

Phylogeny and the history of life

Phylogeny

The history of life

Processes of diversification

Outline

Phylogeny

- Constructing phylogenetic trees

- Example: the evolution of whales

The history of life

- The shape of the tree

- The fossil record

- Putting the timeline together

Processes of diversification

- Adaptive radiations

- Mass extinctions

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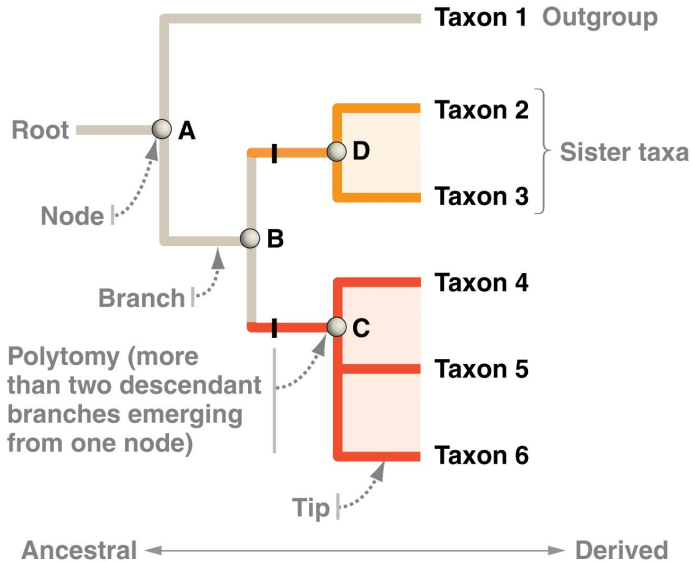
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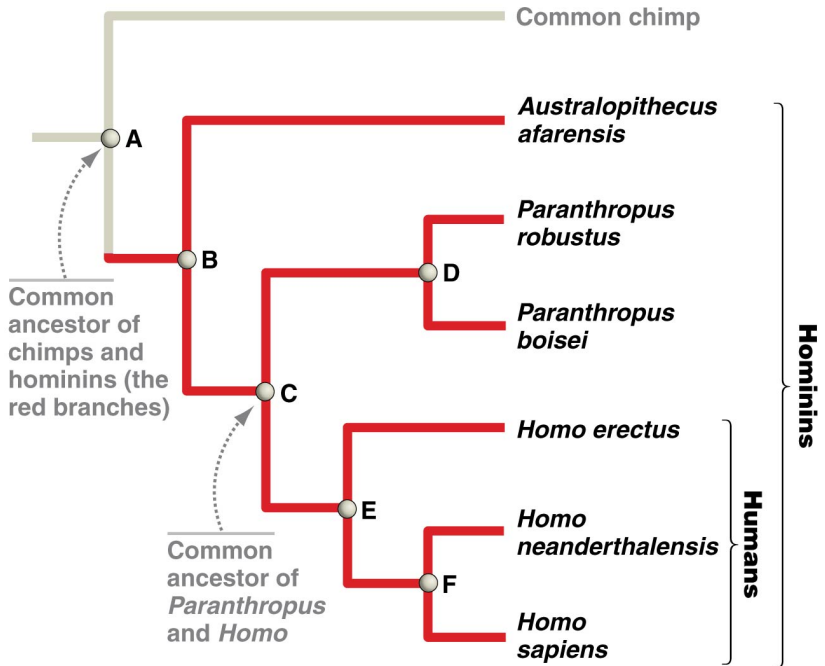
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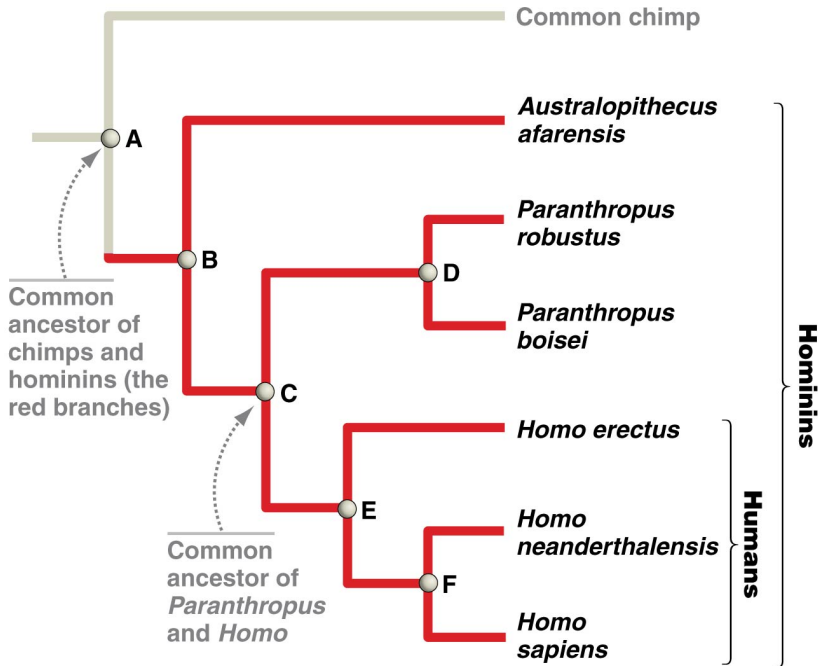
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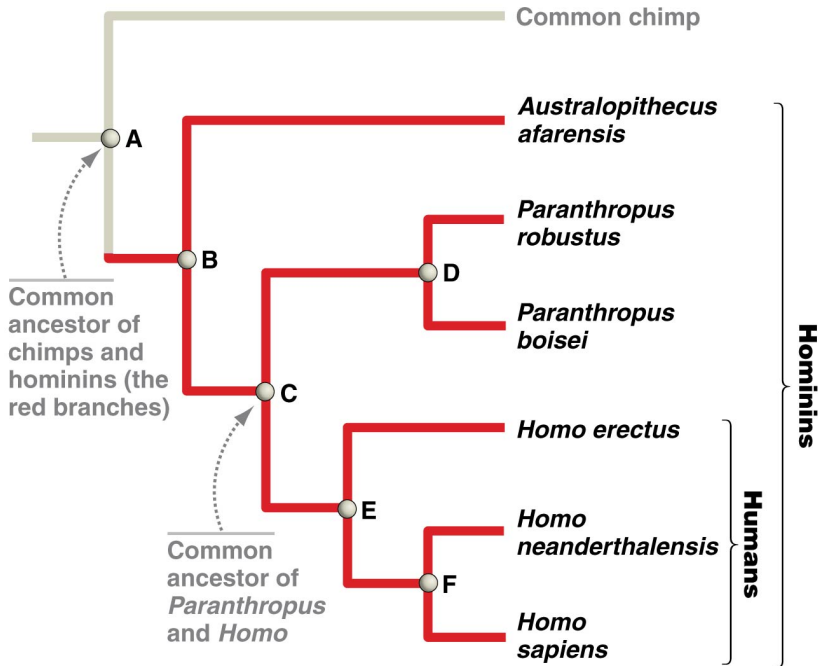
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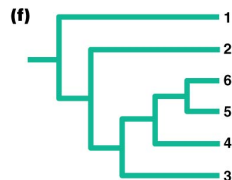
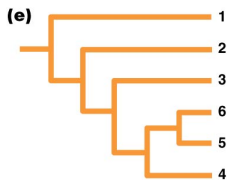
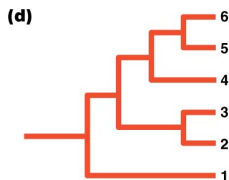
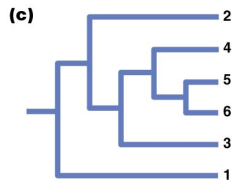
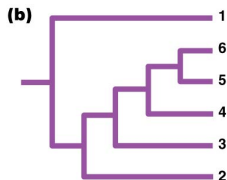
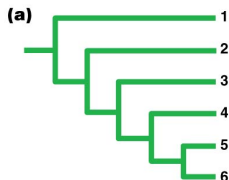
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Activity: which of these things is not like the others?



