KEY CONCEPT

New technology is furthering our understanding of evolution.
Fossils provide a record of evolution.

- Paleontology is the study of fossils or extinct organisms.
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- Paleontology provides evidence to support evolution.

*Dorudon* 40 million years ago

*Ambulocetus natans* 50 million years ago

*Pakicetus* 52 million years ago
Molecular and genetic evidence support fossil and anatomical evidence.

- Two closely-related organisms will have similar DNA sequences.

**Molecular Evidence**

The DNA sequences of whales and ungulates are very similar, as demonstrated by the DNA fragments below.

<table>
<thead>
<tr>
<th>Organism</th>
<th>DNA Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hippopotamus</td>
<td>TCC TGGCA GTCCA GTGGT</td>
</tr>
<tr>
<td>Humpback whale</td>
<td>CCC TGGCA GTGCA GTGCT</td>
</tr>
</tbody>
</table>
• Pseudogenes are sequences providing evidence of evolution.
  – no longer function
  – carried along with functional DNA
  – can be clues to a common ancestor
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- Hox genes indicate a very distant common ancestor.
  - control the development of specific structures
  - found in many organisms
- Protein comparisons, or molecular fingerprinting reveals similarities among cell types of different organisms.
Evolution unites all fields of biology.

- Scientist from any fields contribute to the understanding of evolution.
- The basic principles of evolution are used in many scientific fields.