

Answer the first

1. Evolutionary changes that enable an organism to exploit a certain niche are called
  - a. acclimation
  - b. regulatory
  - c. founders
  - d. adaptation
  - e. diversification
2. Which of the following stresses produce similar or overlapping responses in plants
  - a. heavy metals and cold
  - b. drought and cold
  - c. oxidative and anaerobic
  - d. excess light and cold
  - e. heavy metals and wounding
3. Which of the following is not a characteristic of the heat shock response
  - a. rapid
  - b. conserved (evolutionarily)
  - c. ubiquitous
  - d. transient
  - e. involves glycolytic enzymes
4. The function of the heat shock response in plants is to
  - a. promote reproduction
  - b. stimulate the phase transition
  - c. facilitate water uptake
  - d. promote tolerance to drought
  - e. promote tolerance to lethally high temperatures
5. Which of the following is/are characteristics of HSP70
  - a. homologues found in the cytoplasm, chloroplasts, and mitochondria
  - b. promotes promote folding
  - c. ATPase activity
  - d. a and b
  - e. all of the above
6. HSF is known for
  - a. binding HSEs
  - b. being directly stimulated by heat
  - c. being indirectly stimulated by HSP70
  - d. a and b
  - e. all of the above
7. Cold tolerance involves
  - a. overwintering in perennial plants
  - b. cold acclimation in some annual plants
  - c. quantitative genetic component

- d. a and c
  - e. all of the above
8. At lower temperatures, cell membranes in unacclimated cells become
- a. more fluid
  - b. more gel-like
  - c. inverted hexagonal phase occurs
  - d. b and c
  - e. all of the above
9. True or False. Cold acclimation is not as evolutionarily conserved as the heat shock response.
- a. True
  - b. False
10. Some proteins induced by cold are
- a. *Leas*
  - b. antifreeze proteins
  - c. proteases
  - d. a and b
  - e. all of the above
11. True or False. The response to cold (CA) develops more quickly than the response to heat.
- a. True
  - b. False
12. Regulation of many cold induced genes involves
- a. CBF/DREB factor
  - b. Abscisic Acid
  - c. DRE/C elements
  - d. Calcium
  - e. all of the above
13. Which of the following plants is most resistant to flooding
- a. tomato
  - b. maize
  - c. cactus
  - d. rice
14. The major problem with flooding for plants in the short term is
- a. cellular swelling
  - b. washing away of nutrients
  - c. lack of oxygen
  - d. high chlorine levels
  - e. high salt levels
15. Anaerobic proteins (ANPs)
- a. are mainly involved in glycolysis
  - b. are induced within 24 hours
  - c. include heat shock proteins
  - d. a and b
  - e. all of the above
16. The first virus that was isolated in pure form was
- a. cauliflower mosaic virus
  - b. potato mosaic virus

- c. tobacco mosaic virus
  - d. influenza virus
  - e. none of the above
17. Plant viruses have been found that have which of the following genomes
- a. single-stranded RNA (+ strand)
  - b. single-stranded RNA (- strand)
  - c. double-strand RNA
  - d. a and b
  - e. all of the above
18. Which of the following groups of bacteria cause diseases in plants
- a. *Pseudomonas*
  - b. *Agrobacterium*
  - c. *Escherichia*
  - d. *Pneumococcus*
  - e. a and b
19. Stress due to pathogen attack is called
- a. abiotic
  - b. biotic
  - c. biotropic
  - d. geotropic
  - e. necrotic
20. Which of the following plant responses to a pathogen happens closest to the infection site
- a. local
  - b. systemic
  - c. programmed
  - d. hypersensitive
  - e. SAR
21. A molecular component of a pathogen that can induce the plant defense response is called
- a. an inducer
  - b. an elicitor
  - c. a pathogenesis-related (PR) protein
  - d. a donor
  - e. incompatible
22. Which of the following acts as a secondary signal in the hypersensitive response and may also kill pathogens
- a. phytoalexins
  - b. phenylpropanoids
  - c. salicylic acid
  - d. hydrogen peroxide
  - e. oxygen
23. The systemic signal for SAR is
- a. salicylic acid
  - b. calcium
  - c. hydrogen peroxide
  - d. systemin
  - e. unknown

24. The *avr* gene/protein
- a. is found in the plant host
  - b. is found in the pathogen
  - c. determines the inter-organism signal
  - d. is the inter-organism signal
  - e. b and c
25. R genes/proteins usually contain
- a. leucine zippers
  - b. leucine-rich repeats
  - c. DNA-binding domains
  - d. a lot of basic residues

26. Discuss the organism that caused the extensive famine in Ireland in the 1840s that resulted in the death of 1 million people. What was the host? Where did it originate? Why was it heavily planted? Classify the pathogen as to its strategy (and why), give its scientific name, and something about its reproduction.