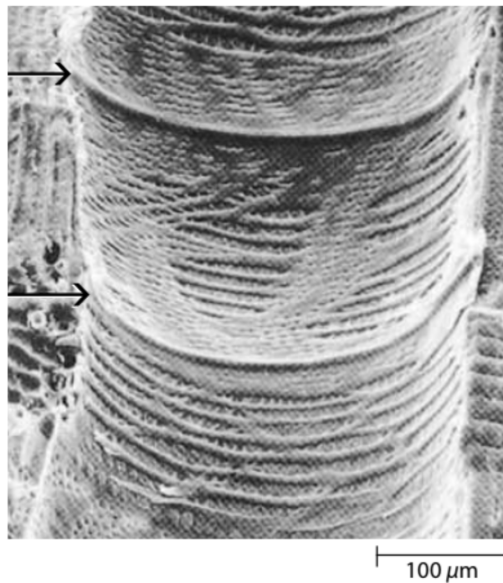


Mitosisphere Practice Exam

1. Which of the following most clearly incorrectly describes a species and its reproductive strategy?
 - A. Human, *K*-selected
 - B. Crab, *r*-selected
 - C. Lizard, Type 2 survivorship curve
 - D. Salmon, Type 1 survivorship curve
 - E. Shark, *K*-selected
2. Shown below is an image taken using a scanning electron microscope on the secondary xylem of a red oak (*Quercus rubra*):



Which of the following choices correctly identifies the type of cells and what the arrows are pointing to?

- A. Tracheid, perforation plates
- B. Vessel element, perforation plates
- C. Tracheid, pit membranes
- D. Vessel element, pit membranes
- E. Sclereid, pit membranes

3. While in the Mitosisphere laboratory, airplanekid16 was looking at a fungal specimen. Jiggle, a systematics hater who was beside him on his lunch break, takes one look and incorrectly labels it as a member of Zygomycota, which is not even recognized as a monophyletic group anymore. The specimen clearly exhibits flagellated sperm. Airplanekid16, who has been studying up on his systematics, correctly labels the specimen as which of the following?



- A. Ascomycota
 - B. Basidiomycota
 - C. Mucoromycota
 - D. Chytrids
 - E. Zoopagomycota
4. Ubiquitin, a scientist at Mitosisphere, is trying to find the location of the *skibidi* gene, a sequence of 200 bp somewhere on chromosome 11 with a known sequence. Which of the following states of chromatin and lab technique would BEST accomplish this task?
- A. Euchromatin, PCR
 - B. Euchromatin, *in situ* hybridization
 - C. Obligate heterochromatin, PCR
 - D. Obligate heterochromatin, site directed mutagenesis
 - E. Facultative heterochromatin, *in situ* hybridization

5. Gregory is breeding fruit flies for an experiment. He has two separate groups, 1 group is composed of true breeding homozygous recessive black body, vestigial winged fruit flies. Group 2 is composed of true breeding, gray body, normal winged flies. He then crosses the F1 generation with group 1, and finds the following frequencies:

Gray, Normal wings	Gray, Vestigial wings	Black, Vestigial wings	Black, Normal wings
653	68	628	74

Calculate the distance between the genes for color and wings.

- A. 10.41 cM
 - B. 9.98 cM
 - C. 4.78 cM
 - D. 5.2 cM
 - E. 11.78 cM
6. Order the following solutes from fastest (most permeable) to slowest (least permeable) in terms of their filtration in the glomerular capillaries.
- A. Na^+ - tryptophan - albumin
 - B. Na^+ - albumin - tryptophan
 - C. Albumin - Na^+ - Tryptophan
 - D. Albumin - tryptophan - Na^+
 - E. Tryptophan - Na^+ - albumin
7. Which of the following ethology concepts is incorrectly matched with an example?
- A. Imprinting: A young bird forms a bond with the first moving object it sees during a critical period of development.
 - B. Fixed action pattern: A cat chases a moving laser pointer, not stopping even when offered a fish.
 - C. Reciprocal Altruism: A vampire bat shares a blood meal with an unrelated bat, with the “understanding” that the favor will be returned.
 - D. Taxis: A cockroach moves away from bright light, demonstrating negative phototaxis.
 - E. Kin selection: A soldier ant sacrifices itself by fighting off predators to protect the colony, increasing the survival of genetically related colony members.