

Evolution by natural selection

Evolution

Natural selection

The nature of adaptation

Outline

Evolution

Change through time

Relationships between species

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Fossils

White beds contain fossilized tracks of vertebrate animals that lived about 260 million years ago.



Limestone accumulated in the oceans about 335 million years ago, burying marine animals and preserving their skeletons.



Slopes made of mud laid down in a shallow sea about 500 million years ago contain fossils of early arthropods called trilobites.



Figure 22.14
Biology: How Life Works

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Transitional forms



Figure 22.22 (Part 2)
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► *See book*

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Figure 22.22 (Part 2)
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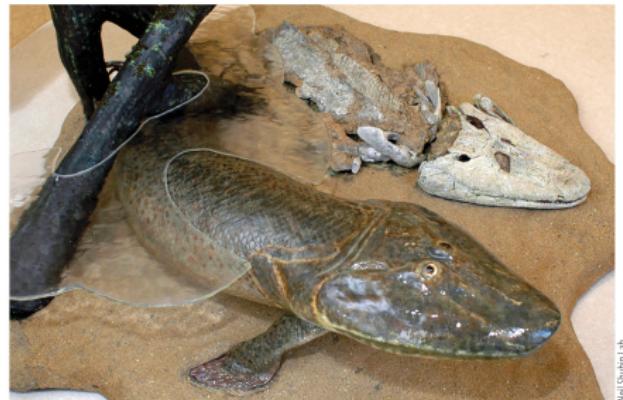


Figure 21.22 (Part 2)
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Ground finches (see textbook)

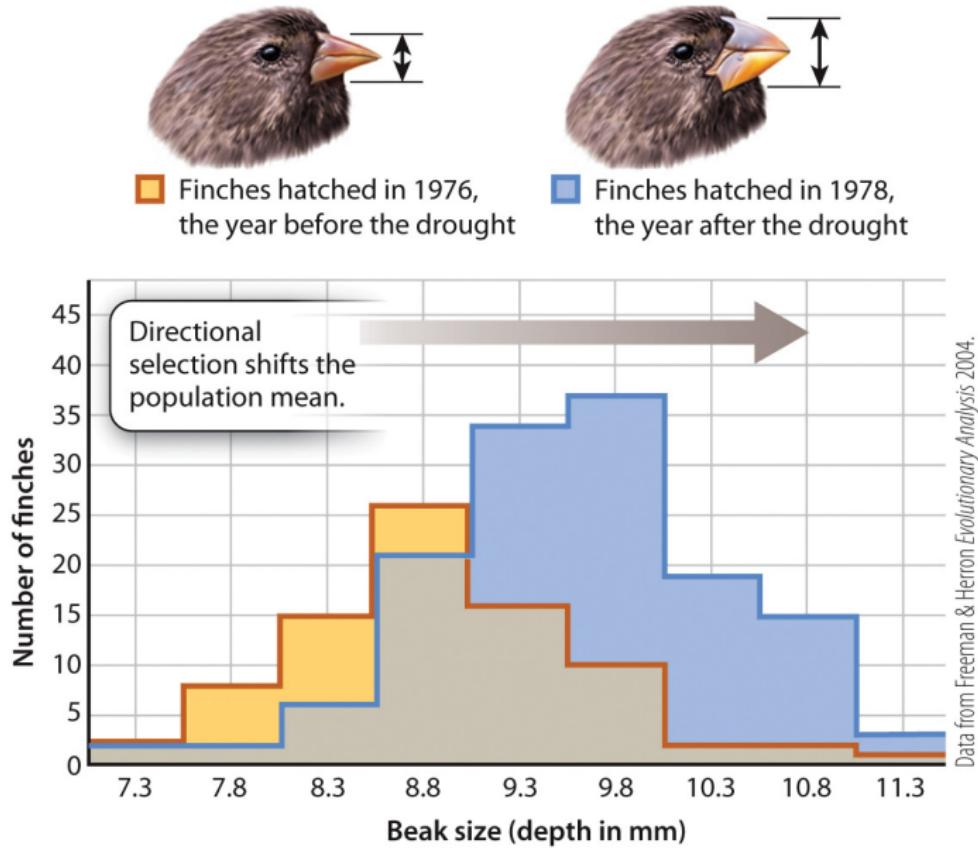
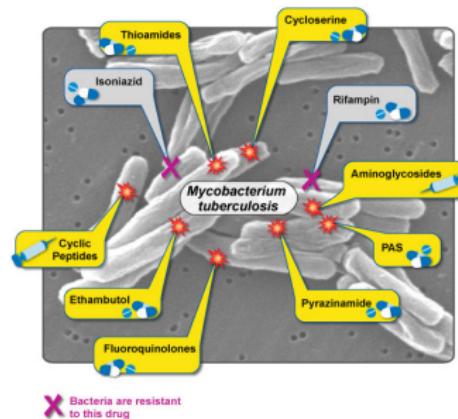


Figure 20.8b
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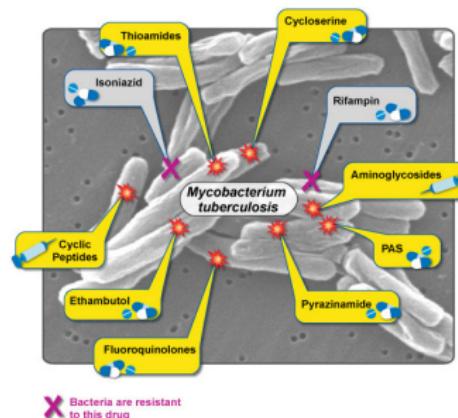
Tuberculosis

- By the time tuberculosis disease becomes apparent, there are usually many millions of bacteria in the lungs



