A close-up photograph of a jellyfish, showing its translucent, orange-brown bell and numerous long, thin, reddish tentacles. The background is a solid blue color.

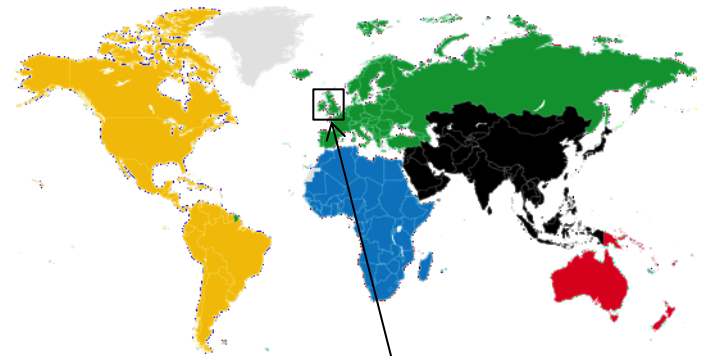
Maximising the value of marine  
bioresources – the future role of  
marine biotechnology

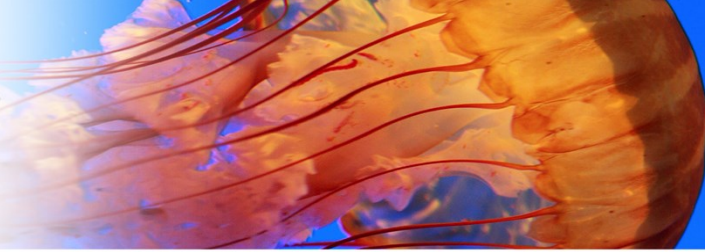
Charles D. Bavington PhD, FRSC  
CEO

GlycoMar Limited

## Company Profile

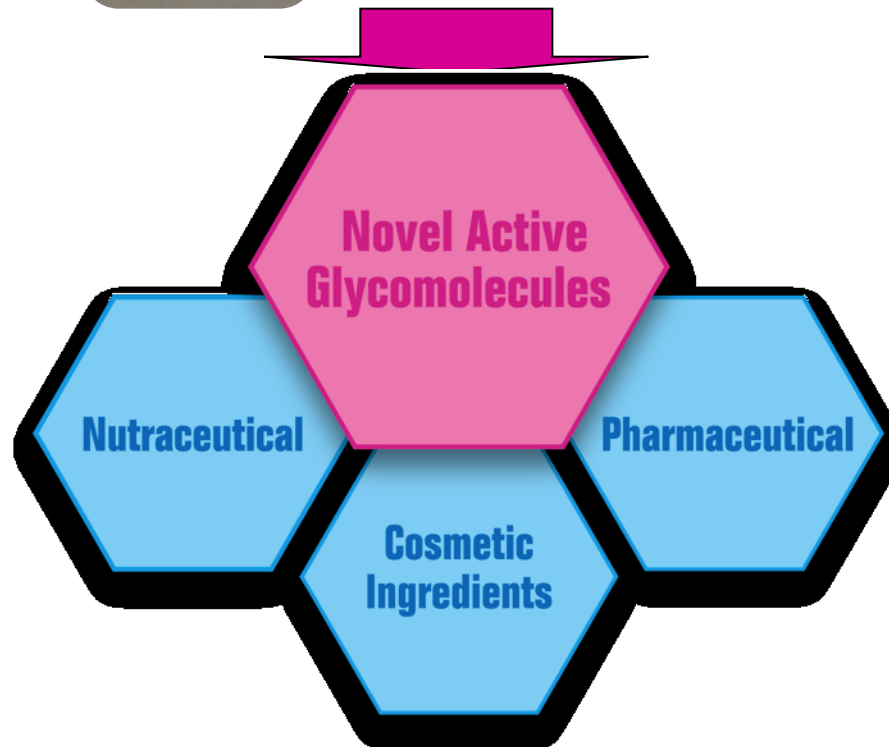
- Established in February 2005
- Located in U.K. at the European Center for Marine Biotechnology
- 9 staff
- Alliances with Pharma and biotech, microalgae companies