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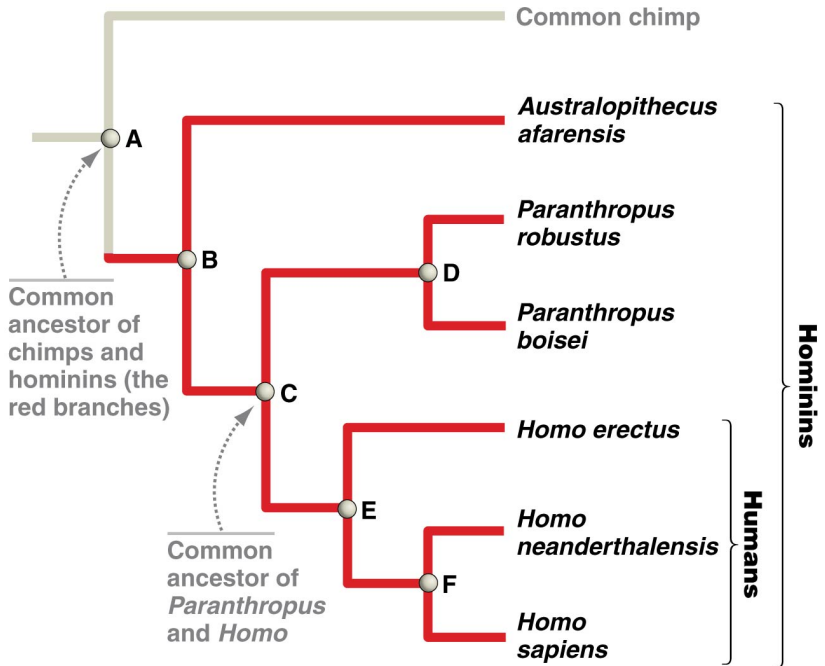