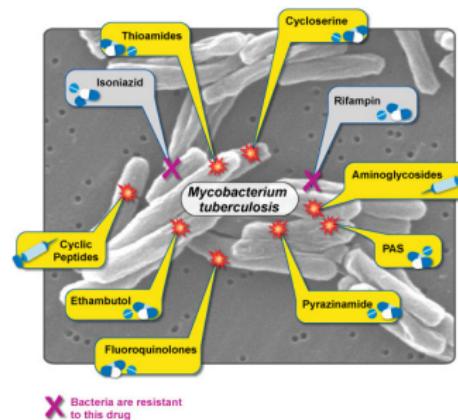
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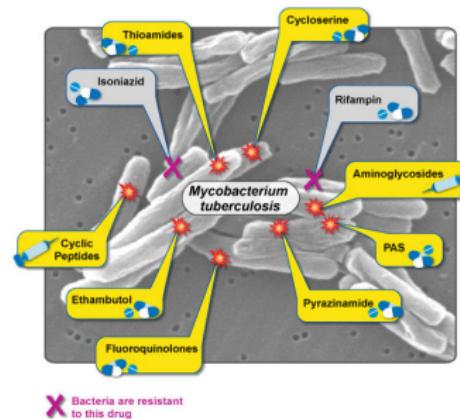
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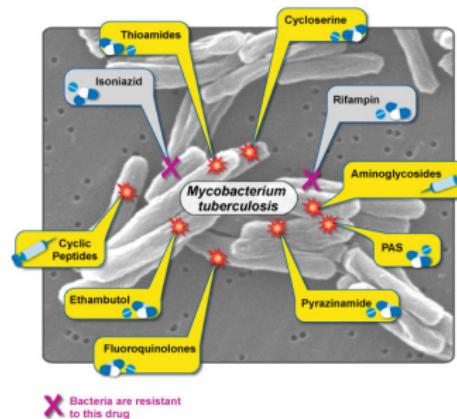
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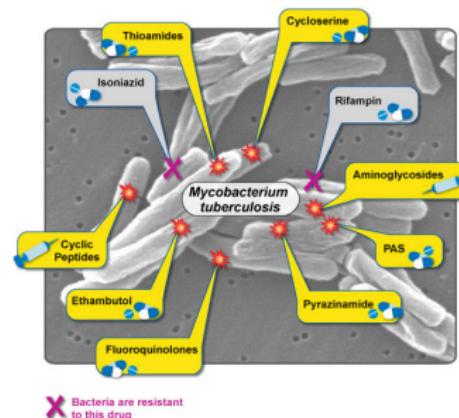
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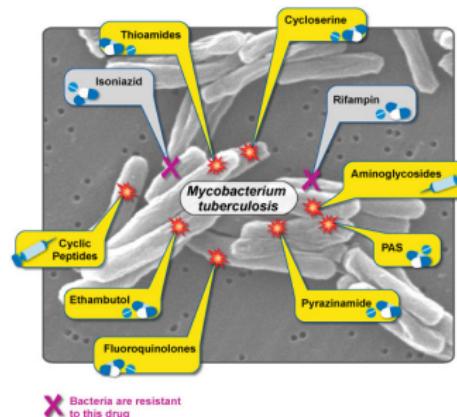
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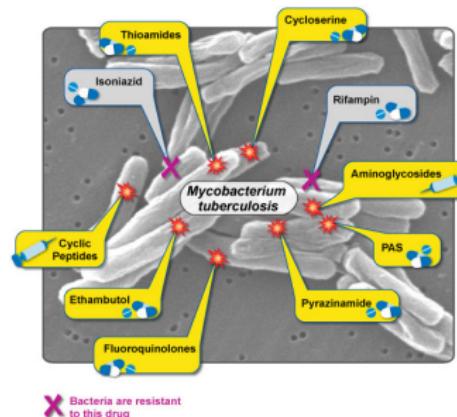
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E. coli (see textbook)

At the first time point ($t = 0$), the numbers of ancestral and descendant bacteria are similar. The ratio is 1:1.

At the second time point ($t = 1$), there are greater numbers of descendant bacteria and fewer ancestral bacteria. The ratio is no longer 1:1.

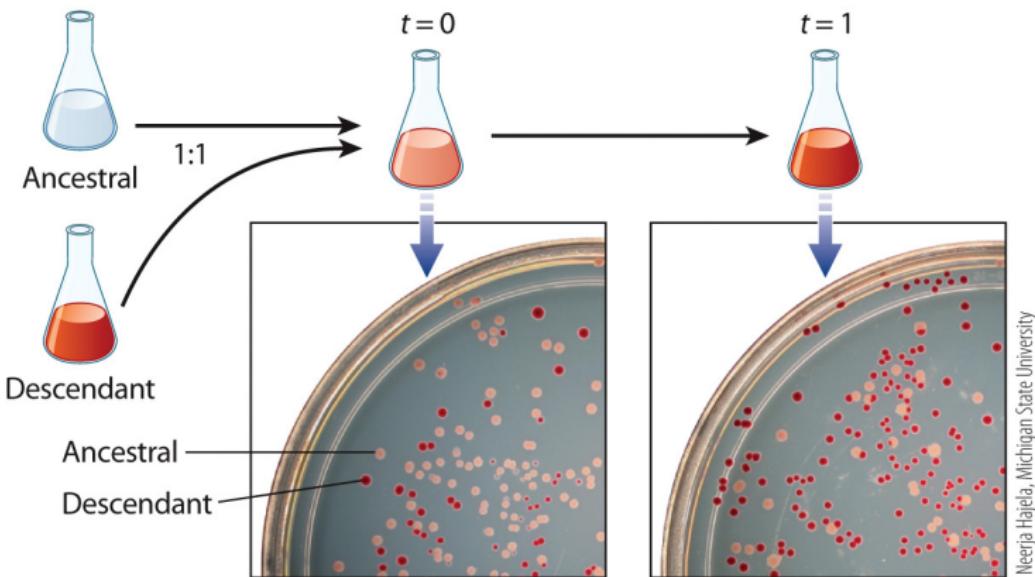
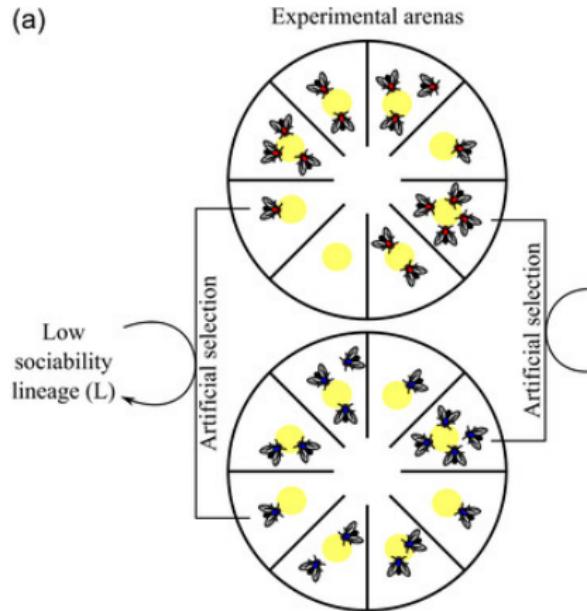