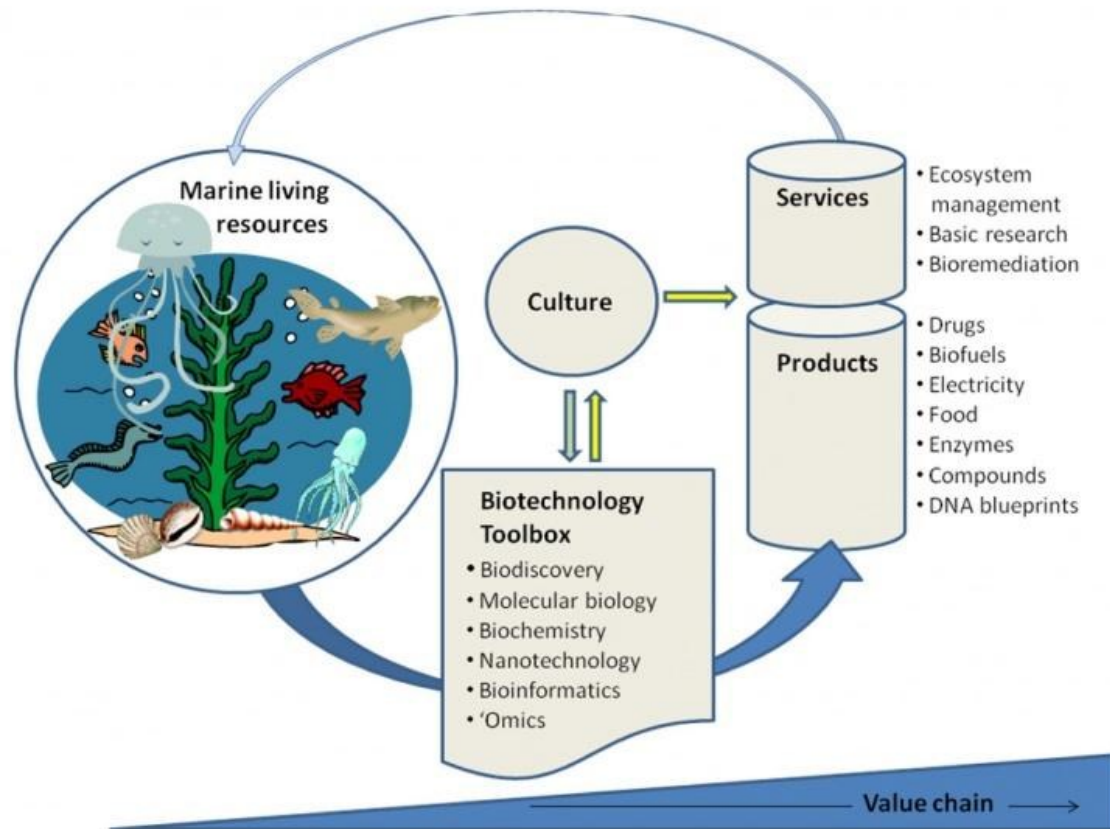
# Marine glycobiology-based discovery & development

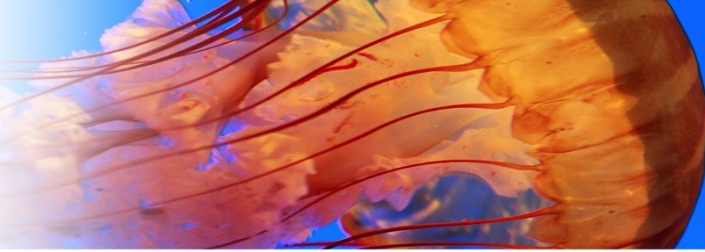
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# Marine (Blue) Biotechnology

- Only colour of biotechnology defined by its source and not its application.
- Global market currently US \$ 2.8 billion
- Annual growth predicted at 4-5%



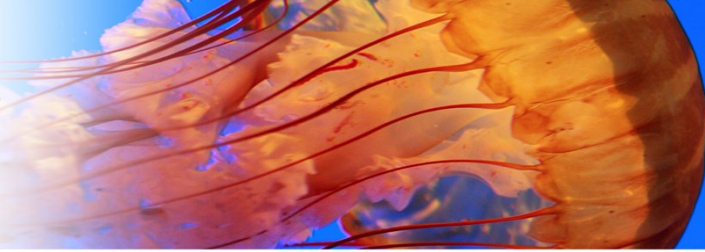


## Biotechnology markets

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- Aquaculture – Blue biotech
- Animal and fish health – Green biotech
- Pharmaceuticals & medical devices – Red biotech
- Food ingredients & Nutraceuticals – Yellow biotech
- Cosmeceuticals
- Industrial biotechnology – White biotech
- Bioremediation