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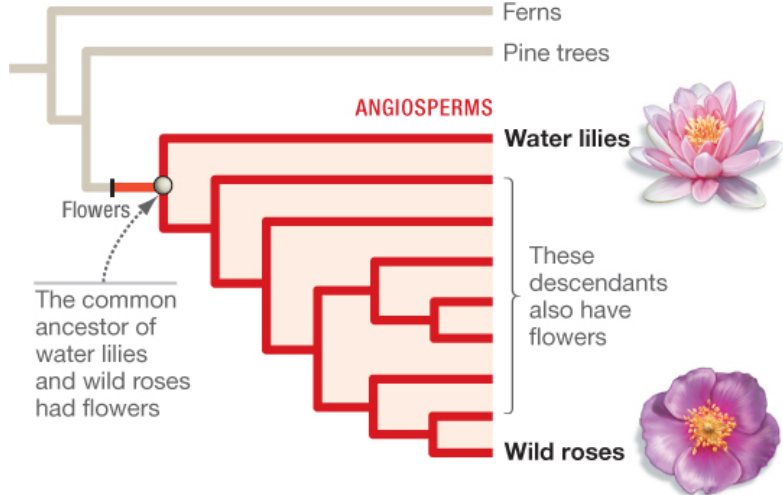


Figure 25.2 Homology: Similarities Are Inherited from a Common Ancestor. Flowers in diverse plants, such as water lilies and roses, are homologous.

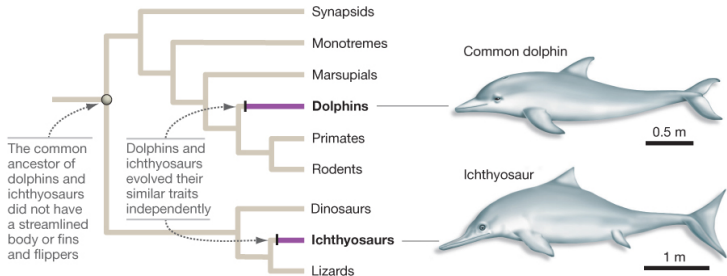


Figure 25.3 Homoplasy: Traits Are Similar but Not Inherited from a Common Ancestor. Dolphins and ichthyosaurs look similar but are not closely related.

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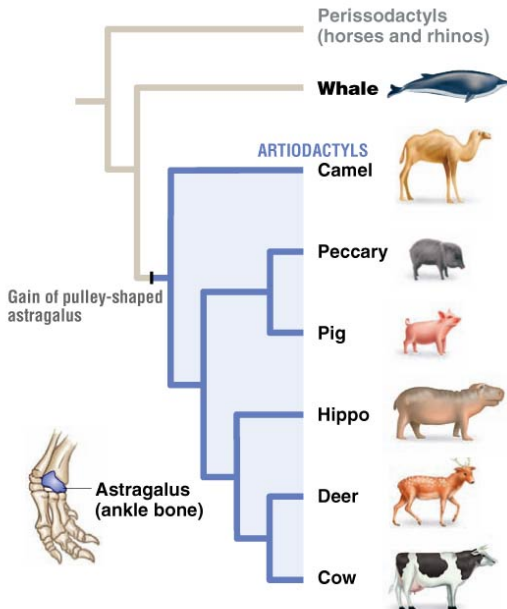
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(a) Data set 1 (morphological traits):
Whales diverged before the origin of artiodactyls.



