Growth experiment design for project ALPHA

Copenhagen, 2013

http://nuno0022.keaweb.dk/mypage_nuno/

Cultures and sampling

Coscinodiscus granii

f/2 or L1 medium
15°C
Light= 13-16 µmol m-2 s-1 ?
Photoperiod: 16:8 h

Coscinodiscum wailesii

f/2 or L1 medium
15°C
Light= 100 µmol m-2 s-1 ?
Photoperiod: 16:8 h

VOLUMES
and replicas ?

MORE species?

Need enough culture for:

Frustule analysis

Constitution:

. **Organic material** → .Protein analysis

Sillafins
Frustulins
Enzymes
Others (D1/psbA)

. **Inorganic material** - SILICA (architecture and photonics)

.Polyssacharides

Genomics

Characterization

Nucleic acids analysis

.Polyamines (LCPAs)

ENGINEERING… → Characterization of species specific LCPAs

Engineering the genome

Creation and maintenance of new strains

Proteins
Polyssacharides
Polyamines (LCPAs)
Molecules involved in frustule morphogenesis

Improve photonic properties of frustules

as we see fit

Frustule characterization

advanced-TEM ->
ELECTRON TOMOGRAPHY

3D shape, porosity and details of holes in silica

Engineer photonic crystals, porosity, valves, thickness of wall

Experimental design

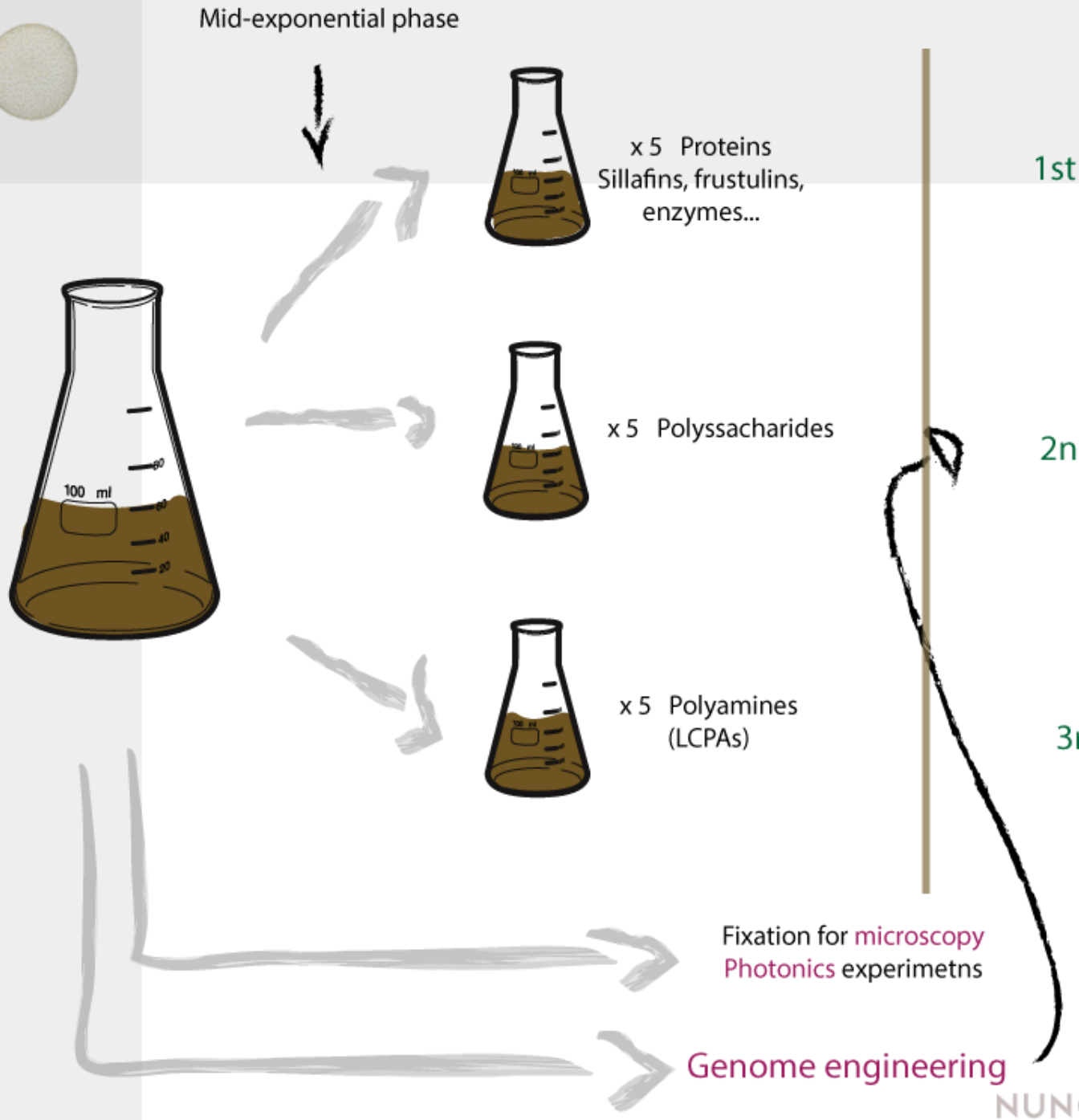
1st Original strains
2nd Manipulated strains
3rd Possibly other model species

Up-scaling and Applications

HOW?

Experimental design

1st Original strains
2nd Manipulated strains
3rd Possibly other model species


Mid-exponential phase
x 5 Proteins
Sillafins, frustulins,
enzymes...
x 5 Polyssacharides
x 5 Polyamines
(LCPAs)
100 ml
1st Characterization of
initial strains
2nd Characterization of
engineered strains
3rd Do the same with
other species?
Fixation for microscopy
Photonics experimetns
Genome engineering