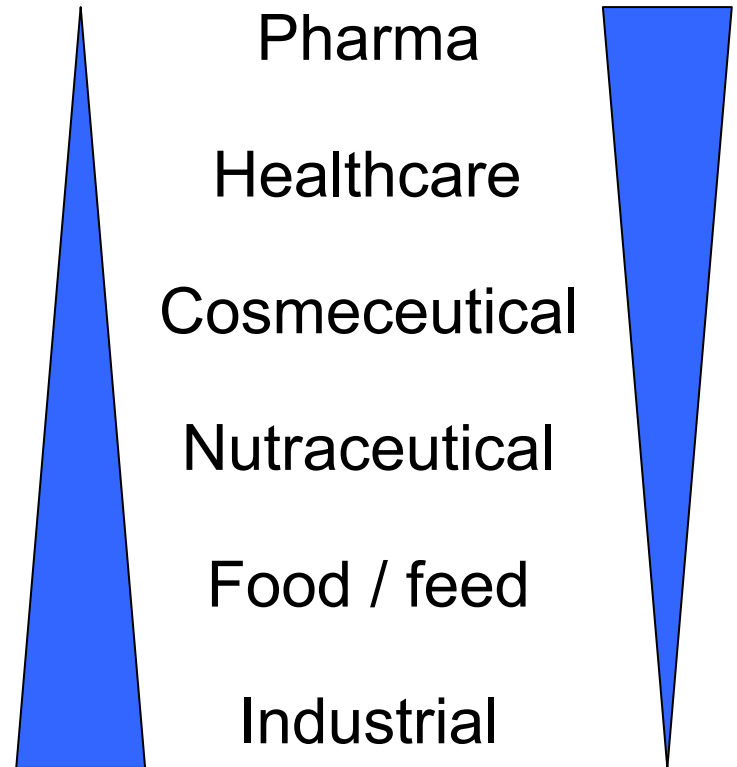


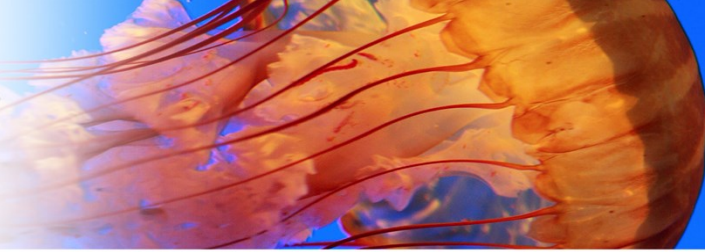
## Marine Biotechnology – opportunities

- New products
- New applications for old products
- New feedstocks
- New production systems
- Market demand
  - Unmet need
  - Innovation