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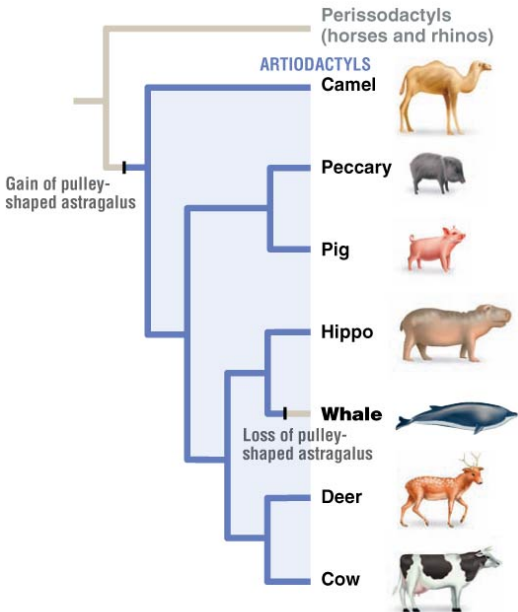
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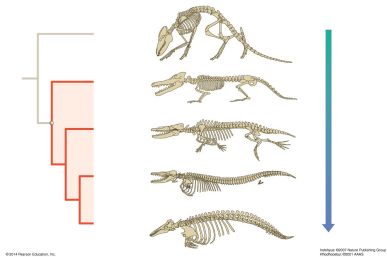
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(b) Data set 2 (DNA sequences):
Whales and hippos share a common ancestor.

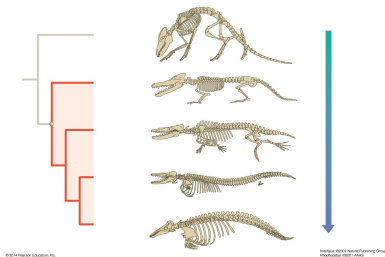


Confirmation



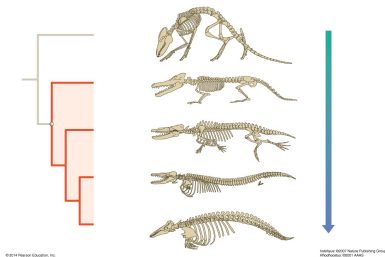
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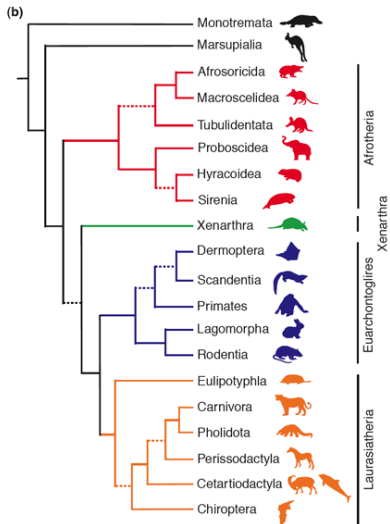
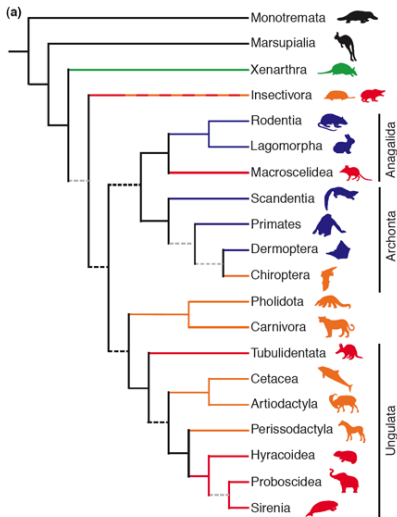


