

112

Analyzing Amino-Acid Sequences to Determine Evolutionary Relationships

Data/Results

Cytochrome c Amino-Acid Sequence Differences Between Humans and Other Vertebrate Species

Species	Number of differences between human cytochrome c

Hemoglobin Amino-Acid Sequence Similarities Between Humans and Other Vertebrate Species

Species	Number of Differences from human hemoglobin

Discussion

- 1) According to the cytochrome c evidence, which organism is most closely related to humans? Which is least closely related to humans?
- 2) Frog and turtle cytochrome c molecules have the same number of differences from human cytochrome c. Which vertebrate, frog or turtle, would you put higher on the list? Explain.
- 3) In the study of hemoglobin, which vertebrate is most closely related to humans? Least closely related?
- 4) What are some methods biologists use to determine evolutionary relationships?
- 5) When the portions of the gorilla and human hemoglobin molecules were compared, there was only one difference in the amino-acid sequence. What could have been responsible for this change?
- 6) If the amino-acid sequences are similar in gorillas and humans, will the nucleotide sequence of their DNA also be similar? Why or why not?
- 7) Examine the data table you completed in step 2 of Part 1. The values listed for the chicken and the horse differ by only one. Can you deduce from this that the chicken and the horse are closely related to each other? Why or why not?
- 8) How is biochemical comparison different from other methods of determining evolutionary relationships?
- 9) Examine the butterfly wing and the bird wing (Analogous Structures) and answer the questions.