Introduction to Fungi

True or False

_____ 1. Fungi are a kingdom in the domain Prokarya.
_____ 2. Mushrooms are fungi.
_____ 3. Yeasts are fungi.
_____ 4. Amoeba are fungi.
_____ 5. Fungi have cell walls made of cellulose, just like plants do.
_____ 6. Many fungi grow as hyphae.
_____ 7. Most fungi reproduce only by sexual reproduction.
_____ 8. Fungal spores can be transported by wind, water, and even by traveling on other organisms.
_____9. A yeast cell produced by budding off a parent cell is genetically identical to the parent cell.
_____ 10. In general, fungi are able to move themselves around.
_____ 11. Baker's yeast is a fungus.

Critical Reading

Read these passages from the text and answer the questions that follow.

Reproduction of Fungi

The majority of fungi can reproduce both asexually and sexually. This allows them to adjust to conditions in the environment. They can spread quickly through asexual reproduction when conditions are stable. They can increase their genetic variation through sexual reproduction when conditions are changing and variation may help them survive.

Asexual Reproduction

Almost all fungi reproduce asexually by producing spores. A fungi spore is a haploid cell produced by mitosis from a haploid parent cell. It is genetically identical to the parent cell. Fungi spores can develop into new haploid individuals without being fertilized. Spores may be dispersed by moving water, wind, or other organisms. Some fungi even have "cannons" that "shoot" the spores far from the parent organism. This helps to ensure that the offspring will not have to compete with the parents for space or other resources. You are probably familiar with puffballs. They release a cloud of spores when knocked or stepped on. Wherever the spores happen to land, they do not germinate until conditions are favorable for growth. Then they develop into new hyphae. Yeasts do not produce spores. Instead, they reproduce asexually by budding. Budding is the pinching off of an offspring from the parent cell. The offspring cell is genetically identical to the parent.

Sexual Reproduction

Sexual reproduction also occurs in virtually all fungi. This involves mating between two haploid hyphae. During mating, two haploid parent cells fuse, forming a diploid spore called a zygospore. The zygospore is genetically different from the parents. After the zygospore germinates, it can undergo meiosis, forming haploid cells that develop into new hyphae.

Questions

1. How do fungi benefit from being able to reproduce both asexually and sexually?
2. What are fungal spores? How are they made?
3. Why have fungi evolved mechanisms for dispersal of their spores? Name a few of these mechanisms.
4. How do many yeast reproduce asexually? What is this process called?
5. How do fungi mate?

Multiple Choice

The thread-like filaments of fungi are called
(a)hyphae.
(b)spores.
(c)zygospores.
(d)chitin.

2.The largest known fungus is
(a)in the Sahara desert and is 3 square feet.
(b)in Antarctica and covers the entire surface of the continent.
(c)in Oregon and covers approximately 10 square kilometers.
(d)none of the above.

3.When environmental conditions are favorable, _____ is generally more beneficial for a fungal species.
(a)asexual reproduction
(b)sexual reproduction
(c)moving to a new location
(d)stopping reproduction completely

4.Sexual reproduction of fungi involves
(a)production of genetically identical offspring.
(b)fusion of six haploid parent cells to form one giant cell.
(c)fusion of two haploid parent cells to form a zygospore.
(d)fusion of two diploid parent cells to form a tetraploid spore.

5.Germination of a diploid zygospore followed by meiosis produces
(a)four haploid cells.
(b)four diploid cells.
(c)two diploid cells.
(d)a yeast bud.

6.The earliest fungi evolved
(a)independently from thousands of different ancestors.
(b)at least 600 million years ago.
(c)before prokaryotes.
(d)after the first humans appeared on the earth.

7.One way that fungi are similar to plants is
(a)they both have cell walls made of cellulose.
(b)they both carry out photosynthesis.
(c)they both move rapidly from place to place.
(d)none of the above.

8.The phylum of fungi that is found in Antarctica, is often part of a symbiotic relationship, and is found in terrestrial ecosystems throughout the world is
(a)protozoa.
(b)ascomycota.
(c)algae.
(d)water mold.

Vocabulary

Match the vocabulary word with the proper definition.

_____ 1. a kingdom whose members include mushrooms
_____ 2. thread-like filaments consisting of haploid cells connected end-to-end and which can form branches
_____ 3. having two copies of each kind of chromosome (2n)
_____ 4. two sequential cell divisions producing four cells, each of which has half the number of chromosomes as the parent cell
_____ 5. the general name for cell division in all organisms that produces cells that have the same number of chromosomes as the parent cell
_____ 6. a diploid spore formed by fusion of two haploid cells
_____ 7. the material that makes up the cell wall of fungi
_____ 8. the material that makes up the cell wall of plants
_____ 9. a mass of fungal hyphae
_____ 10. a form of asexual reproduction in yeast
_____ 11. a reproductive cell specialized for dispersal and survival in harsh environmental conditions
_____ 12. having one copy of each kind of chromosome (n)

Terms

a. budding
b. cellulose
c. chitin
d. diploid
e. haploid
f. fungi
g. hyphae
h. meiosis
i. mitosis
j. mycelium
k. spore
l. zygospore

Thoroughly answer the question below. Use appropriate academic vocabulary and clear and complete sentences.

