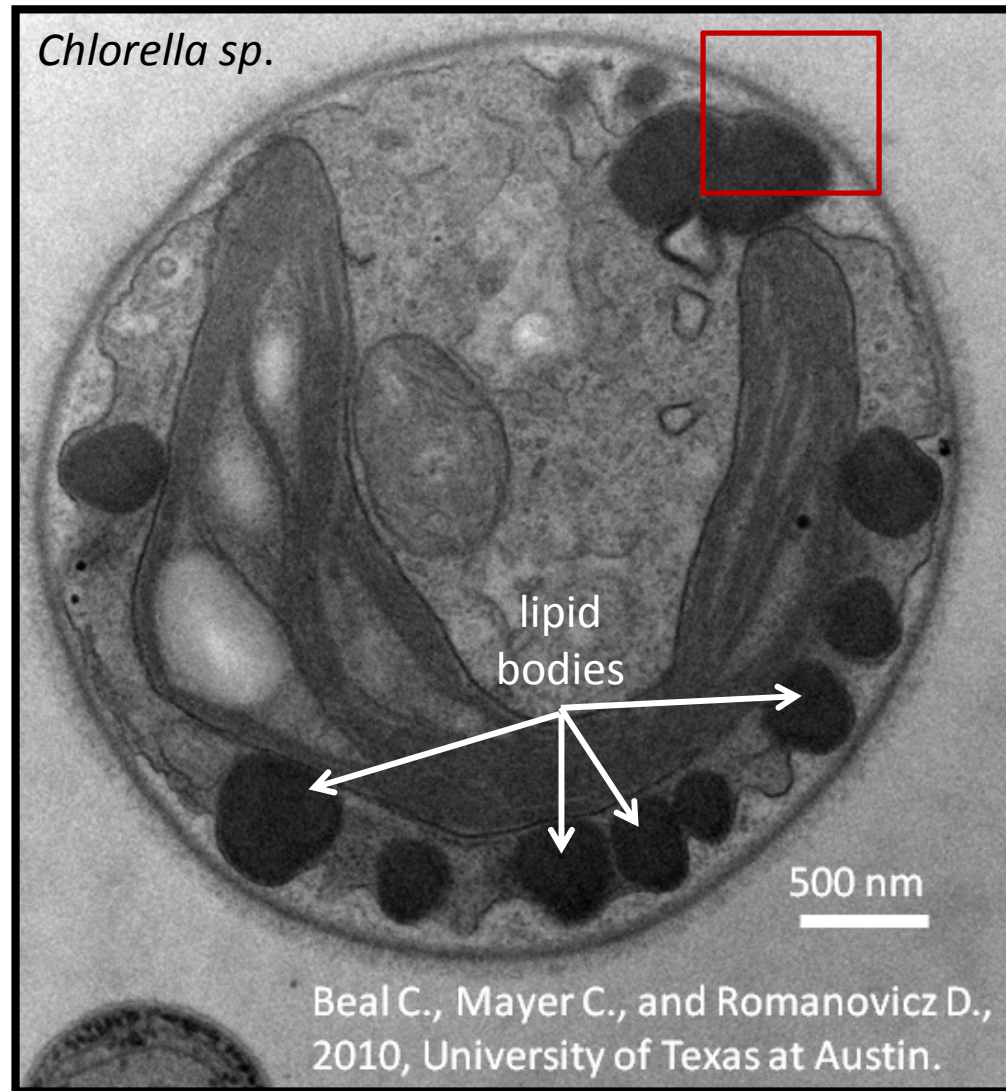
Program Manager

University of Texas Algae Program (UTAP)

