

Name _____

Course/Section _____

Date _____

Professor/TA _____



Activity 28.1 How has endosymbiosis contributed to the diversity of organisms on Earth today?

1. The kingdom Protista has been called a “catch-all group.” What does this mean? Explain.

2. There are more than 100,000 recognized species of protists. Various taxonomies have separated the protists into 46 recognized phyla. Even though this group is so diverse, we can recognize some common themes in their evolution, including the evolution of complex cell structure, novel genetic recombination strategies, and complex life cycles. In addition, this group as a whole has great ecological importance. Provide at least two examples of protists from Chapter 28 in *Biology*, 7th edition, that illustrate each theme.

Theme	Examples
a. Complex cell structure	
b. Novel genetic recombination strategies	
c. Complex life cycles	
d. Ecological importance	

3. In the late 1960s (and since), Lynn Margulis provided considerable evidence for the endosymbiotic theory of the origin of various organelles in eukaryotic cells.

a. What is the endosymbiotic theory?	
b. Which two eukaryotic organelles were proposed to have arisen as endosymbionts?	c. What evidence did Margulis present to support each organelle as an endosymbiont?

4. Structurally, *Giardia lamblia* is thought to be an example of what the earliest living eukaryotes may have looked like.

- Describe *Giardia*'s cell structure. That is, what eukaryotic cell structures does it contain?
- If *Giardia* is similar in structure to the earliest living eukaryotes, what does this imply about the order of evolution of the various eukaryotic organelles (that is, nucleus, cytoskeleton, mitochondria, chloroplasts)?

5. The metabolic pathways of organisms living today evolved over a long period of time—undoubtedly in a stepwise fashion because of their complexity. Considering everything you have learned to date about the evolution of life on Earth, put the following in the order in which they might have evolved, and give a short explanation for your arrangement.

- ___ prokaryotes capable of performing the Krebs cycle
- ___ eukaryotes capable of performing the Krebs cycle
- ___ prokaryotes capable of performing electron transport
- ___ eukaryotes capable of performing electron transport
- ___ prokaryotes capable of performing glycolysis
- ___ eukaryotes capable of performing glycolysis
- ___ prokaryotes capable of performing photosynthesis
- ___ eukaryotes capable of performing photosynthesis