Why were fungi once classified as plants? What indings led to their reclassification into their own kingdom?

Ecology of Fungi

True or False

_____ 1. Fungi make chlorophyll.
_____ 2. Fungi carry out photosynthesis.
_____ 3. Fungi are heterotrophs.
_____ 4. Most fungi use dead organisms as their food.
_____ 5. When fungi break down dead organic matter, nutrients are also released, and these nutrients can be used by other living organisms.
_____ 6. In all parasitic relationships involving fungi, the fungi are attacked by an animal parasite.
_____ 7. Fungi make enzymes that help break down organic compounds.
_____ 8. Bacteria, but not fungi, can break down the cellulose in plant cell walls.
_____ 9. Fungi use their hyphae to access organic matter not reachable to other organisms.
_____ 10. Fungi are the primary producers of carbon-containing compounds in forests.
_____ 11. A mycorrhiza is a parasitic relationship between a plant and a fungus.
_____12. Alichenisamutualisticrelationshipbetweenaphotosyntheticorganism(suchasacyanobac-terium) and a fungus.
_____ 13. Lichens are often found on rocks.
_____ 14. Some fungi make antibiotics such as penicillin.
_____ 15. Human hormones such as insulin can be produced by genetically engineered fungi.

Critical Reading

Read these passages from the text and answer the questions that follow.

Symbiotic Relationships of Fungi

Not all fungi feed on dead organisms. Many are involved in symbiotic relationships, including parasitism and mutualism.

Fungi as Parasites

In a parasitic relationship, the parasite benefits while the host is harmed. Parasitic fungi live in or on other organisms and get their nutrients from them. Fungi have special structures for penetrating a host. They also produce enzymes that break down the host's tissues. Parasitic fungi often cause illness and may eventually kill their host. They are the major cause of disease in agricultural plants. Fungi also parasitize animals. Fungi even parasitize humans. Did you ever have athelete's foot? If so, you were the host of a parasitic fungus.

Mutualism in Fungi

Fungi have several mutualistic relationships with other organisms. In mutualism, both organisms benefit from the relationship. Two common mutualistic relationships involving fungi are mycorrhiza and lichen. A mycorrhiza is a mutualistic relationship between a fungus and a plant. The fungus grows in or on the plant roots. The fungus benefits from the easy access to food made by the plant. The plant benefits because the fungus puts out mycelia that help absorb water and nutrients. Scientists think thata symbiotic relationship such as this may have allowed plants to first colonize the land. A lichen is a mutualistic relationship between a fungus and a photosynthetic organism. The other organism is usually a cyanobacterium or green alga. The fungus grows around the bacterial or algal cells. The fungus benefits from the constant supply of food produced by the photosynthesizer. The photosynthesizer benefits from the water and nutrients absorbed by the fungus.

Questions

1. Define parasitism.
2. Name and describe an example of a parasitic relationship involving a fungus.
3. Define mutualism.
4. Name and describe an example of a mutualistic relationship involving a fungus.

Multiple Choice

Fungi are _____ like _____.
(a)autotrophs, plants
(b)autotrophs, animals
(c)heterotrophs, animals
(d)heterotrophs, plants

2.Saprotrophs get their food
(a)by doing photosynthesis.
(b)from absorbing dead organic matter.
(c)by engulfing living organisms .
(d)by eating live plants.

3.Some of the nutrients that plants absorb from the soil
(a)are released into the soil from dead organic matter by fungi.
(b)are cellulose and lignin.
(c)are saprotrophs engulfed by the plant's leaves.
(d)none of the above

4.Fungal hyphae
(a)are long filaments that aid in absorption of water and minerals.
(b)can penetrate deep into organic matter.
(c)release enzymes that can digest organic matter such as cellulose and lignin.
(d)all of the above

5.Parasitic fungi
(a)help their host.
(b)harm their host.
(c)carry out photosynthesis.
(d)make lignin.

6.Mycorrhiza is
(a)a parasitic relationship between a plant and an animal.
(b)a mutualistic relationship between a plant and an animal.
(c)a mutualistic relationship between a plant and a fungus.
(d)a parasitic relationship between a plant and a fungus.

7.A lichen is
(a)a parasitic relationship between a plant and an animal.
(b)a parasitic relationship between a plant and a fungus.
(c)a mutualistic relationship between an animal and a fungus.

(d)a mutualistic relationship between a fungus and a photosynthetic organism.

8.Penicillin is
(a)an antibiotic produced by plants.
(b)an antibiotic produced by a fungus.
(c)a parasite of some insects.
(d)a mutualism between a fungus and an animal.