Volume

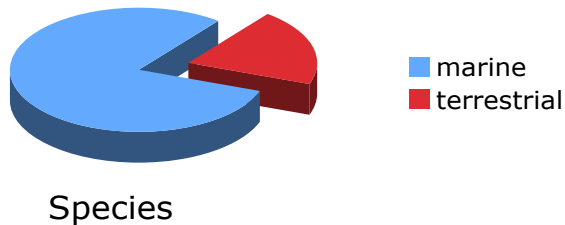
Value





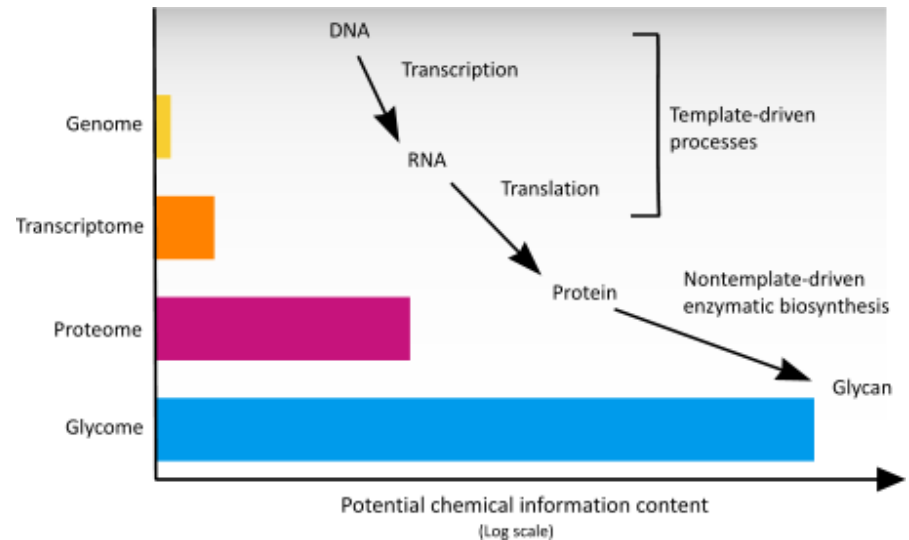
## Opportunity - marine glycobiology

- Unrivaled biological diversity

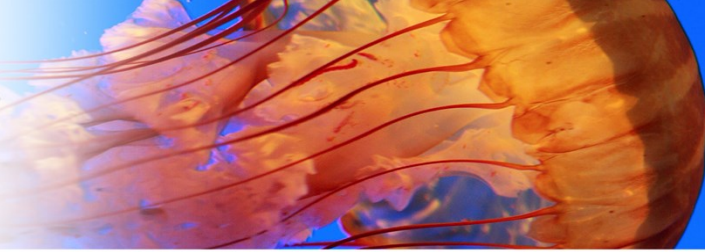


**Glycobiology** – “possibly one in the 10 greatest breakthroughs of the 21<sup>st</sup> century” (MIT Technology Review October 2001)

