

**Student Preview mode is ON**

Settings

Exit Preview

**MCB-3421-Introduction to Molecular Evolution and Bioinformatics-SEC001-1188**

Assessments

Take Test: Takehome exam 4

## Take Test: Takehome exam 4

### Test Information

Description This exam is due on Friday at 5pm

Instructions

Multiple Attempts Not allowed. This test can only be taken once.

Force Completion This test can be saved and resumed later.

✖ Question Completion Status:

### QUESTION 1

**2 points**

Saved

What Boolean operators can be used in NCBI/Entrez searches?

For the toolbar, press ALT+F10 (PC) or ALT+FN+F10 (Mac).

Rich text editor toolbar showing font settings: Arial, 3 (12pt)

Path: p

Words:3

*Click Save and Submit to save and submit. Click Save All Answers to save all answers.*

endosymbiosis.

- True  
 False

**QUESTION 3****1 points**

Saved

True/False Most duplicated genes go on to perform a new function in an organism.

- True  
 False

**QUESTION 4****1 points**

Saved

True/False Plastids are descended from free living Cyanobacteria (also sometimes called blue green algae).

- True  
 False

**QUESTION 5****1 points**

Saved

Which is the most abundant oxygenic photoautotroph in the ocean?

- Thermotoga
- Halobacterium
- Prochlorococcus
- Synechococcus

**QUESTION 6****1 points**

Saved

Which of the following is NOT one of the possible fates of a recently duplicated copy of a gene?

- A. Decay, loss of function, and piece-wise deletion.
- B. Gain a homing endonuclease domain and turn into an intein.
- C. Subfunctionalization (Both copies retain only part of the original function).
- D. Neofunctionalization (Acquires a new function).
- E. Sit around for a some time as junk DNA.

**QUESTION 7****1 points**

Saved

Which of the following is NOT an example how a new gene can be created?

- A. Through mutations
- B. Left over DNA of viruses or other genetic parasite being repurposed
- C.

Golgi Apparatus packaging of proteins

- D. Gene duplication followed by neofunctionalization
- E. None of the above

**QUESTION 8**

**1 points (Extra Credit)**

Saved

Describe a process that in your opinion goes beyond the simplest definition of natural selection (offspring similar to parents but random inherited variation, more offspring than necessary for replacement, selection due to limited resources).

For the toolbar, press ALT+F10 (PC) or ALT+FN+F10 (Mac).

			<b>Arial</b>			<b>3 (12pt)</b>													
Lineage fusion as in endosymbiosis																			
Acquisition of new genes through HGT																			
Large mutations that create "hopeful monsters"																			
directed mutations																			
Path: p															Words:19				

**QUESTION 9**

**1 points**

Saved

Give a few examples (at least 3) of eukaryotic algae becoming endosymbionts in other eukaryotic cells. Give the name of the host, and the name of the symbiont in parenthesis, if known, else a question mark.

For the toolbar, press ALT+F10 (PC) or ALT+FN+F10 (Mac).

			<b>Arial</b>			<b>3 (12pt)</b>													

Diatoms, brown algae, haptophytes, yellow green algae (red algae)

Euglena (green algae)

Dinoflagelates ( mostly red algae)

Apicoplast (remnant of plastic in plasmodium) (red algae)

see <https://en.wikipedia.org/wiki/Algae>

Path: p

Words:30

### QUESTION 10

1 points

Saved

Mitochondrial Eve lived:

- 3.2-4.2 million years ago
- 750,000 years ago
- 166-249 thousand years ago
- 10 thousand years ago
- 90-100 thousand years ago

### QUESTION 11

1 points

Saved

Who drew the first phylogenetic trees?

- A. Lamarck
- B. Darwin
- C.

Mayr

D. Henning

---

**QUESTION 12****1 points**

Saved

Who first suggested that evolution could be described as a Coral of Life?

A. Lamarck

B. Darwin

C. Mayr

D. Woese

---

**QUESTION 13****1 points**

Saved

Which organisms constitute the archaeplastida?

A. Red, Green, and Brown Algae

B. All photosynthetic Eukarya

C. Glaucophytes, Red Algae, Green Algae (I & II), and Plants

D. Everything that has a Red Algae endosymbiont

E. Everything that has a Green Algae endosymbiont

---

**QUESTION 14****1 points**

Saved

Which of the following is true regarding HGT?

A. It is a process through which genes enter a genome, without being inherited parentally

B. It can lead to important biological innovations

- C. A transferred gene can be inherited parentally, so that a clade of organisms all share the same inherited ancient HGT.
- D. It is more common in Bacteria than in humans.
- E. All of the above.

---

**QUESTION 15****3 points**

Saved

Which of the following is an advantage of using the Coral of Life as a description for life's evolution? (Multiple correct answers)

- Fan shaped coral have bifurcating and fusing lineages. These could represent speciation events and the fusion between divergent lineages, respectively.
- The Coral of Life explicitly considers extinct lineages.
- In a stone coral the living cells sit on top of the remnants of their dead ancestors. This is similar in evolution, where only the extant species are alive, whereas the lineages leading to them are constituted by dead ancestors.

---

**QUESTION 16****1 points**

Saved

Why did Darwin consider the term "Coral of Life" as preferable over the term "tree of life"?

- Because an herbarium specimen of a red algae that was wrongly labeled as a coral looked very similar to a phylogenetic tree.
- Because he recognized that fusion of lineages is an important process in evolution of species, and fan corals often have strands that fuse, in contrast, tree branches only branch and never fuse.
- Because a tree has living cells in the root, stem and leaves, whereas a phylogenetic tree has living representatives only at the tips.

**QUESTION 17****1 points**

Saved

The Modern Synthesis ignores the significance of mutations for the direction of the evolutionary process

- True
- False

**QUESTION 18****1 points**

Saved

What is GC strand bias?

- There are more GC nucleotide pair simple repeats near the origin.
- The CG versus AT content of a genome changes over time due to the mutation bias.
- The G versus C content of the leading is different from the G versus C content lagging strand.
- None of the above.

**QUESTION 19****4 points**

Saved

The leading and lagging strand in a bacterial circular chromosome

- usually have different nucleotide composition
- differ in the number of genes that are transcribed from the strand into mRNA
- have different length, which makes replication of one strand faster, which necessitates the replication machinery to wait until the other strand is completely replicated
- contain strand specific oligo nucleotide sequence motifs that tell the replication machinery when to slow down because the terminus of replication is near



**QUESTION 20****4 points**

Saved

Within chromosome recombination events most frequently occur between point that are equidistant from the origin of replication. The reason for this may be that

- Recombination between point that are equidistant from the origin of replication does not place genome architecture imparting sequences in the wrong position or orientation relative to the origin and terminus of replication
  - Does not destroy the strand bias with respect to the number of ORF encoded on the leading strand
  - Recombination occurs at particular motifs that are at the corresponding location relative to the origin of replication
  - Recombination occurs at the same time as replication
-