Biochemical Evidence For Evolution

If two organisms have similar DNA molecules, they have similar proteins. Similar proteins have similar amino acid sequences (orders). Thus, if amino acid sequences are similar, DNA of the organisms is similar.

Scientists believe that similar DNA sequences indicate a common origin. The more similar the DNA of two living organisms, the more closely related they may be to one another.

Hemoglobin, a protein in red blood cells, has been studied. Scientists know the specific amino acids and their arrangements in hemoglobin molecules of humans, gorillas, and horses.

In this investigation, you will
(a) count and record differences in the sequence of amino acids in similar portions of human, gorilla, and horse hemoglobin.
(b) count and record the molecules of each amino acid present in similar portions of human, gorilla, and horse hemoglobin.
(c) use these data to show how biochemical evidence can be used to support evolution.

Procedure

Part A. Amino Acid Sequence

Figure 2 on page 110 represents the amino acid sequence of corresponding portions of the hemoglobin molecules of horses, gorillas, and humans.

• Read the amino acid sequences from left to right beginning at the upper left-hand corner of Figure 2. Compare the sequences of humans to the sequences of gorillas and horses. An example of a sequence difference between humans and gorillas is shown in Figure 1.

• Record in Table 1 the total number of differences in the sequences of gorilla and human amino acids. Then repeat this procedure for horse and human, and for gorilla and horse.

<table>
<thead>
<tr>
<th>ORGANISMS</th>
<th>NUMBER OF DIFFERENCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gorilla and human</td>
<td></td>
</tr>
<tr>
<td>Horse and human</td>
<td></td>
</tr>
<tr>
<td>Gorilla and horse</td>
<td></td>
</tr>
</tbody>
</table>

Part B. Numbers of Amino Acids

• Count the number of each kind of amino acid in human hemoglobin. Record the totals in the proper column of Table 2.
• Count each amino acid in the hemoglobin of gorillas and horses. Record these in Table 2.

![Figure 1](image-url)