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Sociable fruit flies:

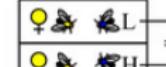
(a)



(b)

Sociability tests

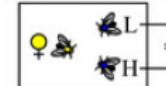
Male mating success



M-M aggression



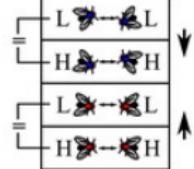
Female mate choice



Male mate choice



NN distance



= No difference

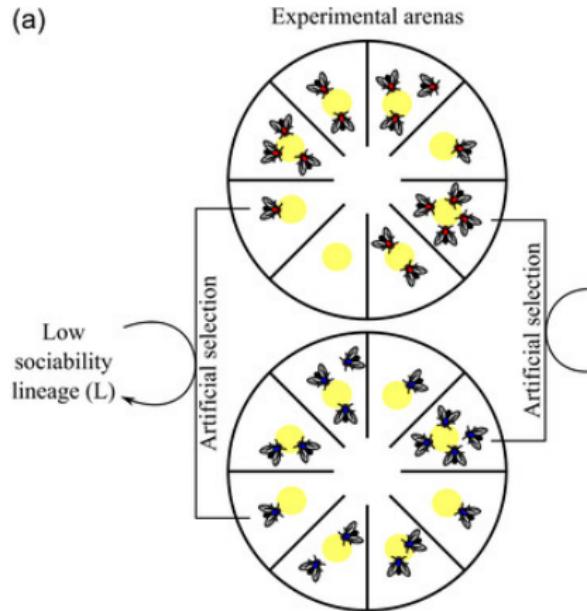
↑ Higher

↓ Lower

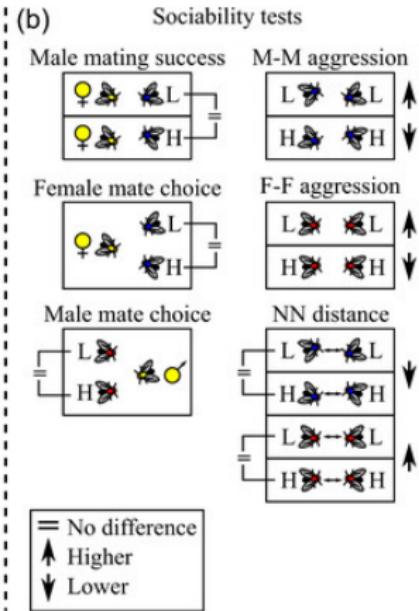
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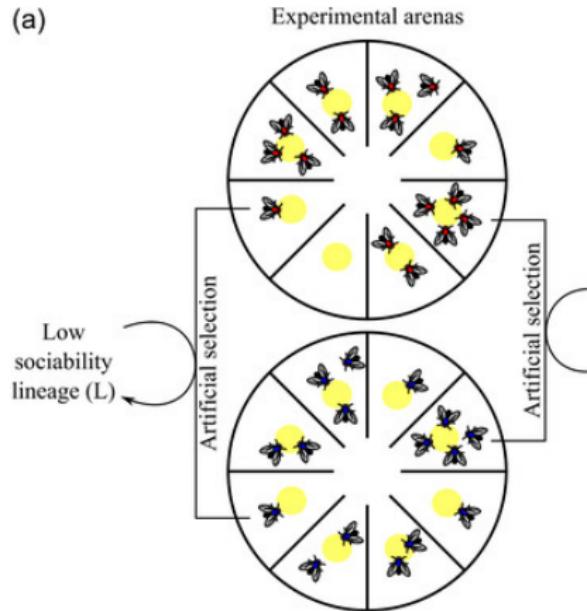
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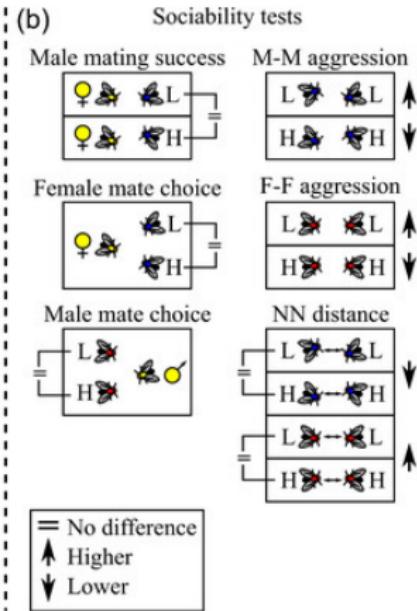
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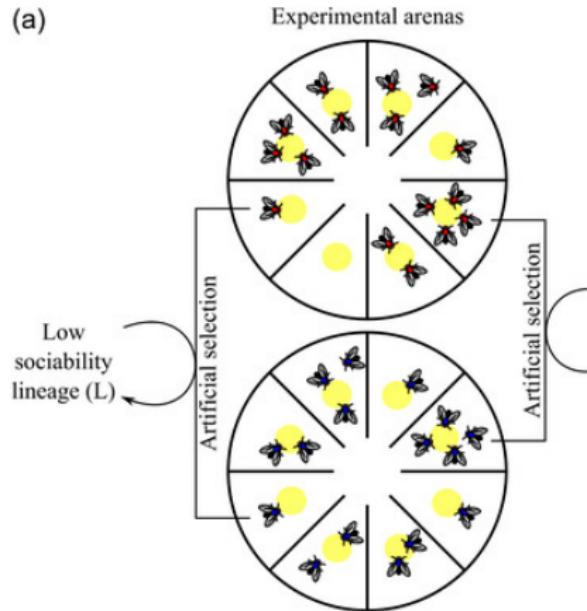
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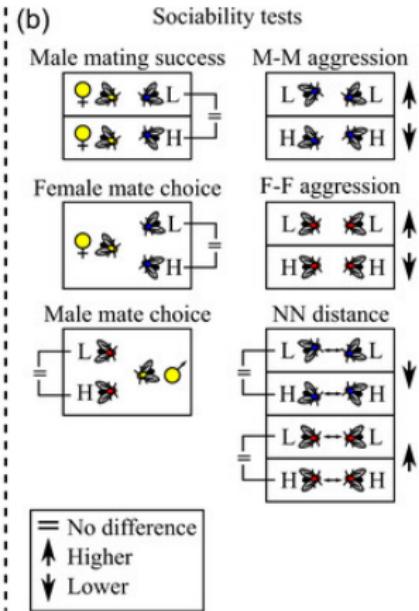
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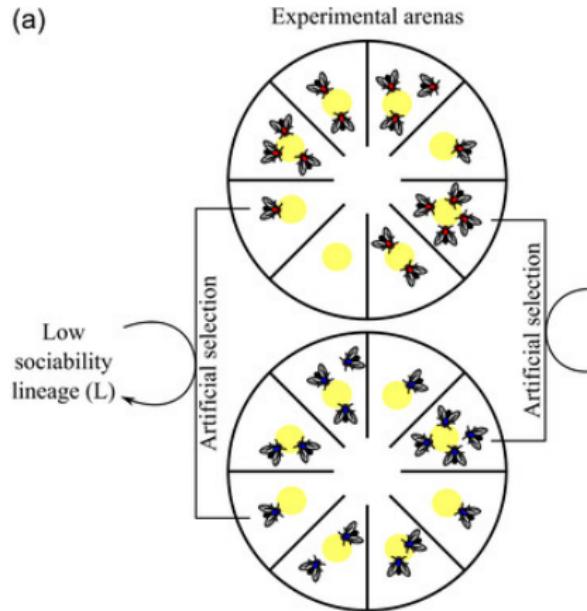
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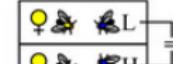
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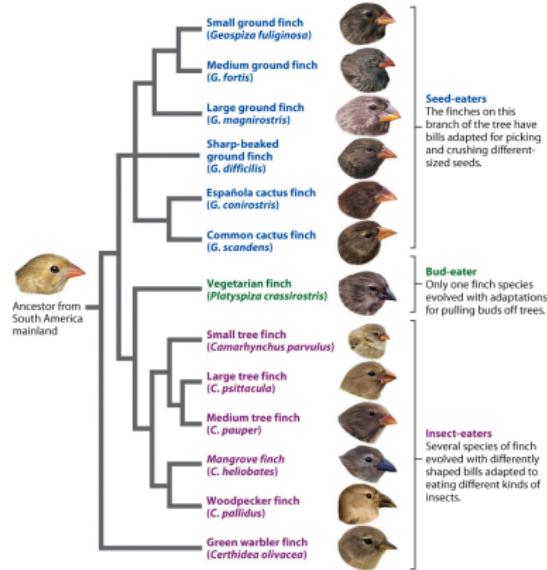