- Unrivaled chemical diversity



Turnbull & Field 2007 Nature Chemical Biology 3(2), pp74-77



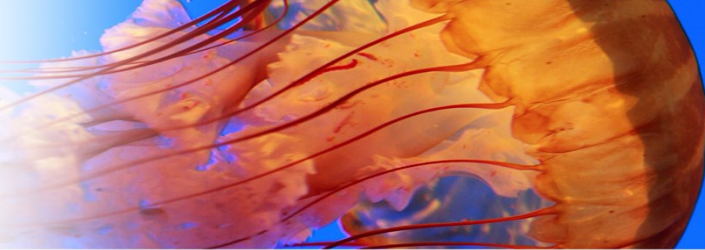
## Opportunity – marine bioresources

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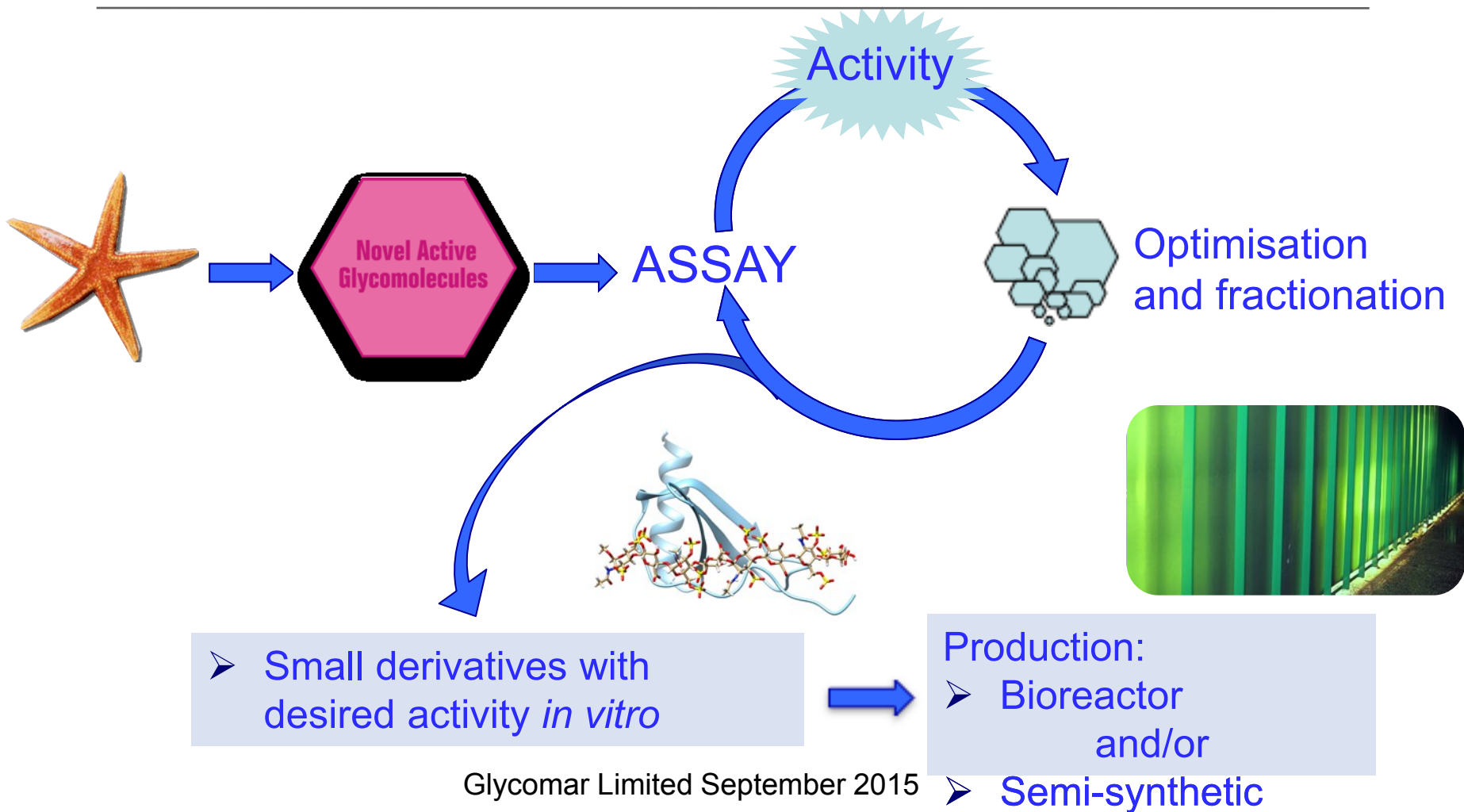
- Unrivaled biological diversity
- Microalgae – diversity, novelty
  - innovative products
  - High value products
- Macroalgae – old & new
  - novel products
  - novel applications for existing products
  - Large available biomass / product volume
- By-products & rest raw materials – old & new
  - New sources
  - Novel products
  - Novel applications for existing products
- Others

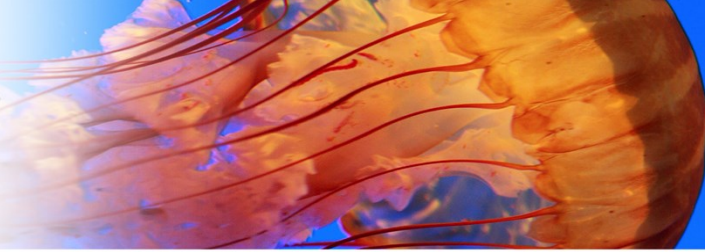






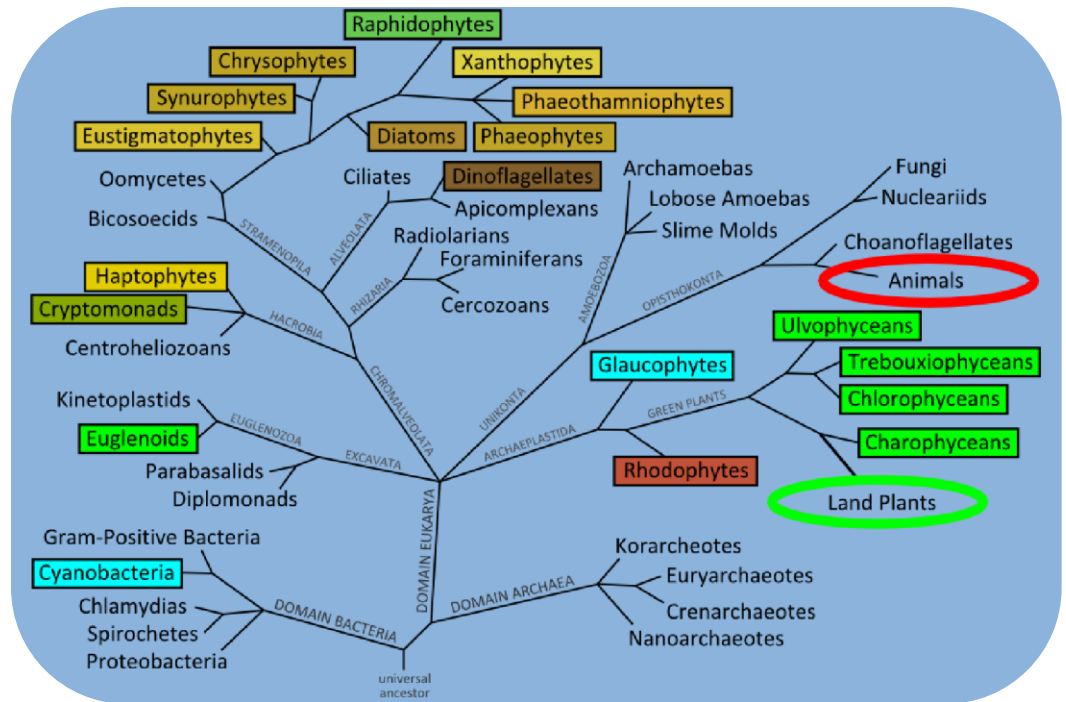
# Marine bioresource – discovery & development