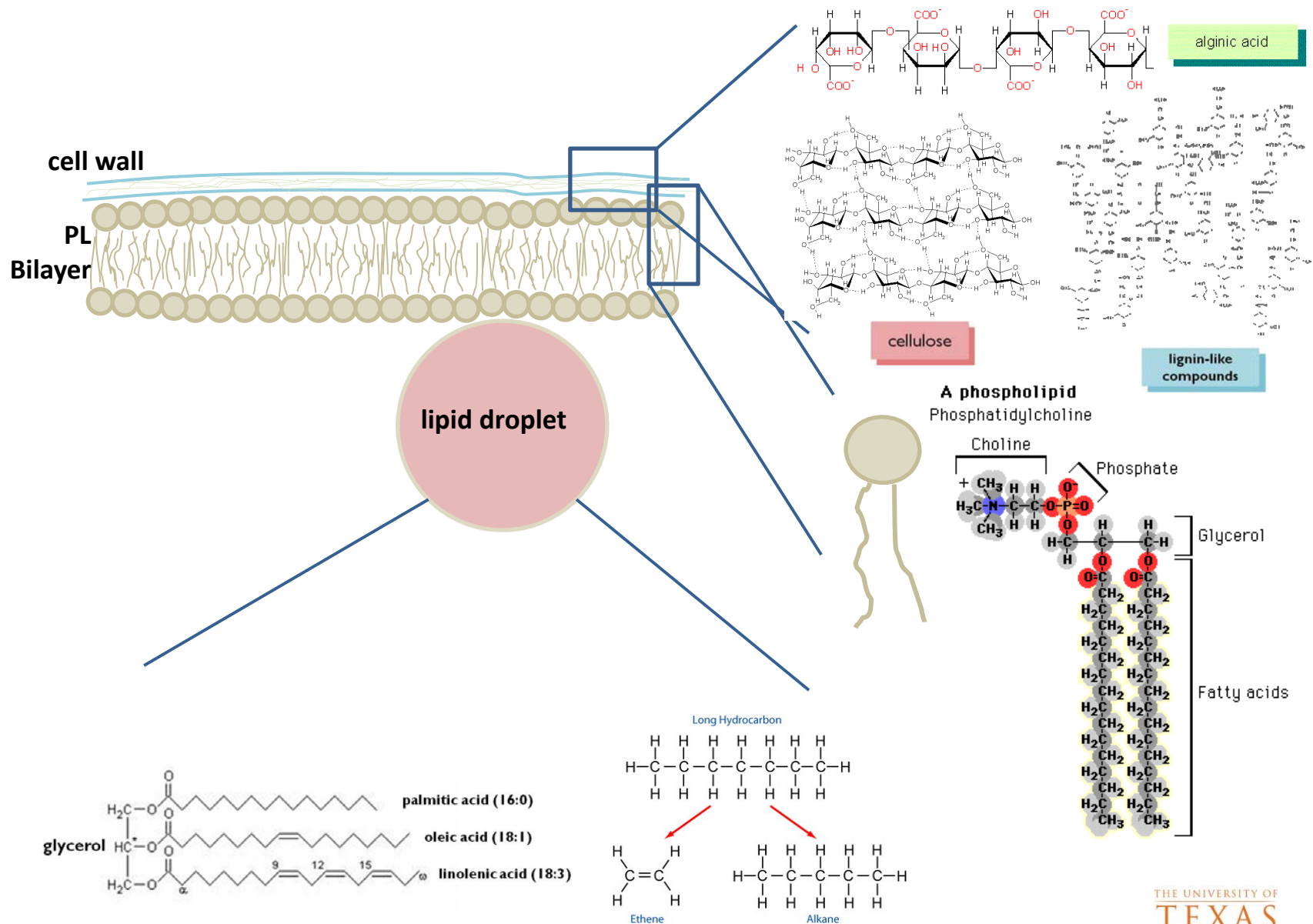
Microalgal Products



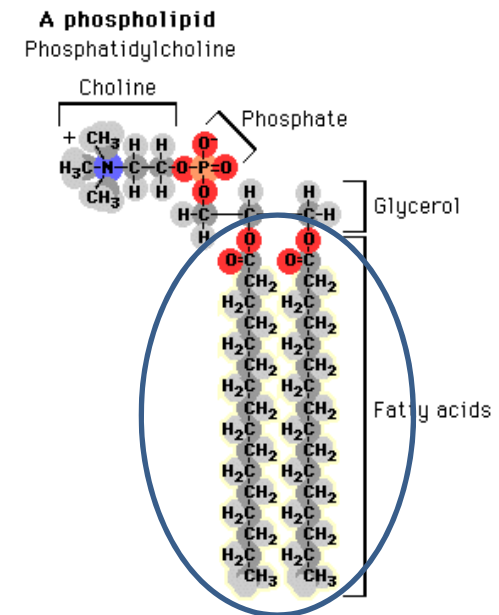
