018. Applications of Immune Responses

1. Define the following:

variolation: powdered scabs from smallpox lesions inhaled or placed in skin for immunity.

vaccination: use of prepared pathogen or its products to induce active immunity.

termed by Pasteur from the Latin word *vacca* for cow.

naturally acquired immunity: immunity through natural events; infection.

artificially acquired immunity: immunity through vaccination.

attenuated vaccine: weakened pathogen replicates causing mild or no disease.

single dose gives long lasting immunity.

can cause disease.

inactivated vaccine: does not replicate and cannot cause disease.

booster shots needed to induce immunity.

toxoids: inactivated toxins that induce immunity.

subunit vaccine: antigenic fragments that induce immunity.

recombinant vaccine: subunit vaccines produced by gene engineered organisms.

yeast produce viral protein coat and used as vaccine against hepatitis B.

adjuvants: substance in inactivated vaccines that enhances immune response.

Salk vaccine: mid 1950’s; inactivated poliomyelitis vaccine; does not prevent transmission.

Sabin vaccine: attenuated poliomyelitis vaccine; prevents transmission but may cause infection.

seroconversion: change from seronegative to seropositive; no antibodies to having some.

monoclonal antibodies: antibodies that recognize only a specific epitope.

hypersensitivity: increased reactivity to antigen.

humoral immunity: B cell.

approved adjuvant: alum.

immune complex: IgG or IgM bound to antigen.

2. Variolation was used to protect against what?

smallpox

3. What is the difference between natural active immunity and artificial active immunity?

natural active: immunity from infection; induces memory.

artificial active: immunity from vaccination; induces memory.

4. The last case of naturally contracted smallpox occurred in what year?

1977 in Somalia, Africa.

5. Inactivated whole agents are prepared by treatment with?

formalin or chemicals.

6. What is an attenuated vaccine?

weakened pathogen replicates causing mild or no disease.

single dose gives long lasting immunity and may immunize others.

mutations lessen virulence.

still causes disease in immunocompromised.

may mutate back and cause disease.

7. What is the difference between attenuated and inactivated vaccine?

attenuated: replicates causing mild or no disease.

single dose gives long lasting immunity.

can cause disease.

inactivated: does not replicate and cannot cause disease.

several booster shots needed to elicit immunity.

8. A type of vaccine that causes the host to produce microbial agents for a short time involves the use of?

DNA vaccine

9. How do DNA vaccines work?

DNA segments injected into muscle tissue which expresses the DNA.

microbial antigens are produced triggering an immune response.

10. What do monoclonal antibodies obtained from a hybridoma provide?

large amount of epitope specific antibodies.

11. Rapid diagnosis of \_\_\_\_\_\_ can be identified by monoclonal antibodies.

pregnancy

hepatitis

influenza

chlamydia

12. Natural passive immunity occurs as a result of what? How long does it last in the body?

IgG crossing the placenta.

IgA from breast milk.

IgG degrades within 3 to 6 months.

13. If a dilution of 1:256 is observed last, this positive reaction result is reported as?

titer is 256.

14. Most serological tests are conducted in?

microtiter plates

15. Attenuated vaccines are contra-indicated in this condition and why?

pregnant woman because strain may damage fetus.

16. When agarose is used for precipitation reactions, this test is known as?

immunodiffusion test

17. What did Edward Jenner observe about milkmaids?

milkmaids who recovered from cowpox rarely got smallpox.

transferred material from cowpox lesion onto milkmaid then to a scratch on Phipps.

Phipps became immune to smallpox.

18. The diagnosis of which disease use hemagglutination tests?

blood typing

hepatitis

HIV

19. Describe the following test methods:

radioimmunoassay: radioactive isotopes to tag antigen or antibody.

fluorescent antibody test: fluorescent microscopy to locate fluorescent antibodies.

ELISA test: enzyme tag antibodies bind to antibodies from serum that bind to antigen.

immunodiffusion test: precipitation reactions in agarose; Ouchterlony.

immunoelectrophoresis: serum proteins are separated by electrophoresis.

hemagglutination: RBC agglutination.

20. Anti human IgG antiserum is often used in?

indirect ELISA

indirect fluorescent

western blotting

21. Testing procedures used to identify AIDS in blood used for transfusion is?

ELISA

22. What is herd immunity?

critical portion of population is immune

infectious agent unable to spread.

23. nylon filter

western blot

24. flow cytometry

fluorescent activated cell sorter

25. fluorescent microscope

indirect fluorescent antibody test

26. chromogen

ELISA

27. agarose gel

ouchterlony procedure

28. immunity from mother’s milk

naturally acquired passive

29. child recovered from chicken pox

naturally acquired active

30. gamma globulin

artificially acquired passive

31. immunization with measles vaccine

artificially acquired active

32. Agglutination reactions utilize particles rather than molecules.

True

33. Active immunity develops only after a natural infection and not after vaccination.

False

34. Attenuated agents often give rise to a long lasting immunity.

True

35. Inactivated vaccines typically require booster shots.

True

36. Recombinant vaccines and inactivated vaccines typically require several shots to be effective.

True

37. Alum is an adjuvant.

True

38. Peptide vaccines have proven to be cheap and very immunogenic.

False

39. The effectiveness of DNA vaccines stems from the effective production of antibodies against the naked DNA molecule.

False

40. What is a T cell dependent antigen and a T cell independent antigen?

T-dependent antigen: induces immune memory.

T-independent antigen: LPS and carbs; elicits poor immune response.

41. What is a hapten and what is an adjuvant?

hapten: not immunogenic by itself.

adjuvant: substance in inactivated vaccines that enhances immune response.

makes hapten immunogenic.

42. What cytokines are used by helper T cells to activate APC cells?

IL 4, 5, 6, 10,13,14

43. What antibody binds to the constant region of human IgG molecules?

anti-human IgG

44. What is the Mantoux test and what is it used to identify?

tuberculin skin test used to identify M. tuberculosis.

PPD injected; redness and swelling occurs if positive.

45. What are polyclonal antibodies and how are they made?

mix of different antibodies recognizing different epitopes.

animals immunized and the antibodies produced are harvested from animal’s serum.

46. What are monoclonal antibodies and how are they made?

antibodies that recognize only a specific epitope.

animal B cells fused with myeloma cells producing hybridomas that create specific antibodies.

can be humanized using DNA recombinant.

47. What is plasma and what is serum?

serum: fluid portion of blood after blood clots.

plasma: fluid portion of blood treated to prevent clotting.

48. What are detectable markers?

enzymes

fluorescent dyes

radioactive tags

49. Identify some important diagnostic HIV markers.

ELISA

western blotting

enzyme or radioactively labeled anti-human IgG.

50. Precipitation reactions have been replaced with which techniques?

fluorescent antibody

ELISA

western blotting

fluorescent activated sorter