## Marine bioresource – the challenge

- Biological diversity
  - 200,000 – 800,000 species, 35,000 known
- Knowledge gaps
  - Physiology / biochemistry
  - Functional properties
  - Cultivation
  - Harvesting
  - Extraction
  - Down stream processing (DSP)

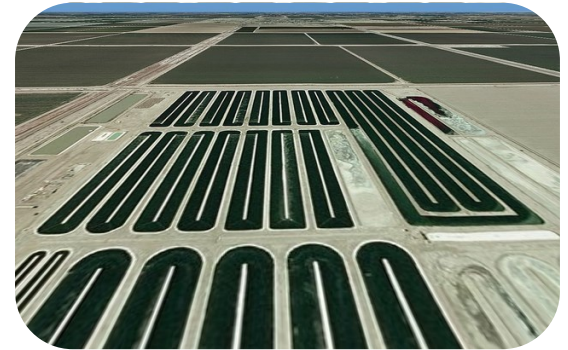


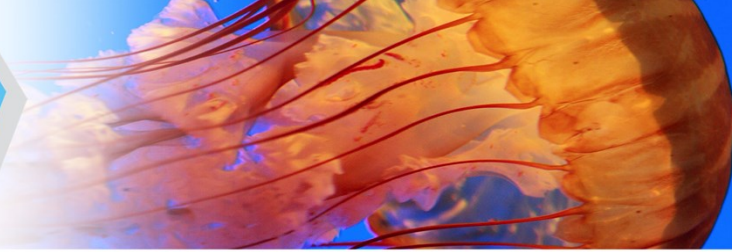
adapted from [www.keweenawalgae.mtu.edu/](http://www.keweenawalgae.mtu.edu/)

## Utilising marine bioresources

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- **Microalgae**
  - Diversity of cultivation systems
  - Excellent environmental sustainability profile
  - High development cost / high production cost
- **Macroalgae**
  - Wild harvest – sustainability? Quality?
  - Farmed – sustainability & quality
- **By-products & rest raw materials & others**
  - Sustainability of source
  - Availability of raw material





## Case study - *Prasinococcus capsulatus*



July 2009

Discovery  
screening



2010 & 2011

Testing & analysis



2012 -13

Pilot scale  
Patent filed



2013-14

Up-scale  
INCI & CAS  
"Prasinoguard"