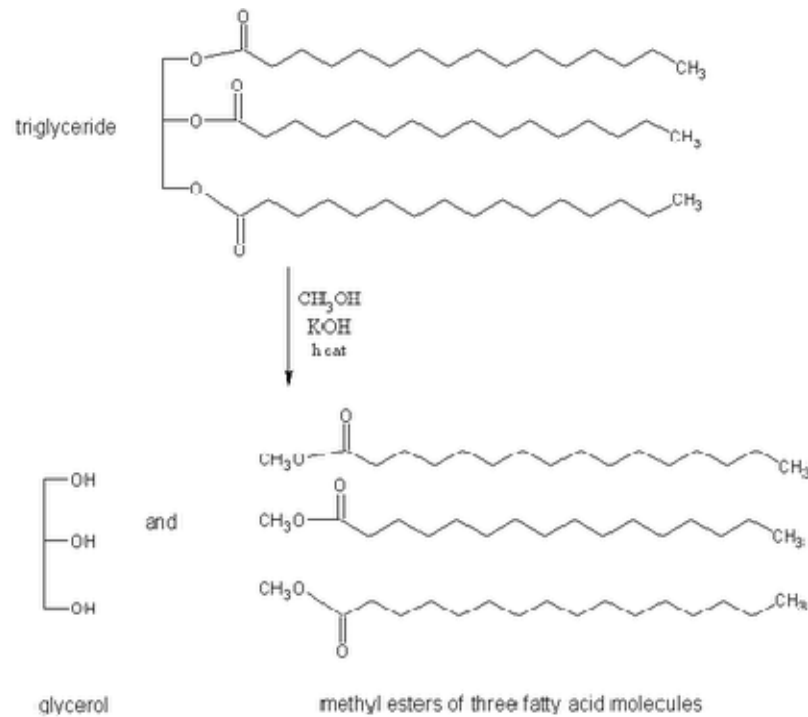
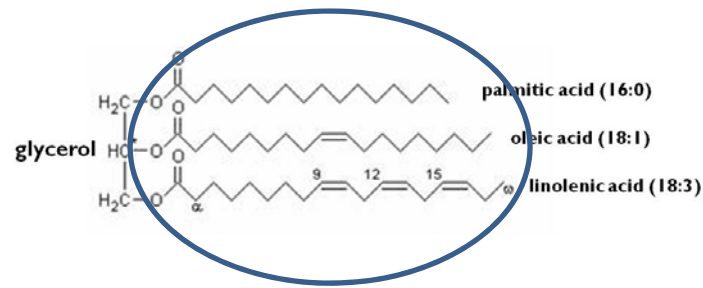
Structure of a Microalga