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▶ See book

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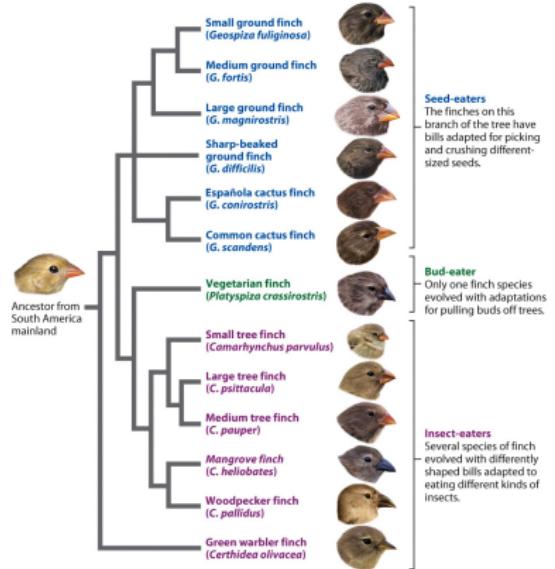


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► See book

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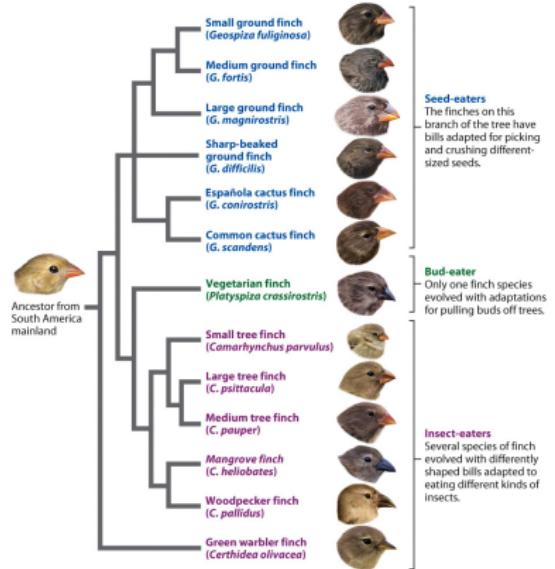


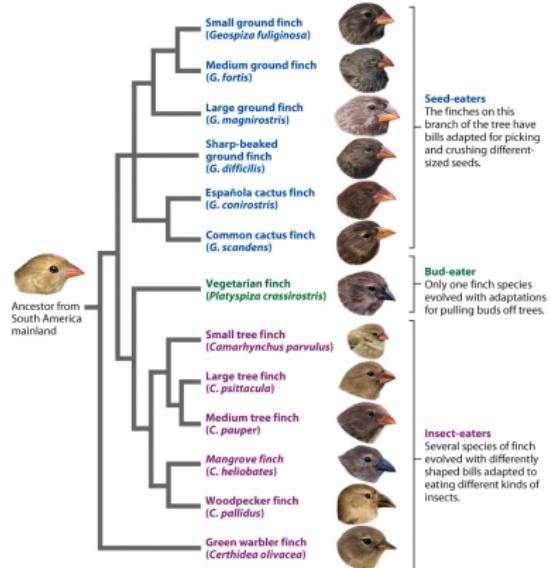
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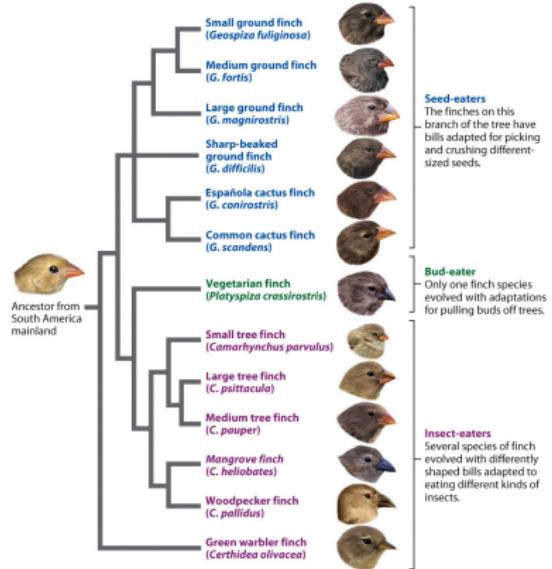


