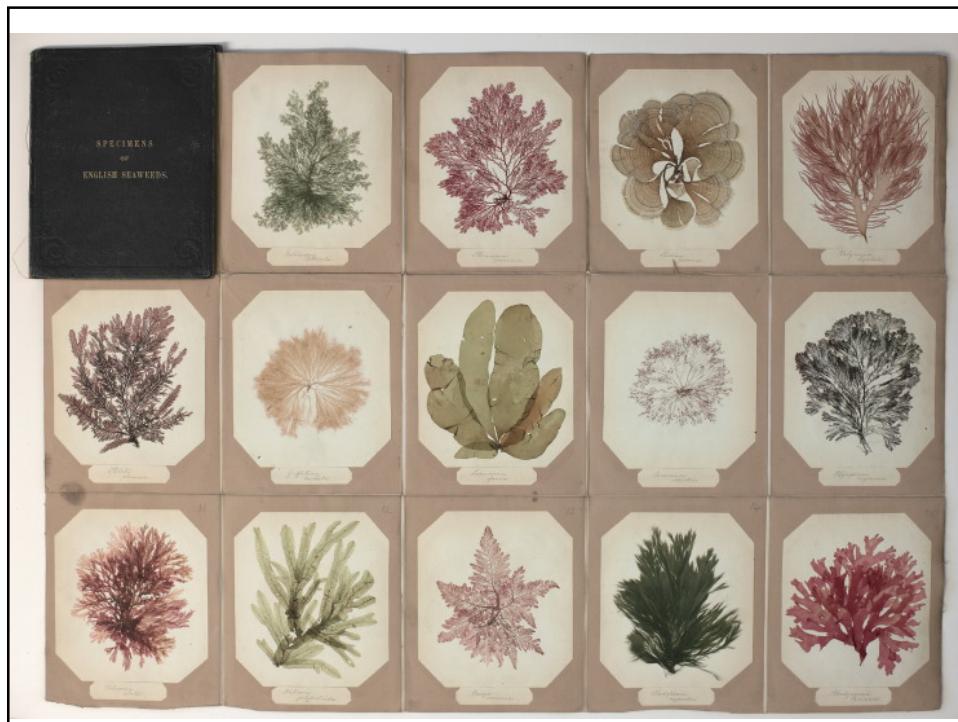




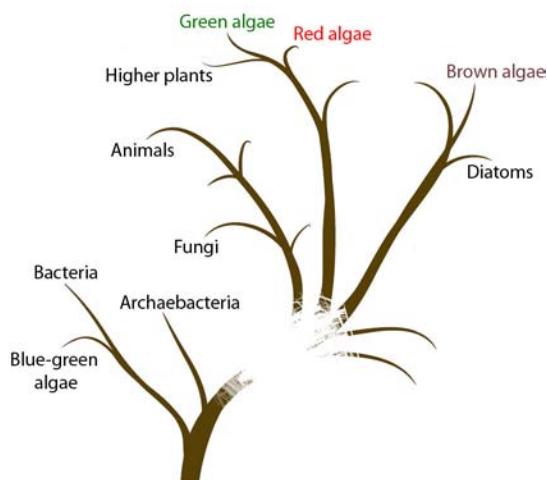
*Welcome*





**Seaweeds**  
are algae,  
*not* plants

**Green** (*Chlorophyta*) 1000-2000  
**Red** (*Rhodophyta*) 5000-6000  
**Brown** (*Phaeophyceae*) 1500-2000



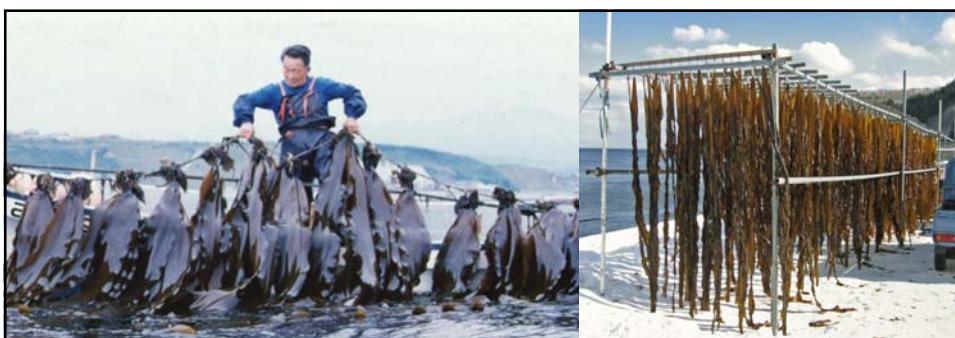
Photosynthesis  
Colors  
Pigments



**Bull kelp**

(*Nereocystis luetkeana*)