Structure of a Microalga – At the Membrane

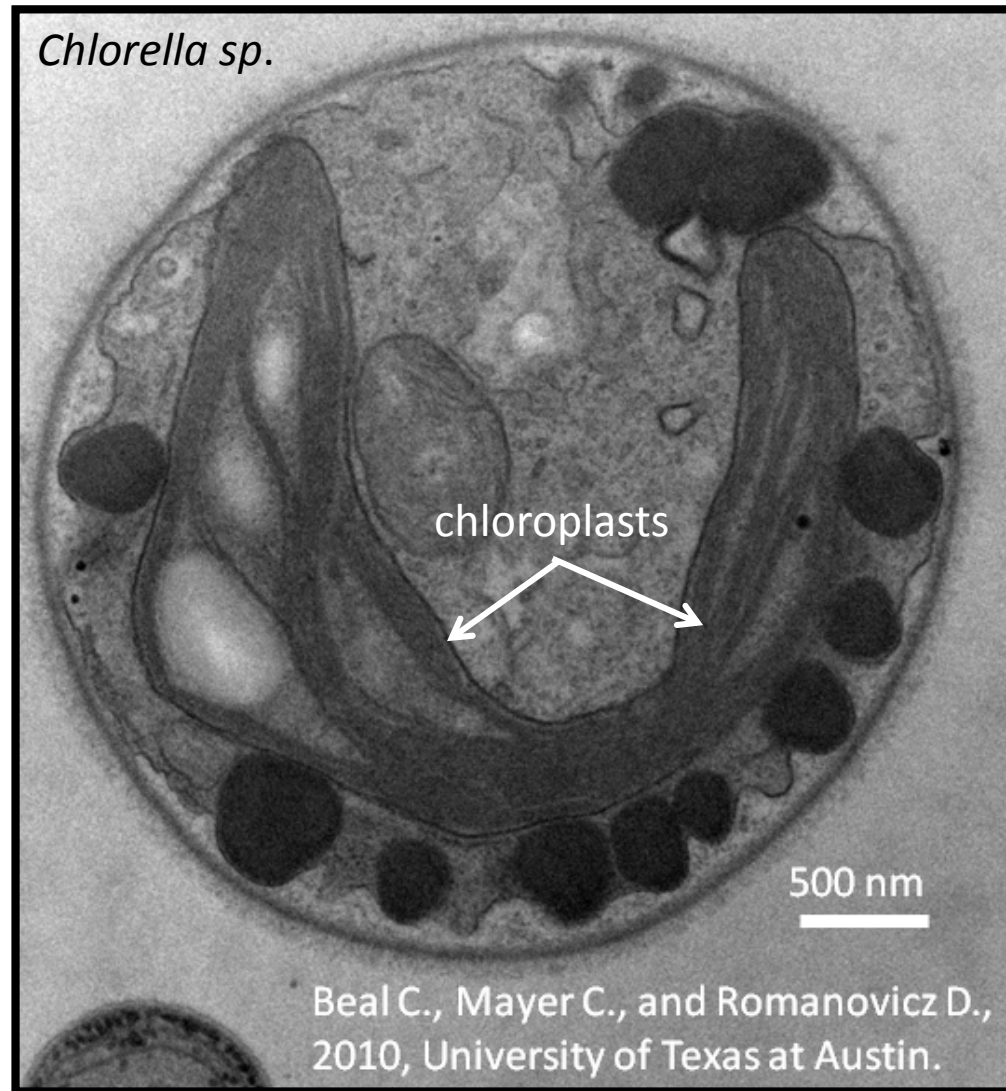


Structure of a Microalga – At the Membrane

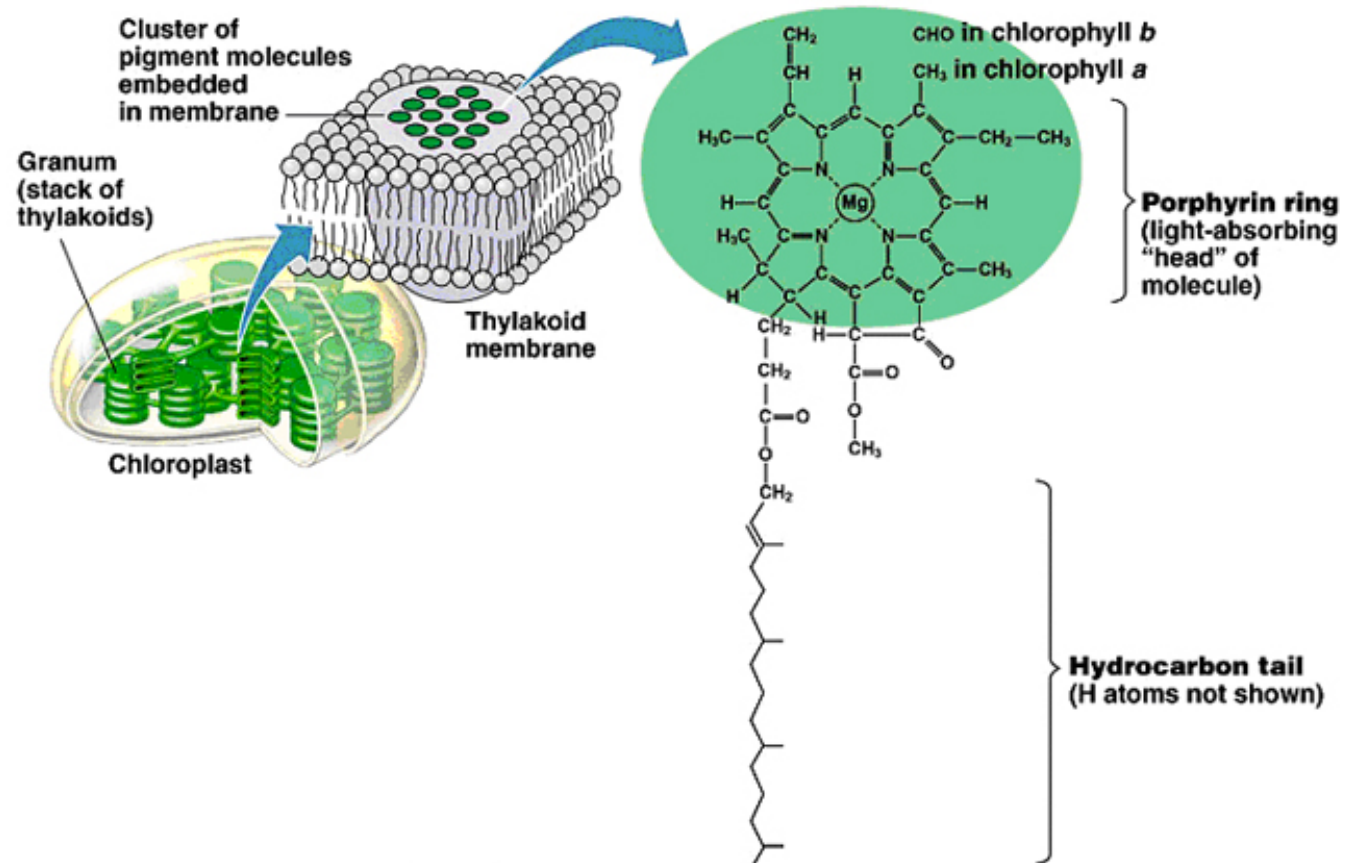


Biodiesel

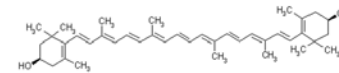
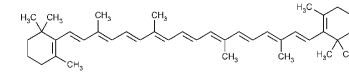