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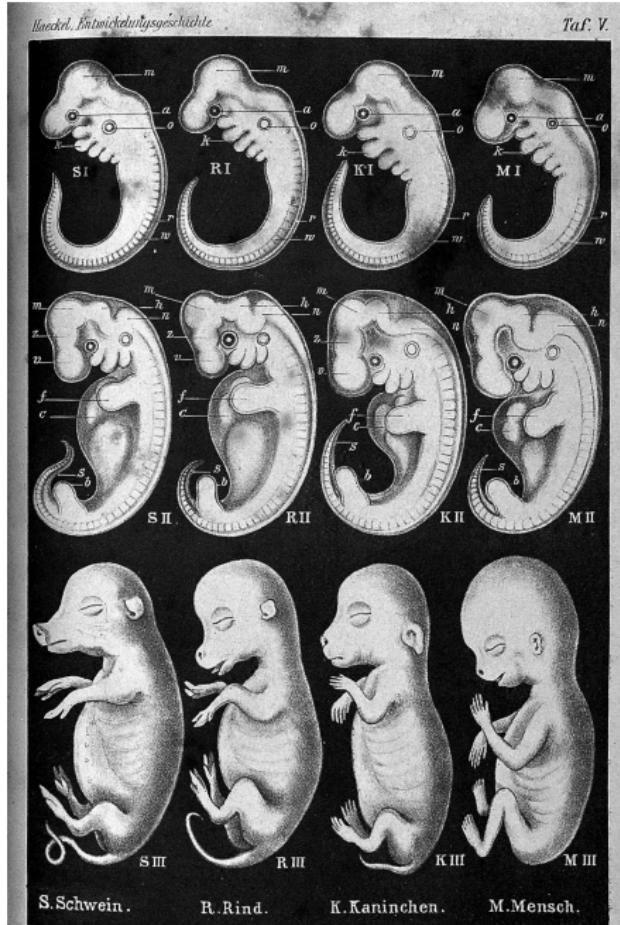
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 - ▶ Genes from mice can cause frogs to grow eyes on their legs!

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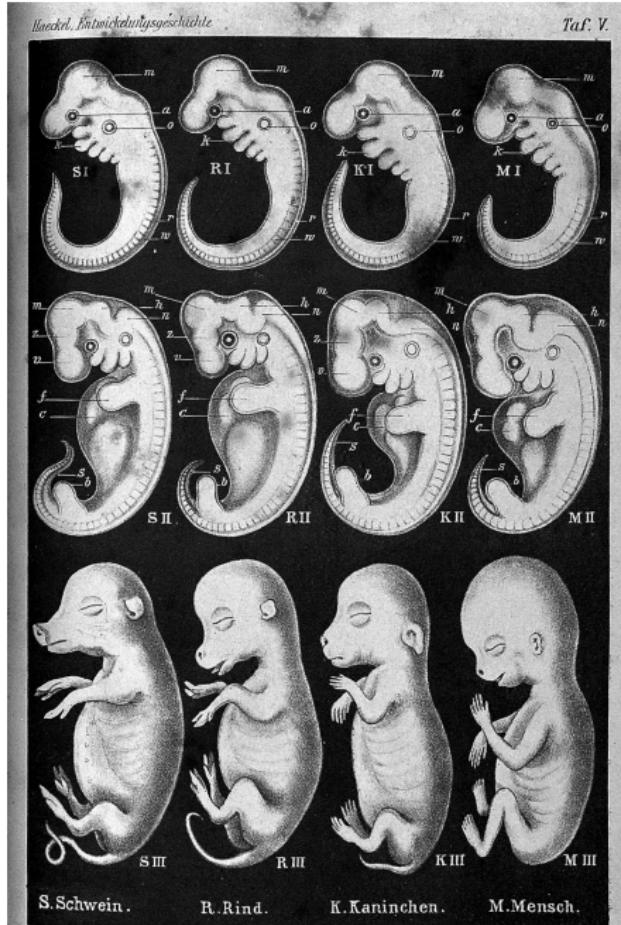
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 - ▶ Some genes involved in development are very similar all the way from insects to mammals
 - ▶ Genes from mice can cause frogs to grow eyes on their legs!

Developmental homology



► **Developmental homology** is homology in the traits of **embryos** (developing organisms)