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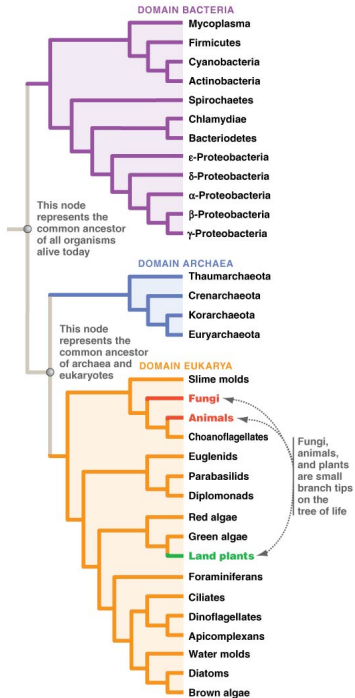
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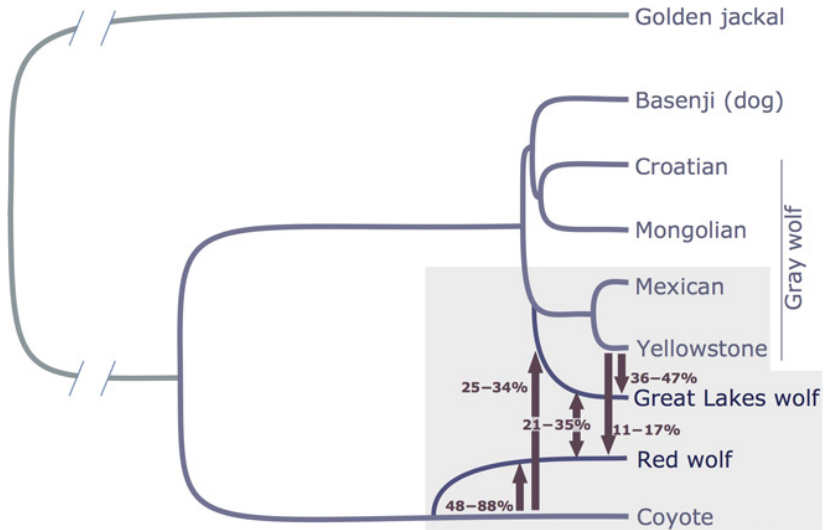
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(a) Intact fossil (pollen)



(b) Compression fossil (leaf)



(c) Cast fossil (bark)



(d) Permineralized fossil (tree trunk)