*Saccharina japonica*  
(kelp, konbu)



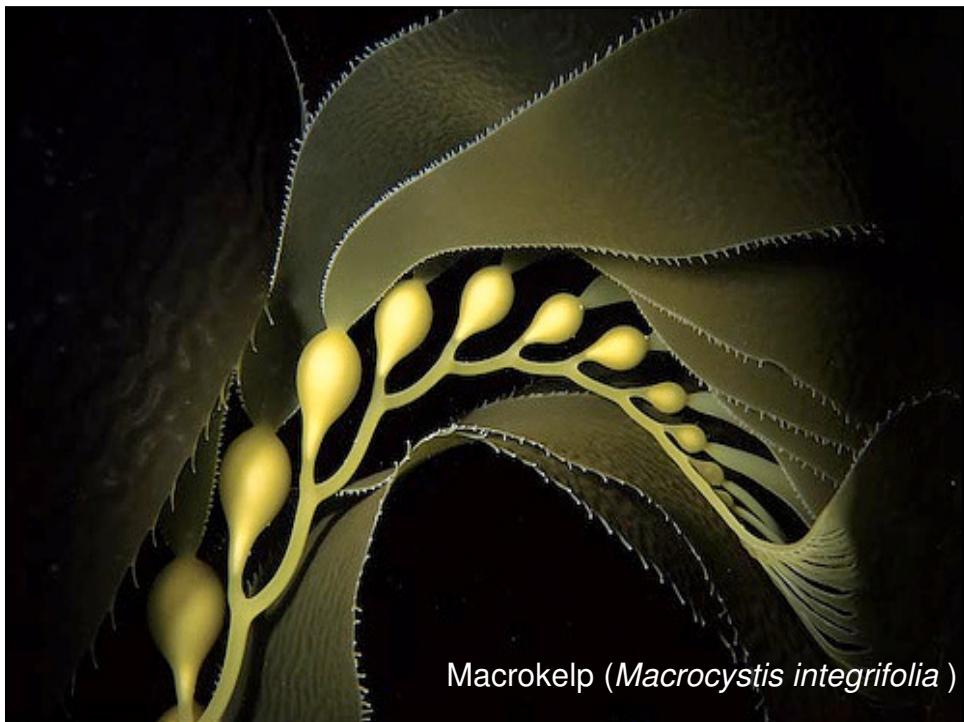
Konbu dashi



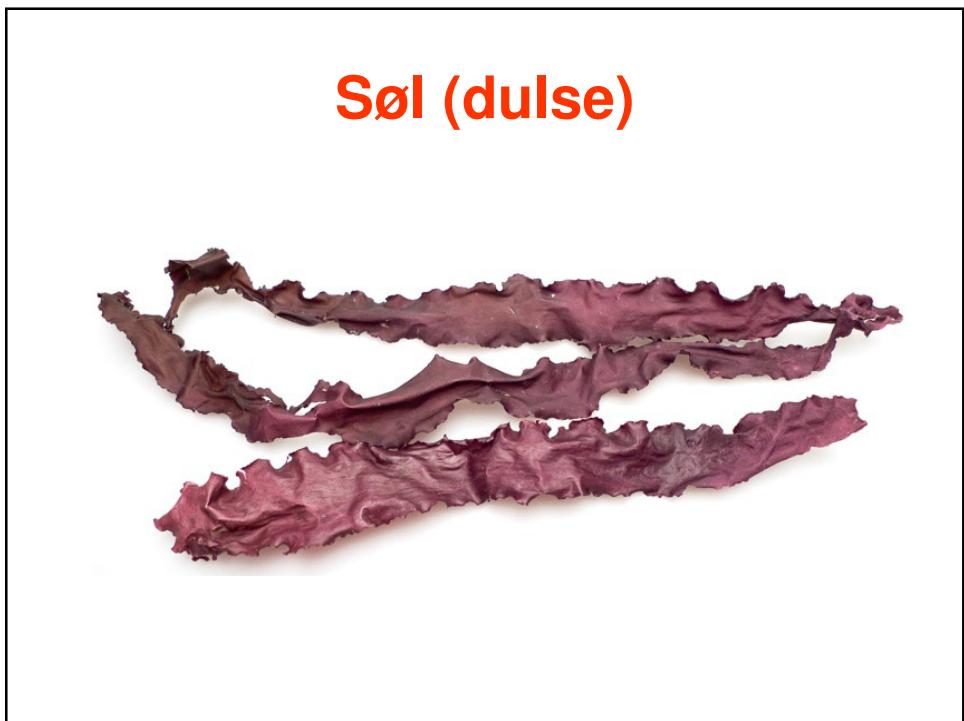
