

Introduction to Biology. Lecture 19

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October 20, 2014



- 1 Where we are?
 - Cambrian life
 - Cambrian explosion

- 2 Animals
 - Origin of animals



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Where we are? Cambrian life



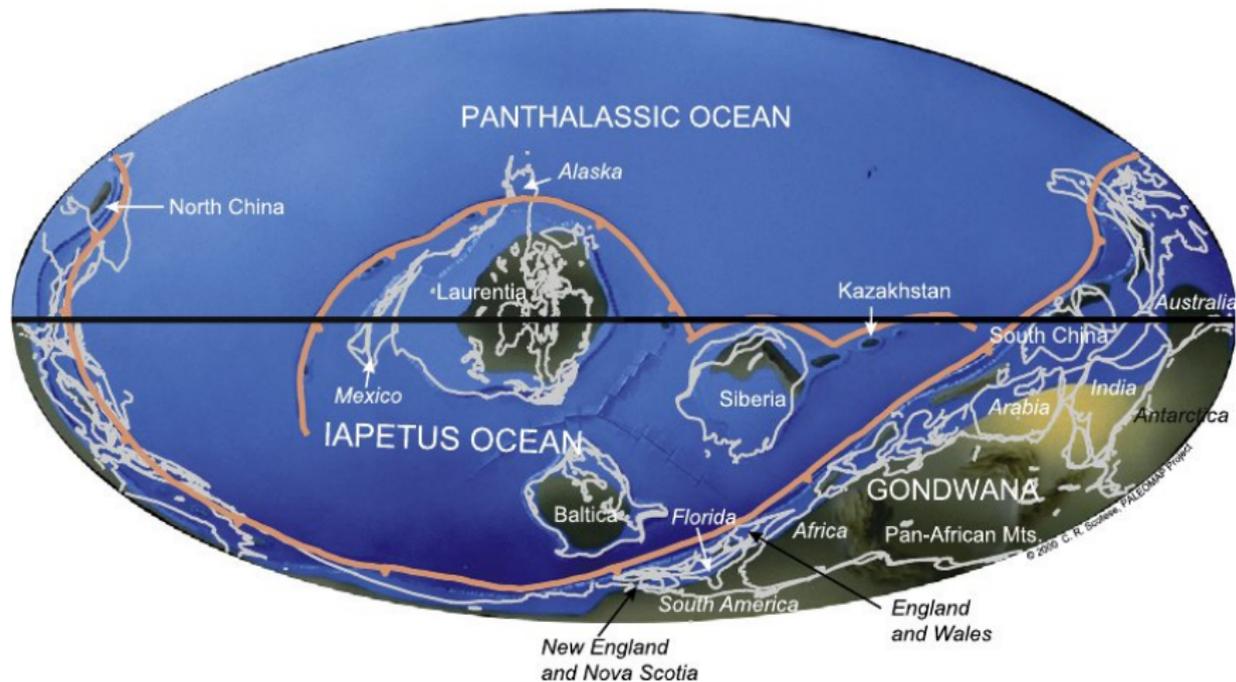
Timescale of Phanerozoic eon, Paleozoic era

- Phanerozoic eon
 - Paleozoic era
 - Cambrian period: 541 Mya
 - Ordovician period: 485 Mya
 - Silurian period: 443 Mya
 - Devonian period: 419 Mya
 - Carboniferous period: 358 Mya
 - Permian period: 299–252 Mya



Cambrian map

514 Ma Cambrian



Where we are? Cambrian explosion



Animal phyla in Cambrian

- Porifera
- Cnidaria
- Mollusca
- Brachiopoda
- Arthropoda (including Lobopoda)
- Echinodermata
- Chordata



Theories of Cambrian explosion

- Pellet revolution
- Acquiring the ability of making hard tissues
- Absolute predator



Evolutionary cascade resulted in skeletal revolution

- Muddy water: all dust and microscopic feces is slowly subsiding down
- Plankton arthropods appeared, they are making pellets from dust and excretions
- Water became more transparent, oxygen is not spending for dust oxidation
- More photosynthesis, more oxygen, more organic on bottom
- Animals became more active
- Big predators appeared
- Animals acquire skeleton and other defensive structures



Skeleton

- Internal (endoskeleton): hydrostatic (worms), spicules (sponges), bones and cartilage
- External (exoskeleton): chitinous, shells, skin plates

Since volume grows faster with size than surface, animals with exoskeleton will suffer from the big size more than animals with endoskeleton. This is why arthropods do not reach size of chordates.

