

- TRUE 1. An epidemic is commonly defined as the occurrence of cases of disease at a frequency greater than expected.
- FALSE 2. Inactivated vaccines when given to children elicit only IgG antibodies and no Thelper cell responses.
- TRUE 3. T cells and B cells provide specificity for the adaptive immune response by recognizing distinct pieces of pathogens called antigens.
- FALSE 4. Giving the tetanus vaccine (an inactivated toxin form called a toxoid) is a form of passive immunization.
- FALSE 5. The VSV- Ebola vaccine is a live attenuated vaccine.
- TRUE 6. A zoonosis is an infection acquired from an animal reservoir with no sustained human to human transmission.
- TRUE 7. One of the greatest challenges in controlling *Ascaris* transmission is the lack of symptoms in most infected individuals.
- FALSE 8. The most common nematode infection in the United States is *Giardia lamblia*.
- TRUE 9. Trypanosomes live extracellularly in the bloodstream and immune responses is primarily IgG antibodies that bind to the protozoan parasites.
- TRUE 10. The new malaria vaccine contains B cell epitopes, T cell epitopes from malaria combined with a hepatitis B virus antigen.
- TRUE 11. The most serious disease complication from *Ascaris* infection in humans is intestinal blockage.
- FALSE 12. Penicillin-resistance only developed in the United States after 30 years of clinical use.
- FALSE 13. The “gold standard” for diagnosing active tuberculosis is the smear test.
- FALSE 14. Malaria evades CTLs by expression of variable proteins (Pfemp1) during liver infection.
- TRUE 15. The big campaign to eradicate Malaria in the United States took place from 1947 to 1951.
- FALSE 16. Malaria primarily causes death in children from anemia and systemic hemorrhaging (bleeding).
- FALSE 17. *Trichinella* has an animal reservoir with a life cycle in mice/rodents and cats.
- TRUE 18. *Staphylococcus* toxin-food poisoning is caused by enterotoxins that can act as superantigens
- TRUE. 19. Macrophages express Toll-like receptors (TLRs) that recognize PAMPs.
- FALSE 20. Most vaccines are given intramuscular because it is the most effective route for memory.

Multiple Choice.

21. Which of the following is NOT generally considered to be a characteristic of adaptive immunity in contrast to innate immunity?

- A. Slower responses
- B. Memory responses
- C. PAMP responses**
- D. Helper T cell responses

22. The Global Campaign for worldwide malaria eradication started in 1955 and combined:

- A. systematic spraying with DDT and treatment of infected patients with artemisinin
- B. systematic spraying with DDT and treatment of infected patients with chloroquine**
- C. use of insecticide treated bed nets and treatment of infected patients with chloroquine
- D. use of insecticide treated bed nets and treatment of infected patients with artemisinin

23. An overly reactive immune response to *Leishmania chagasi* can lead to increased immunopathology disease resulting in which form of Leishmaniasis?

- A. Cutaneous
- B. Mucocutaneous**
- C. Asymptomatic
- D. Visceral
- E. None of the above

24. Which of the following are NOT animals that help in the transmission of parasites either protozoan or helminth worms?

- A. tsetse flies
- B. mosquitoes
- C. leeches**
- D. snails

25. The oral polio vaccine is?

- A. An attenuated viral vaccine**
- B. An inactivated viral vaccine
- C. A recombinant protein vaccine
- D. An inactivated toxin vaccine
- E. None of the above

26. Lipopolysaccharide is thought to be a PAMP (in part) because it

- A. is conserved among many pathogens**
- B. is expressed on all bacteria
- C. is a large molecule
- D. has a lipid component
- E. all of the above

27. Which of the following pathogens can cause pneumonitis (lung disease) in human hosts?

- A. *Taenia solium*
- B. *Plasmodium falciparum*
- C. *Ascaris lumbricoides***
- D. *Toxoplasma gondii*

28. Endemic infections of *Ascaris lumbricoides* in communities are difficult to control because?

- A. Ascaris infections are often asymptomatic
- B. Ascaris infections are difficult to diagnose
- C. Ascaris infections often do not elicit a strong immune response
- D. Ascaris worms can repeatedly infect the same person.
- E. All of the above**

29. Which of the following pathogens commonly causes swelling in lymph vessels leading to accumulation of edema?

- A. Malaria /*Plasmodium falciparum*
- B. Filarial worms**
- C. Guinea worms
- D. Schistosomes
- E. They all cause lymph edema

30. Which of the following vaccine types activates T helper cells?

- A. Attenuated
- B. Inactivated
- C. Live vector
- D. Recombinant protein
- E. All of the above

31. A primary difference between CD4+ Thelper cells and CD8+ Tcytotoxic cells is that cytotoxic T cells.....

- A. only recognize antigen presented on MHC
- B. become activated in lymph nodes or spleen
- C. form memory cells
- D. kill virally infected target cells directly
- E. all of the above are properties unique to CD8+ T cells

32. Which of the following is NOT true for the variable region of antibodies?

- A. the variable region binds to antigen
- B. the variable region is determined by antibody isotype
- C. the variable region is identical between two different antigen binding sites
- D. Each B cell produces antibodies with unique variable regions
- E. all of the above are true for antibodies

Table 33. Fill in the chart on vaccines.

	Elicits strong antibody response (YES/NO)	May need adjuvant (YES or NO)	ONE advantage in comparison to other vaccines
Attenuated	YES	NO	Inexpensive. More antigens present. Replicating so no need for adjuvant and live vaccine so lower dose can be used
Inactivated (killed)	YES	YES	No revirulence so safer than attenuated. More antigens present than recombinant.
Recombinant protein vaccine	YES	YES	Inexpensive to produce. safer than attenuated vaccine

Table 34. Fill in the rest of the chart on parasites.

	Malaria (<i>Plasmodium falciparum</i>)	Ancylostoma (Hookworm)	Filariasis (<i>Brugia malayi</i>)	Sleeping sickness (<i>Trypanosoma brucei</i>)
Causes severe neurological disease or brain inflammation (YES/NO)	YES	NO	NO	YES
Currently considered a zoonosis (YES/NO) If yes, what is animal reservoir?	NO	NO	NO	YES. Cows /horses
Human transmission via arthropod vector? (YES/NO) If yes, what IS THE vector. No species name required	Yes, Anopheles mosquitoes	NO arthropod vector	Yes. Mosquitoes. Culex and other genera	Yes, tsetse fly

SHORT ANSWER questions.

35. LIST TWO differences that make Guinea worm eradication more difficult than smallpox eradication was. The answer should **only be differences** that affect eradication.

Guinea worm has other animal hosts (1) . Guinea worm has no vaccine or nor an easy drug treatment—only education and daily treatment for removing worm(1). (Guinea worm is more chronic 1 year)

Smallpox had vaccine (1). Smallpox only human hosts (1). Smallpox acute (short term) easy to diagnose infection (1).

36. Why would it be unlikely that the immune system would recognize toxic shock syndrome toxin-1 (TSST-1) as a PAMP? [Hint: what are two key characteristics of PAMPs and why does TSST-1 lack these features?]

**PAMPs must be conserved among many pathogens – but TSST-1 is unique to Staph aureus
PAMPs must be difficult for pathogens to alter.**

37. Draw and label a diagram showing antibody opsonization of a virus.

Refer to slide in adaptive immunity handout.