Konbu tsukudani



Oboro konbu



Macrokelp (*Macrocystis integrifolia*)

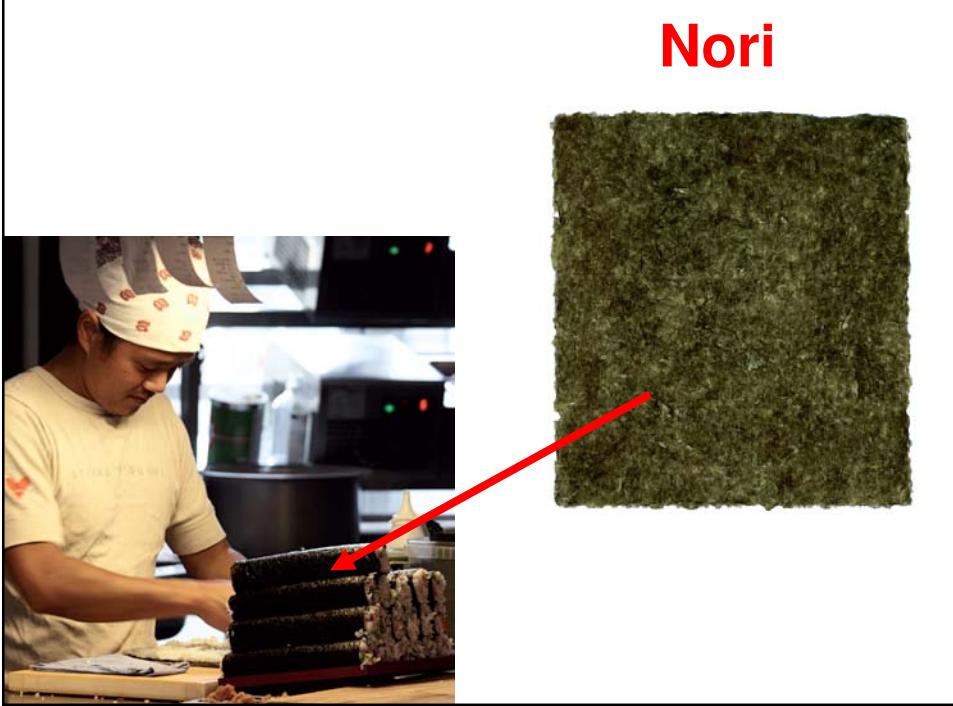


Søl (dulse)