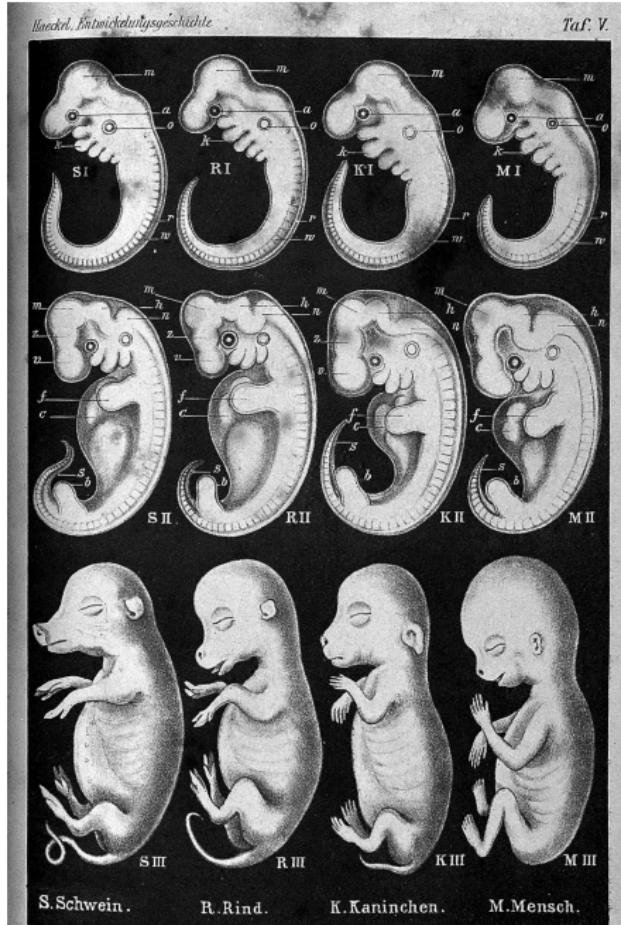
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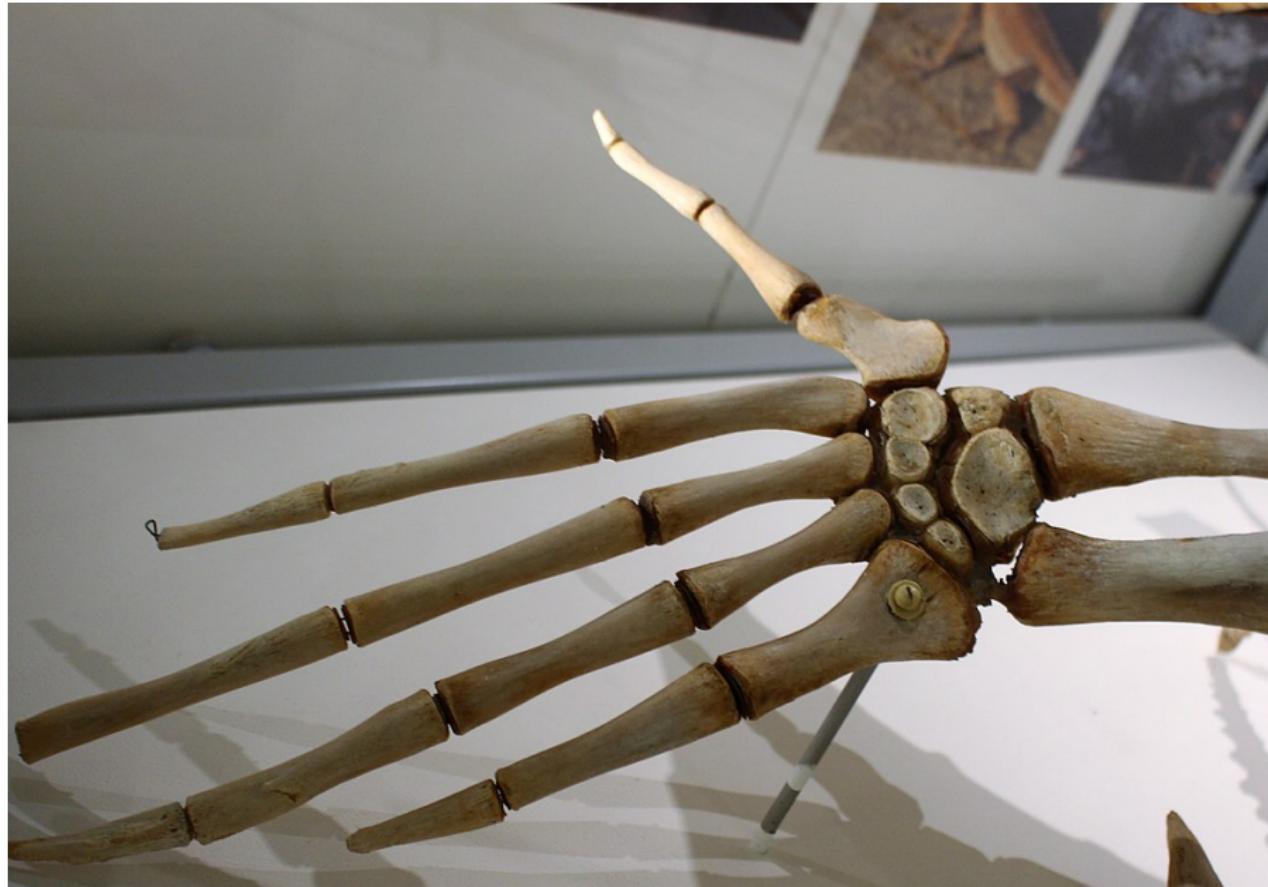
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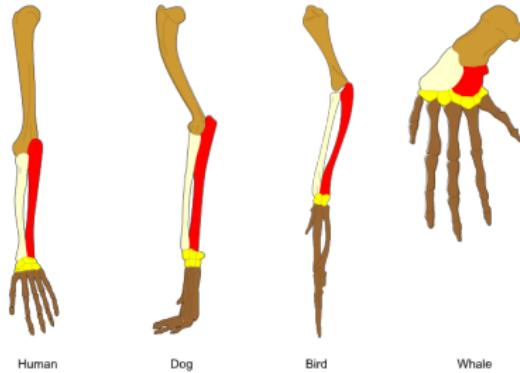
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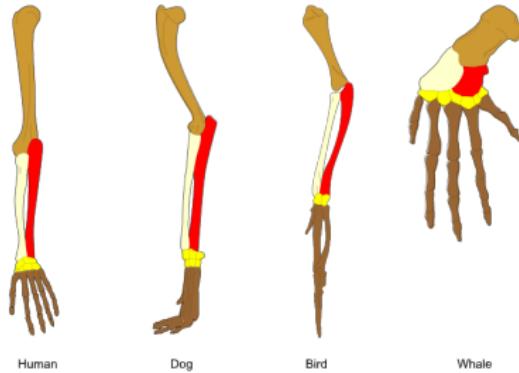


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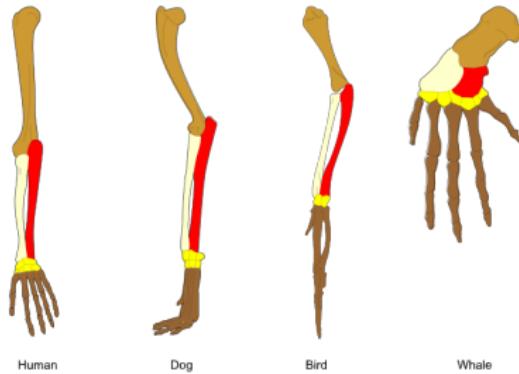
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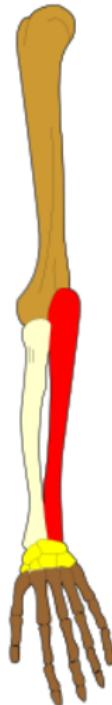
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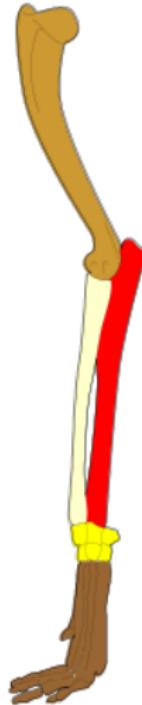