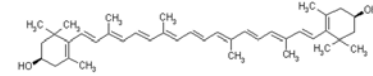
Structure of a Microalga



Structure of a Microalga – Light Harvesting and Photoprotection



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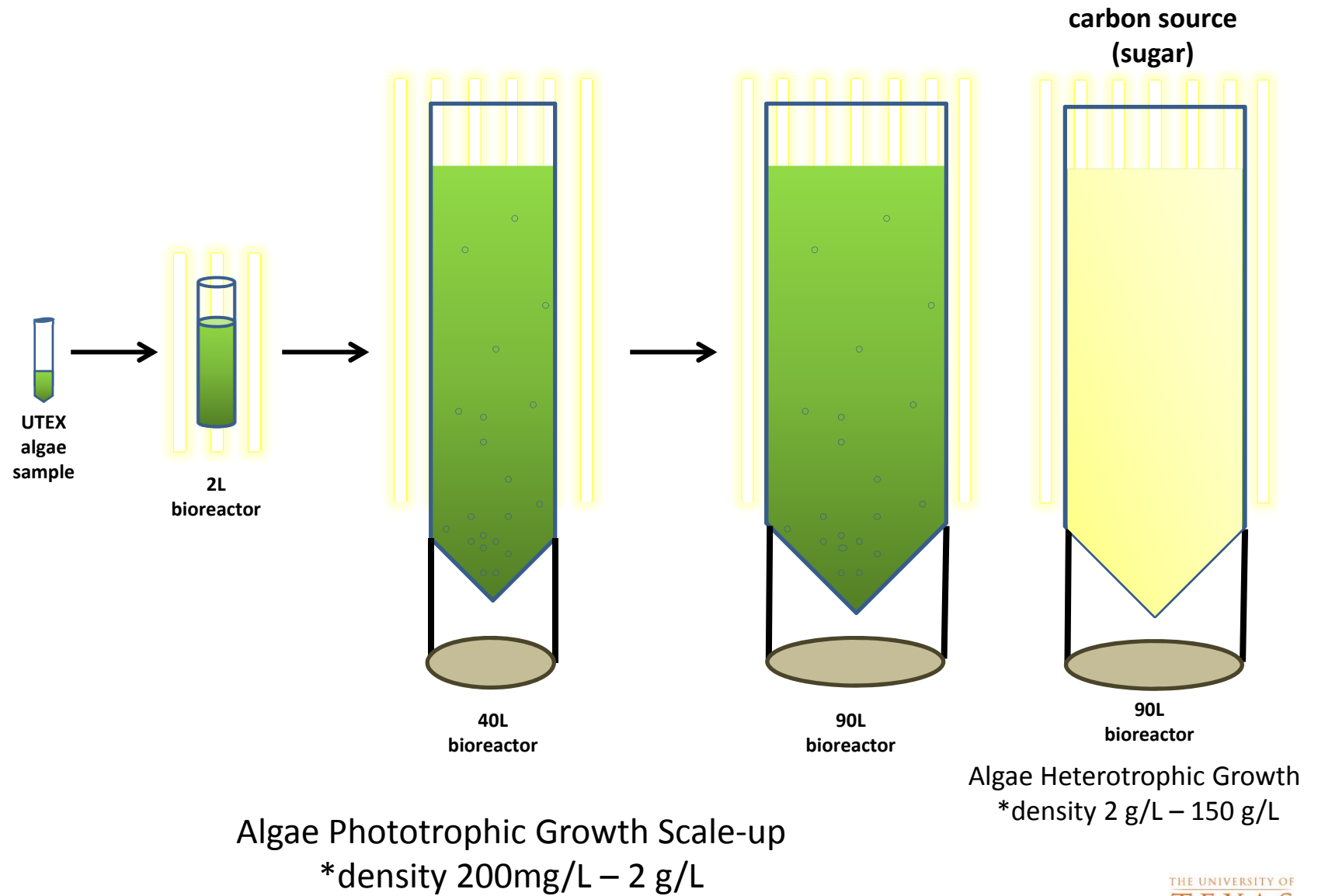