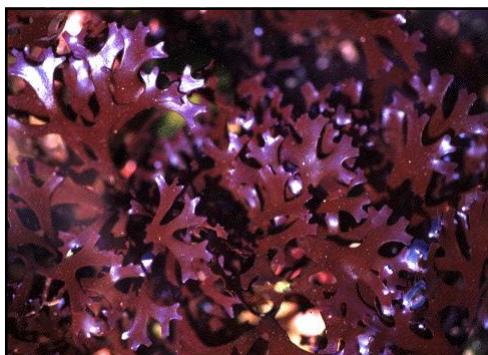
## *Porphyra yezoensis*



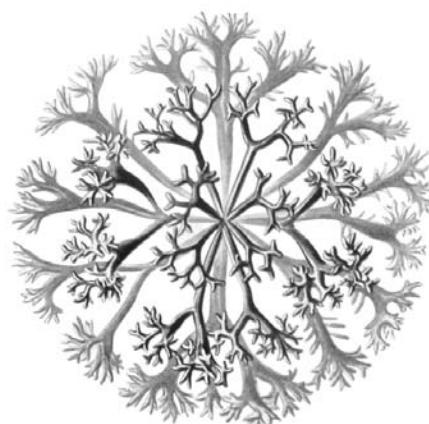
## Nori



## Welsh 'laverbread'



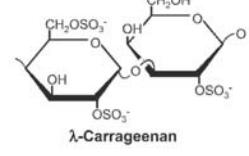
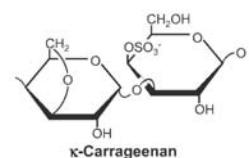
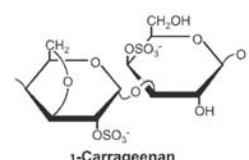
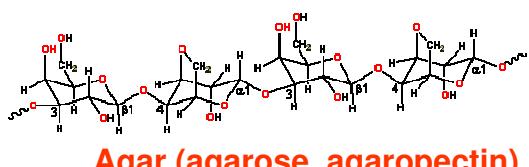
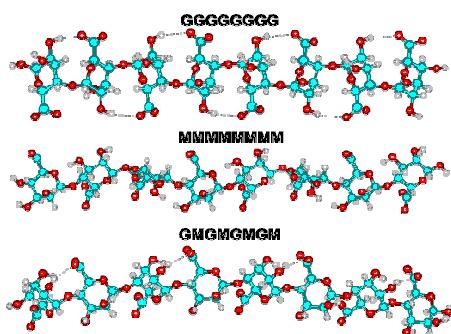
*Chondrus crispus*



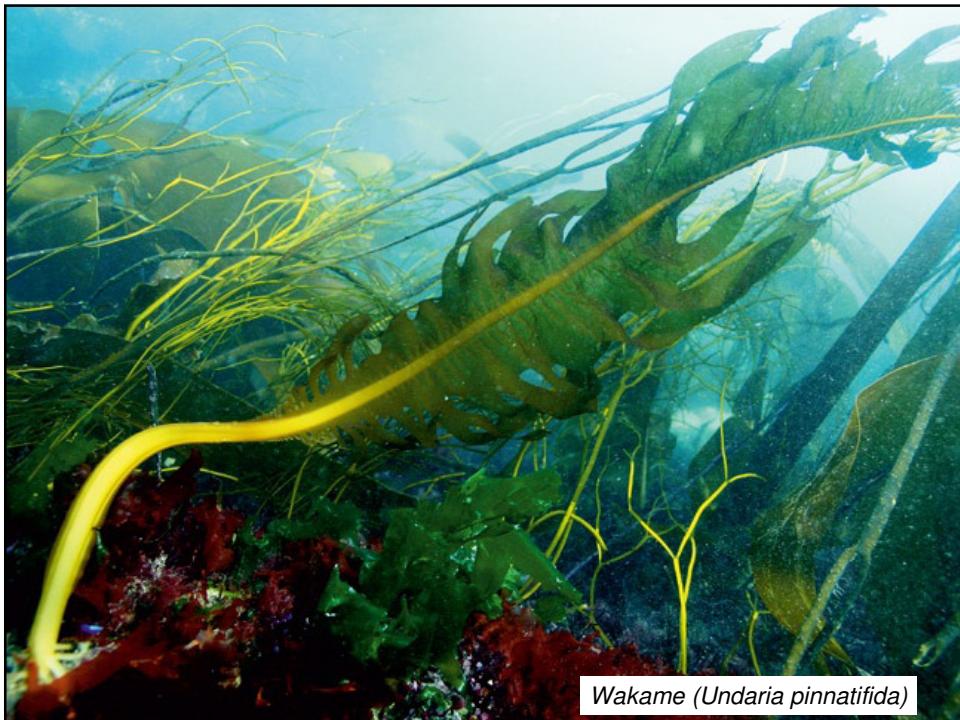
Ernst Haeckel's *Florideae* (1834-1919)