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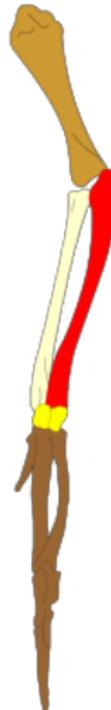
Tetrapod limbs



Human



Dog



Bird



Whale

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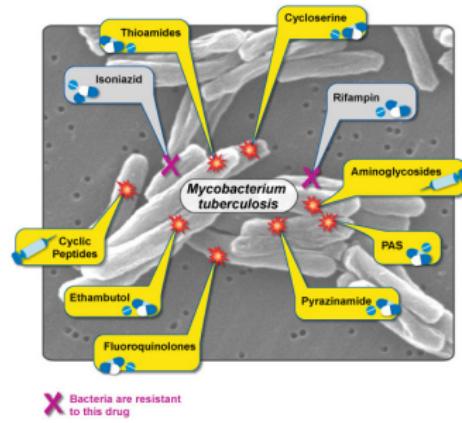
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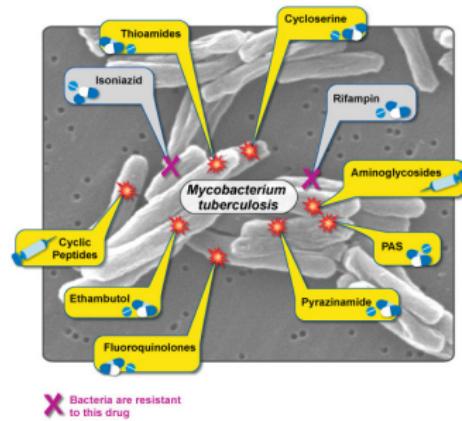
Example: Tuberculosis

► What if there were no variation?



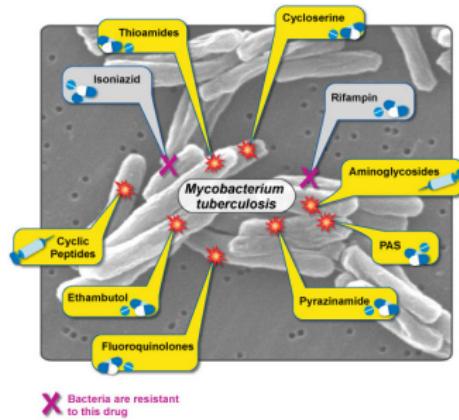
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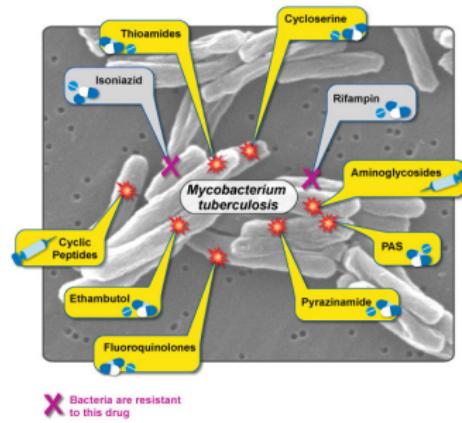
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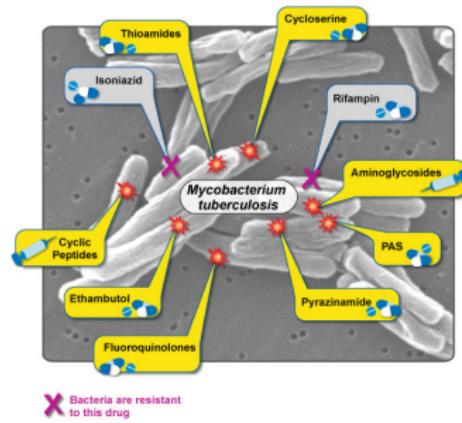
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Finch beaks (see textbook)

