

NAME: _____ Period: _____

Biochemical Comparisons and Molecular Clocks

Introduction: Mutation provides all initial change. A mutation is new when the DNA does not replicate perfectly. When a mutation occurs, it may be able to spread. In a gene population, these mutations are random (can occur at any location along the DNA). The rate of these mutations is relatively constant within a given species. If the mutation occurs at a critical location, the result is usually disastrous. Other genes will accept change with no immediate consequence. Once made, the mutation is permanent and variability within the gene pool of the species is increased. Mutations add variability to the gene pool.

Examine the amino acid sequences below which compare corresponding portions of hemoglobin molecules in humans and five other vertebrate animals. The sequence shown is only a small portion of the chain of 146 amino acids. The numbered columns indicate the position of each amino acid within the whole chain.

1. Look at each numbered column and circle the amino acids in each column that are different from the human amino acid for that column.
2. Put an X in the blank under each numbered column in which all of the organisms have the same amino acid listed in that column.
3. In the blanks on the right hand side of each row, identify how many amino acids were unlike different from the human amino acids.

Table A: Comparing hemoglobin of a human to other vertebrates

	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	
Human	Y98	L101	W103	L105	L105	Y105	H105	V105	A107	L108	L111	H111	H111	V111	V111	V111	V111	V111	V111	V111	V111	V111	V111
Chimp	Y98	L101	W103	L105	L105	Y105	H105	V105	A107	L108	L111	H111	H111	V111	V111	V111	V111	V111	V111	V111	V111	V111	V111
Orangutan	Y98	L101	W103	L105	L105	Y105	H105	V105	A107	L108	L111	H111	H111	V111	V111	V111	V111	V111	V111	V111	V111	V111	V111
Mouse	Q100	L101	W103	L105	L105	Y105	H105	V105	A107	L108	L111	H111	H111	V111	V111	V111	V111	V111	V111	V111	V111	V111	V111
Monkey	Q100	L101	W103	L105	L105	Y105	H105	V105	A107	L108	L111	H111	H111	V111	V111	V111	V111	V111	V111	V111	V111	V111	V111
Human	Y98	L101	W103	L105	L105	Y105	H105	V105	A107	L108	L111	H111	H111	V111	V111	V111	V111	V111	V111	V111	V111	V111	V111
Kingfisher	Y98	L101	W103	L105	L105	Y105	H105	V105	A107	L108	L111	H111	H111	V111	V111	V111	V111	V111	V111	V111	V111	V111	V111
	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

	103	104	105	106	107	108	109	110	111	112	113	114	115	116
Human	Q100	P100	A101	L101	L101	L101	L101	L101	L101	L101	L101	L101	L101	L101
Chimp	Q100	P100	A101	L101	L101	L101	L101	L101	L101	L101	L101	L101	L101	L101
Orangutan	Q100	P100	A101	L101	L101	L101	L101	L101	L101	L101	L101	L101	L101	L101
Mouse	Q100	P100	A101	L101	L101	L101	L101	L101	L101	L101	L101	L101	L101	L101
Monkey	Q100	P100	A101	L101	L101	L101	L101	L101	L101	L101	L101	L101	L101	L101
Human	Q100	P100	A101	L101	L101	L101	L101	L101	L101	L101	L101	L101	L101	L101
Kingfisher	Q100	P100	A101	L101	L101	L101	L101	L101	L101	L101	L101	L101	L101	L101
	X	X	X	X	X	X	X	X	X	X	X	X	X	X

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Biochemical Evidence For Evolution Packet Answers

Answer to List three examples of biochemical evidence for evolution.... This article summarizes multiple independent lines of evidence that evolution is the best For example, the skeletons of A complex biological structure with. Evidences of evolution. thereby the evidence of fossils cannot be entirely relied upon in evolutionary studies.

An Example Of Biochemical Evidence Of Evolution

Thus, scientists use biochemical evidence(the amino acid sequence of proteins) to establish how organisms have evolved. Hemoglobin, a component of red blood cells, is one of the most widely studied of all proteins. In this activity, you will analyze the amino acid sequence of the hemoglobin protein in three species: human, horse and gorilla.

Student Work Evolution LAB#23: Biochemical Evidence of ...

The most convincing evidence of descent from a common ancestor comes from the similarities in the biochemical composition and physiological activities of organisms. 1) Enzymes and hormones: in the...

Biochemical Evidence For Evolution | eNotes

The theory of evolution is supported by biochemical evidence; many of the same molecules and biochemical processes occur within all living organisms, from single-cell bacteria to humans. Originally, scientists couldn't understand how the process of evolution began, but they later discovered that RNA possesses catalytic properties.

Biology Biochemical Evidence For Evolution Answer Key

BIOCHEMICAL EVIDENCE FOR EVOLUTION 26 ANSWER KEY PDF Biochemical Evidence for Evolution Lab CURRICULUM MAP Subject: Living Click here to access this Book Vestigial structures are remnants of organs or structures that had a function in an early ancestor. Examples. include ostrich wings, human appendix, and wisdom teeth, whale and snake pelvis/hind legs. Pythons have tiny femurs (leg bone) #5 ...

Biology Biochemical Evidence For Evolution Answers

In this biochemical evidence for evolution lesson plan, students compare the number of matching and non-matching amino acids in chimpanzees, fish and mice. They construct a graph to compare the data and they calculate percent similarities and differences between species. They answer 8 analysis questions about similarities of species based on their amino acid sequences.

Biochemical Evidence For Evolution Lab 12 Answers ...

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Evidence of Evolution-Answers in gray Background When Charles Darwin first proposed the idea that all new species descend from an ancestor, he performed an exhaustive amount of research to provide as much evidence as possible. Today, the major pieces of evidence for this theory can be broken down into the fossil record, embryology,

Evidence of Evolution-Answers in gray Background Fossils

The biochemical evidence (the proteins) is indirect evidence of the specific allele (the coding of the gene). How is the biochemical evidence of protein comparisons used in determining evolutionary...

Examples of biochemical evidence of evolution? - Answers

It is the study of fossils—the bones, shells, teeth, and other remains of organisms, or evidence of ancient organisms, that have survived over eons of time. Paleontology supports the theory of evolution because it shows a descent of modern organisms from common ancestors. Paleontology indicates that fewer kinds of organisms existed in past eras, and the organisms were probably less complex. As paleontologists descend deeper and deeper into layers of rock, the variety and complexity of ...

Evidence for Evolution - CliffsNotes

Similarities in two species that involve the fossil record and biochemical evidence, as well as anatomical and embryological comparison, may reveal features that are homologous (or from shared...

How does biochemical evidence support evolution? | Yahoo ...

Biochemical Evidence for Evolution Lab Activity | VWR Thus, scientists use biochemical evidence(the amino acid sequence of proteins) to establish how organisms have evolved. Hemoglobin, a component of red blood cells, is one of the most widely studied of all proteins.

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