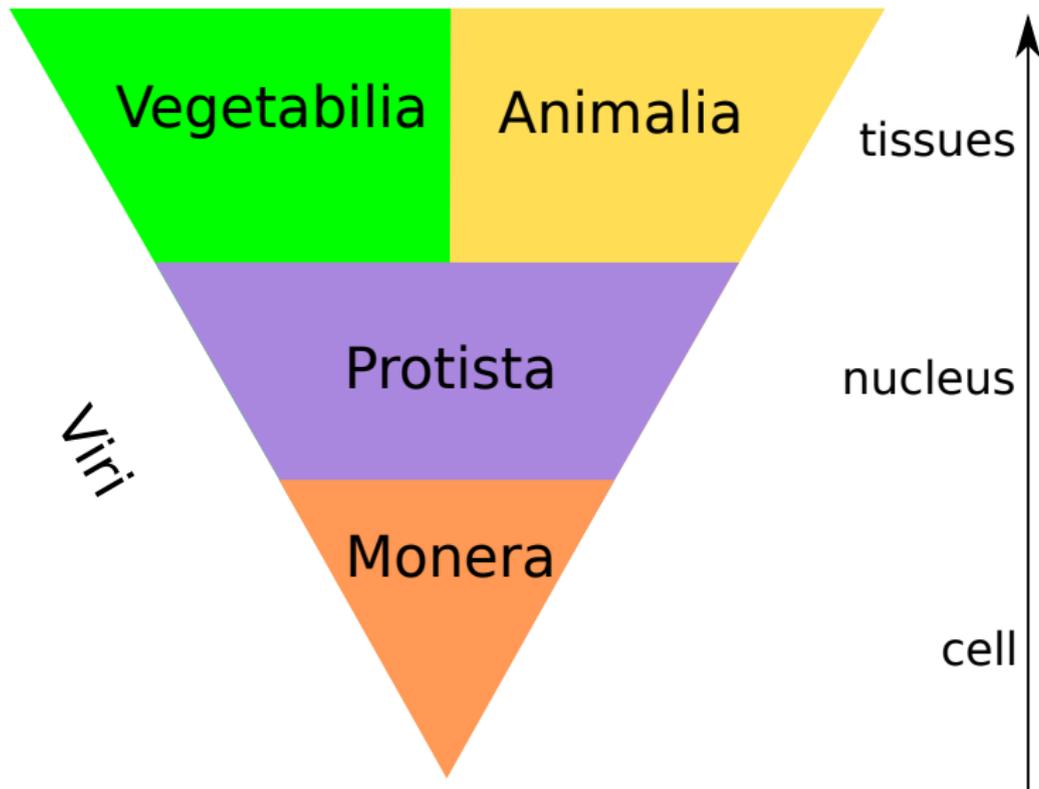


Animals

Origin of animals



Cells, tissues and kingdoms



Origin of animals

- Blastaea: not the animal yet. *Volvox*, *Proterospongia*.
- Phagocytella. Two tissues: kinoblast and phagocytoblast.
Trichoplax.
- Gastraea. Three tissues: ectoderm, entoderm and mesoderm.
Closed gut.



Summary

- The main driving force of animal evolution was feeding on bigger and bigger pray



For Further Reading



Skeleton.

<http://en.wikipedia.org/wiki/Skeleton>



Animal.

<http://en.wikipedia.org/wiki/Animal>