## The polysaccharides of seaweed



**Carrageenan**



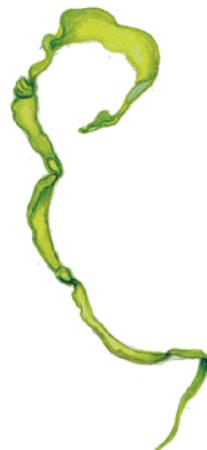
Wakame (*Undaria pinnatifida*)



## Seaweed salads



## Granulates and salt substitutes



*Ulva* spp. (sea lettuce)



## Important nutrients in seaweed some required for brain evolution

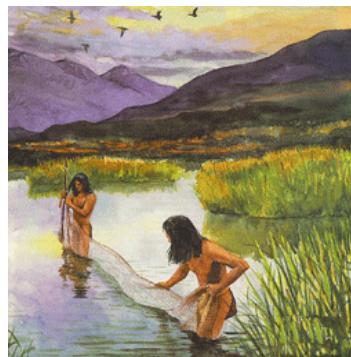
- Protein, essentiel amino acids (7-35%)
- Dietary fibers (45-75%, soluble, insoluble)
- Vitamins: A, B ( $B_1, B_2, B_3, B_6, B_{12}$  og folate), C, E
- **Iodine**
- More K-salts than Na-salts
- Minerals: (~ 10x land plants) **Fe** (>spinach, egg yolk), Ca (> milk), P, Mg, Cl
- Trace compounds: **Zn, Cu, Mn, Se, Mb, Cr**
- Essentiel fatty acids (2-5%), omega-3, omega-6  
**EPA, no DHA**

$$\frac{\text{omega-3}}{\text{omega-6}} \approx 1$$

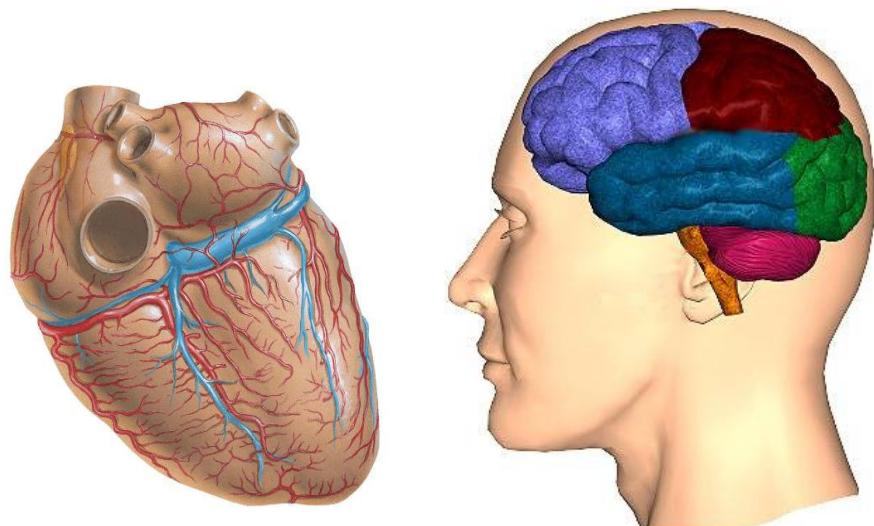
## Bioactive compounds in seaweed Neutraceuticals

- **Fucosterol** ( $\rightarrow$  plasmin, blood clearance), anti-cancer
- **Fuciodan** ( $\rightarrow$  heparin) anti-coagulant
- **Carrageenan**, anti-viral ( $\downarrow$  vicanal cancer)
- **Iodine** + lowering of estrogen ( $\downarrow$  breast and thyroid cancer)
- .....

**Where do we come from ?**



**What are we supposed to eat ?**





There is nothing more  
disgusting than seaweed

(Vergil, 70-19 f.Kr.)

Ψ

Seaweed is appropriate for  
distinguished guests  
– even kings

(Sze Teu, 600 f.Kr.)