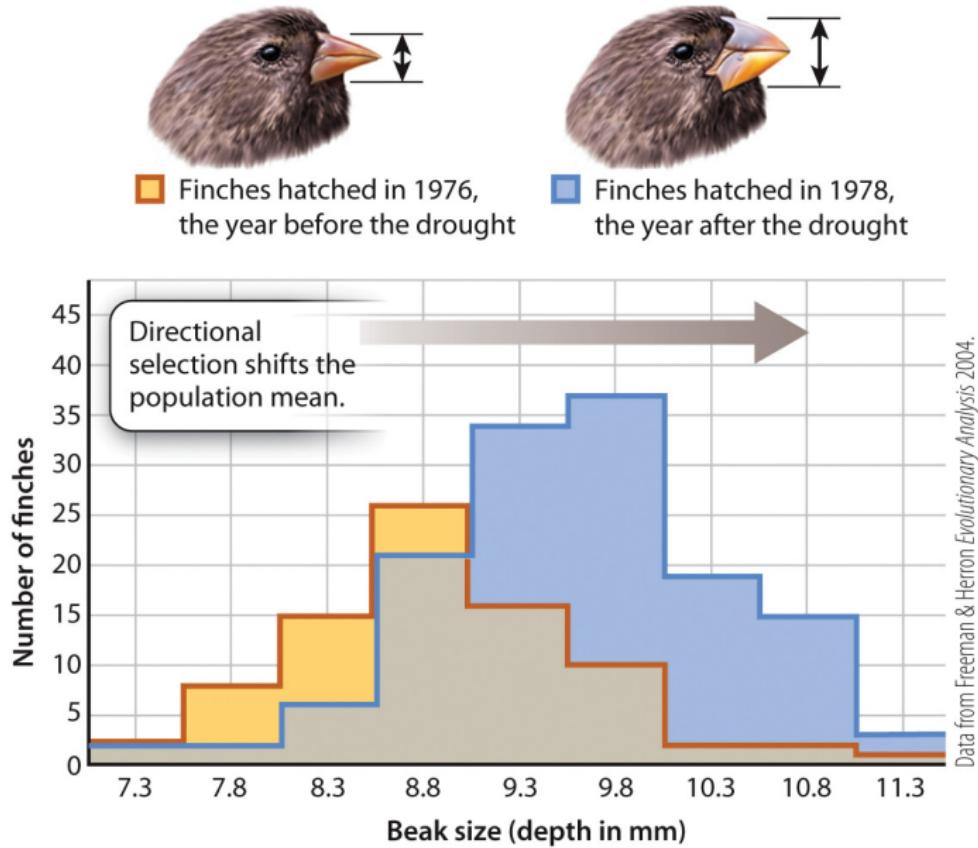


Figure 20.8b
Biology: How Life Works
© Macmillan Learning

Activity

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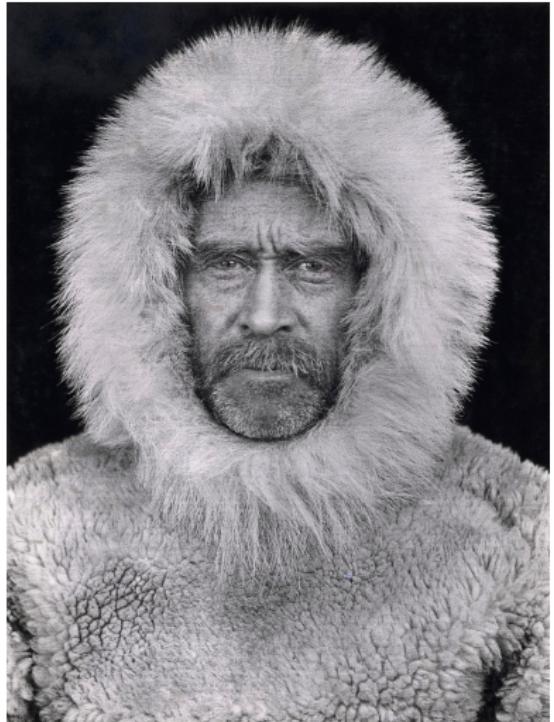
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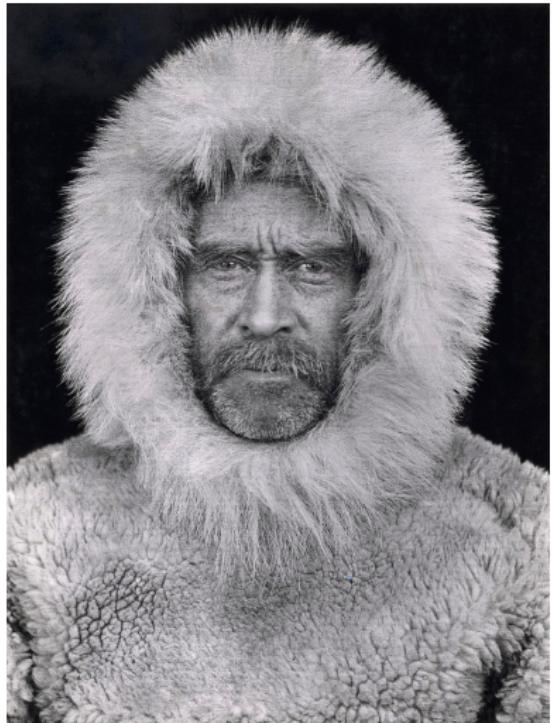
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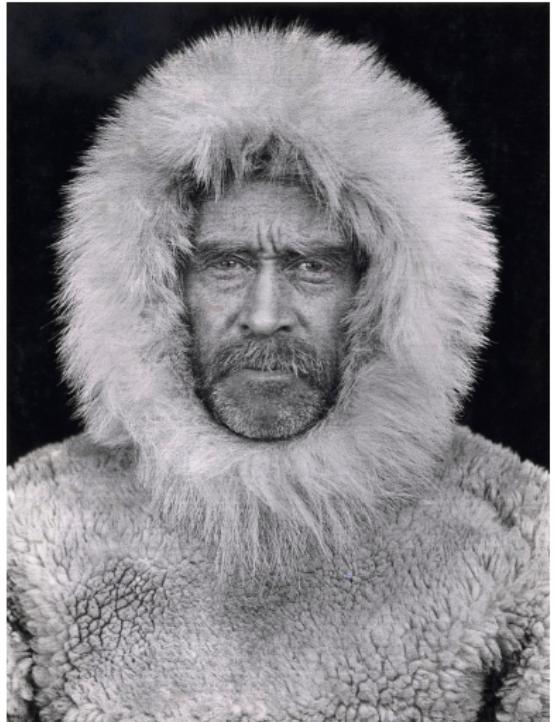


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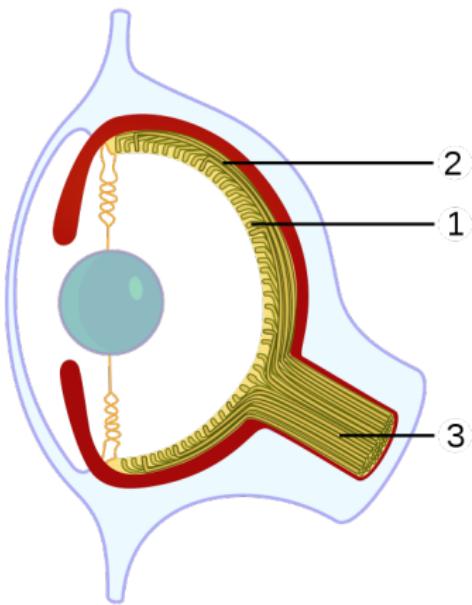
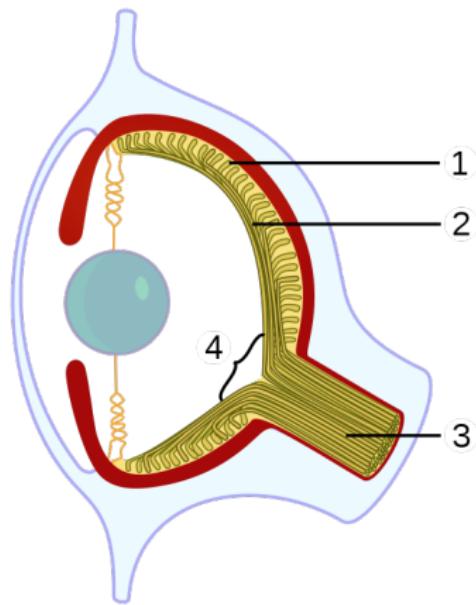
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