- THE UNIVERSITY OF
TEXAS
AT AUSTIN

Algae Targets

- fatty acids and hydrocarbons – refine into biodiesel and gasoline
- carotenoids – nutraceutical products
- carbohydrates
 - food additives
 - ethanol
- protein – animal feed supplement
- biomass
 - methane
 - syngas
 - biofertilizer

Growth Systems

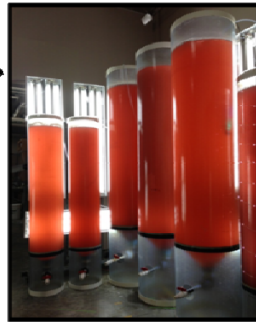




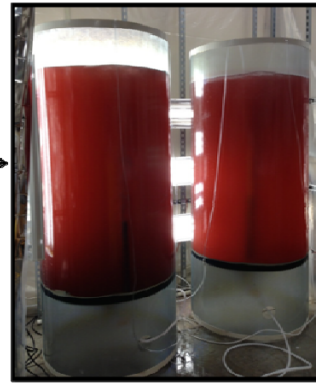
10 ml
UTEX



2 L
UTAP



90 - 260 L
UTAP



1,000 L
UTAP



50,000 L
AlgEternal Technologies



20,000 L
AlgaStar
(coming soon)

Biomass Scale-up

Metabolite Analysis +
Engineering Support

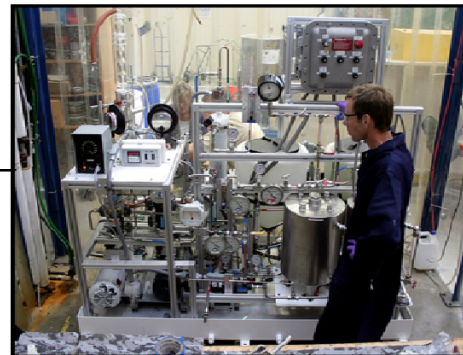
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Product and Process
Optimization

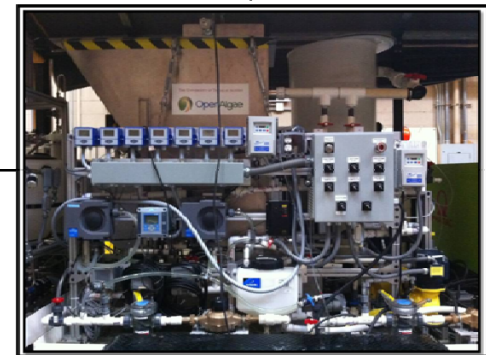
Product Extraction and Biocrude Production



Biocrude Production Unit



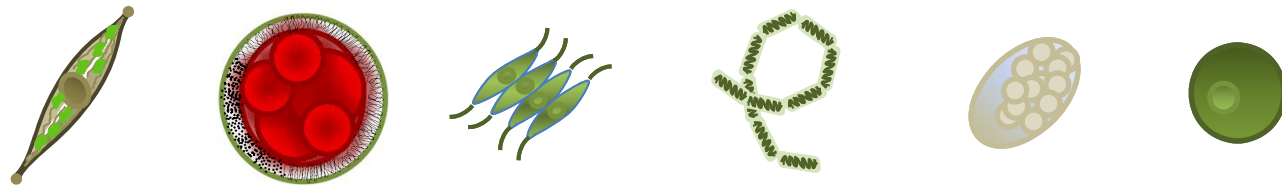
University of Texas Product Recovery Unit



University of Texas Algae Concentration Unit

value-added
products

biocrude



Today's Lab – Establishing and scaling up a microalgae culture

1. Acquiring algae
2. Starting a 500ml culture in a photobioreactor
3. Monitoring growth kinetics (dry cell weight, spectrophotometry to measure chlorophyll, microscopy)
4. Troubleshooting (competing algae, predators, bacteria)
5. Transferring a starter culture to a working scale 2L photobioreactor system
6. Examining the effects of light quality on the accumulation of high-value products