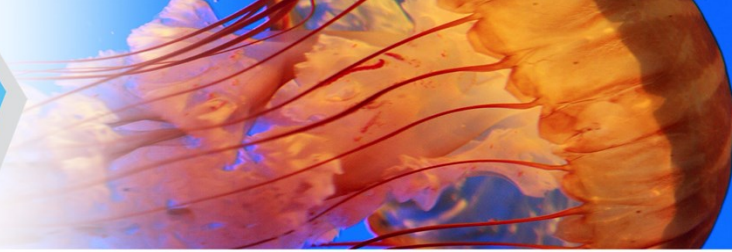
2015

Market entry

microA  
Et selskap i Priforsk Partners gruppen

BiolC

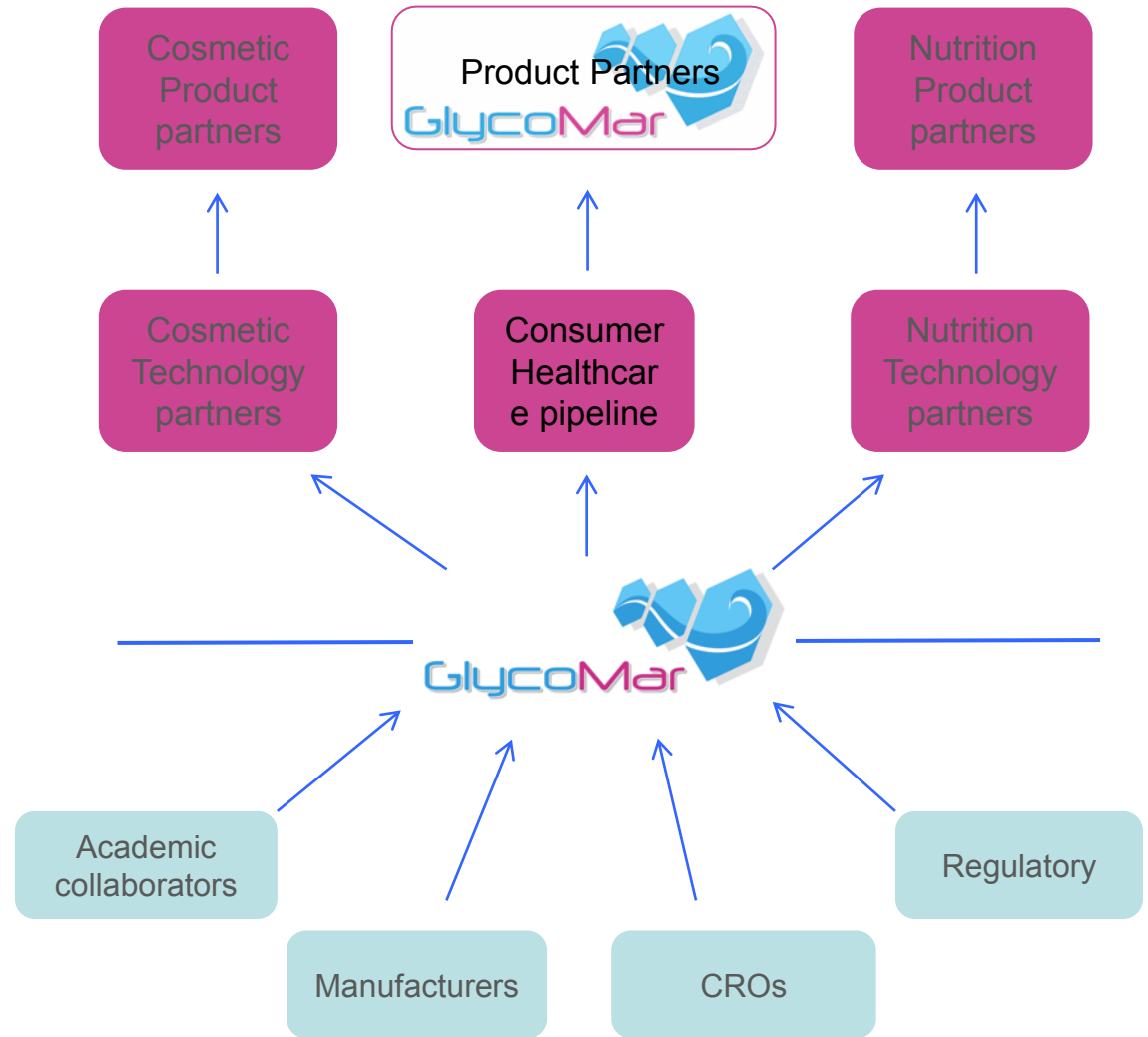




## Open Innovation

### Collaboration throughout the value chain

- Academic
- Bioresource supplier
- Production partners
- Marketing partners



The GlycoMar logo features a stylized blue and white graphic of a protein or molecular structure. To its right is a photograph of a jellyfish with a glowing orange and red bell and long, thin tentacles, set against a blue background.

GlycoMar

[www.glycomar.com](http://www.glycomar.com)

*Thank you*

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*Twitter: @cbav*