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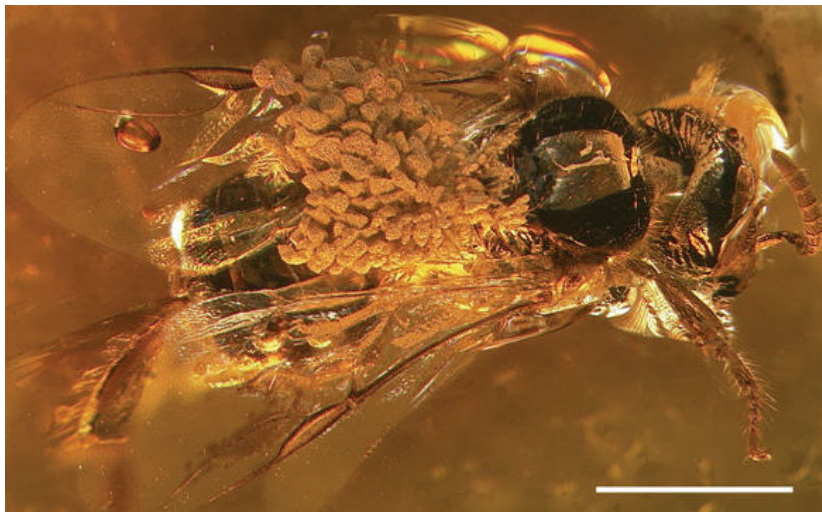
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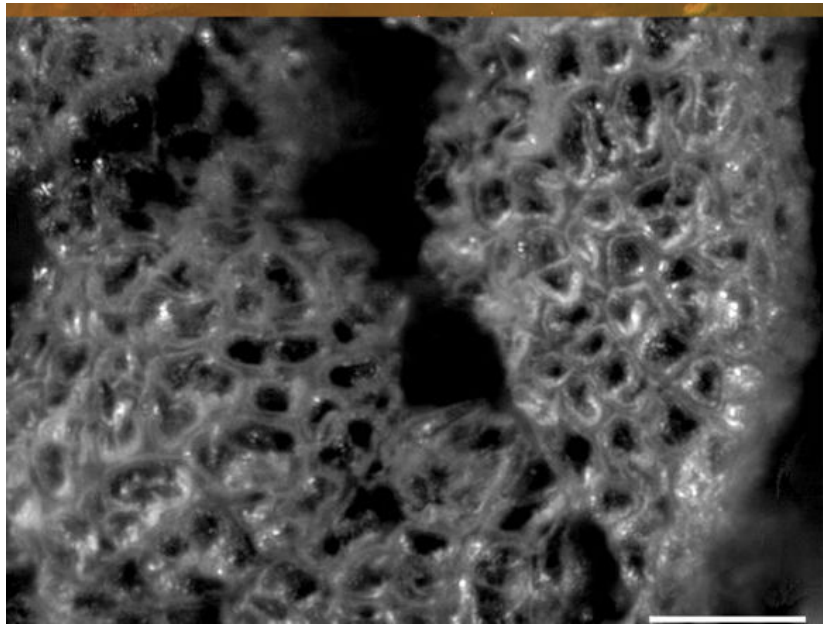
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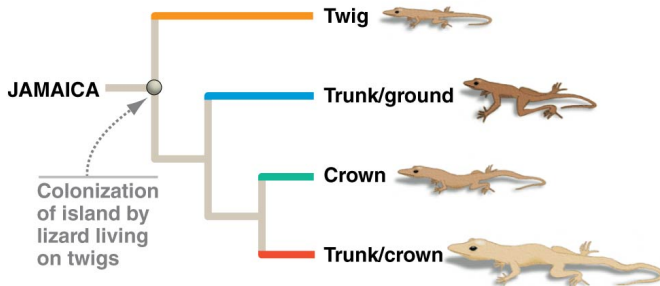
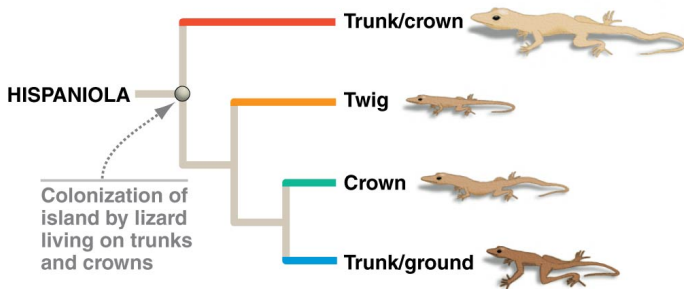
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(c) The same adaptive radiation of *Anolis* has occurred on different islands, starting from different types of colonists.



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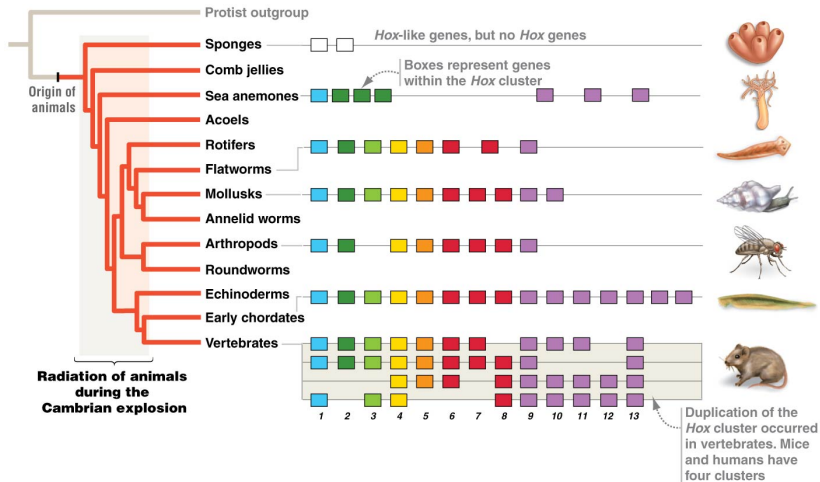
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Outline

Phylogeny

- Constructing phylogenetic trees

- Example: the evolution of whales

The history of life

- The shape of the tree

- The fossil record

- Putting the timeline together

Processes of diversification

- Adaptive radiations

- Mass extinctions

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