

KEY

Medicinal Chemistry 401/561P

Final Examination

June 9, 2008

NAME: _____

Medicinal Chemistry 401/561P

Name: KEY

Grade: _____

Pick the BEST answer from the following choices:

1. Which of the following is FALSE about *Clostridium difficile*
 - a. Is effectively treated with Lactobacillus GG (Culturelle) probiotic
 - b. Is an anaerobe
 - c. Is usually sensitive to metronidazole
 - d. Is usually resistant to imipenem

2. Fourth generation cephalosporins
 - a. Can be used in the case of an anaphylactic reaction to penicillin G
 - b. Have excellent oral bioavailability
 - c. Have good activity against *Pseudomonas aeruginosa*
 - d. Are pregnancy category C

3. Metronidazole would normally be preferred for treatment of a ruptured appendix because
 - a. It has broad activity against Gram positive cocci
 - b. It has broad spectrum anti-anaerobe activity
 - c. It has a broad activity against Gram negative bacilli
 - d. It is targeted for nosocomial infections

4. Aminoglycosides are noted for their activity against
 - a. Gram negative anaerobic pathogens
 - b. Gram positive aerobic pathogens
 - c. Gram negative aerobic pathogens
 - d. Gram positive anaerobic pathogens

5. The most *irreversible* common adverse event problem with aminoglycosides is
 - a. Hepatotoxicity
 - b. Renal toxicity
 - c. Peripheral neuritis
 - d. Ototoxicity

6. Macrolide antibiotics, although structurally similar, are individually different in antimicrobial properties. However, they all have good activity against:
 - a. *Pseudomonas aeruginosa*
 - b. *Klebsiella pneumoniae*
 - c. *Escherichia coli*
 - d. *Mycoplasma pneumoniae*

7. Tetracyclines have been vastly overused yet still remain useful against some important pathogens. In the USA all of the following except which one can be logically treated with doxycycline.
- a. *Bacillus anthracis*
 - b. *Clostridium difficile*
 - c. *Propionibacterium acnes*
 - d. *Borellia burgdorferi*
8. A common adverse reaction with tetracycline therapy for adults would be
- a. Nephrotoxicity
 - b. Diarrhea
 - c. Staining of teeth
 - d. Ototoxicity
9. Moxifloxacin would be expected to have better activity against which pathogen compared to ciprofloxacin
- a. *Klebsiella pneumoniae*
 - b. *E. coli*
 - c. *Clostridium difficile*
 - d. *Streptococcus pneumoniae*
10. Esterases elaborated by *Klebsiella pneumoniae* render which of the following antibiotics inactive
- a. Tetracycline
 - b. Daptomycin
 - c. Azithromycin
 - d. Vancomycin

William Whiner, age 2, developed a sore, red throat. William remained at home.

11. A logical prescription for this infection is:
- a. Penicillin G
 - b. Penicillin V
 - c. Ciprofloxacin
 - d. Ceftriaxone

Three days of the therapy chosen in (11) was not effective and the infection was becoming widespread. William was still at home.

12. A logical treatment regimen now would be:
- a. Amoxicillin/clavulanic acid
 - b. Ampicillin/sulbactam
 - c. Doxycycline
 - d. Vancomycin

13. The following is true about meropenem

- a. It can be used in the case of an anaphylactic reaction to penicillin G
 - b. Has good activity against MRSA
 - ~~b.~~ Has good activity against *Enterococcus faecalis*
 - d. Has good activity against *Enterobacter aerogenes*
14. What is FALSE about Clindamycin
- a. Is noted for causing diarrhea
 - b. Has good activity against most Gram positive aerobes
 - c. Has good activity against most Gram negative aerobes
 - d. Acts by binding to the 50S ribosomal subunit
15. What is FALSE about gentamicin
- a. acts by concentration dependent killing
 - b. has poor oral bioavailability.
 - c. acts by time dependent killing
 - d. can be used topically for ophthalmic infections
16. The best oral one dose treatment for gonorrhea in a STD clinic would be
- a. Cefpodoxime axetil
 - b. Ceftriaxone
 - c. Tetracycline
 - d. Azithromycin
17. The best oral one dose treatment for *Chlamydia trachomatis* in a STD clinic would be
- a. Cefpodoxime axetil
 - b. Ceftriaxone
 - c. Tetracycline
 - d. Azithromycin
18. Community acquired MRSA is often sensitive to which oral antimicrobial
- a. Azithromycin
 - b. Trimethoprim/sulfa
 - c. Cefpodoxime axetil
 - d. Metronidazole
19. *Enterococcus faecium* should be expected to be sensitive to
- a. Ampicillin IV
 - b. Amoxicillin/calvulanic acid
 - c. Daptomycin
 - d. All of the above
20. Which of the following could be safely used for a pregnant patient (category B)
- a. Azithromycin
 - b. Clarithromycin
 - c. Minocycline
 - d. Ciprofloxacin

21. Moxifloxacin acts by inhibiting
- Topoisomerase I
 - Topoisomerase II
 - Topoisomerase IV
 - Both II and IV
22. The following is FALSE about a penicillin allergy manifesting in a rash
- Aztreonam may be safely given
 - Cephalosporins can usually be safely given
 - Piperacillin/tazobactam can usually be safely given
 - The rash is usually seen on the trunk of the body
23. A big cytochrome P450 3A4 inhibitor antimicrobial is
- Erythromycin
 - Azithromycin
 - Metronidazole
 - All of the above
24. Harvy Hacker, age 75, at home, develops an acute pneumonia that requires hospitalization. A likely pathogen would be
- Klebsiella pneumoniae*
 - Chlamydia pneumoniae*
 - Streptococcus pneumoniae*
 - Streptococcus pyogenes*
25. In the hospital Harvy the pneumonia clears but he develops a urinary tract infection. Microscopic exam shows a Gram negative rod. A logical first treatment for this would be
- IV
- Vancomycin
 - Azithromycin
 - Clindamycin
 - Ciprofloxacin
26. Which of the following statements about fungal infections is FALSE :
- Thrush is a superficial *Candida* infection of the mouth or vagina.
 - The primary port of entry of *Cryptococcus neoformans* is inhalation.
 - Antiviral drugs are usually used to treat severe infections
 - Coccidioidomycosis and Blastomycosis are endemic in certain regions of the United States.
27. Which of the following statements about subcutaneous fungal infections is FALSE:
- Confined to the dermis, subcutaneous tissue, or adjacent structures.
 - They tend to be slow in onset and chronic in duration.
 - No systemic spread is usually observed.
 - Examples include tinea pedis and tinea capitis.

28. Which of the following statements about Amphotericin B is FALSE:
- a. Binds to ergosterol in fungal cell walls.
 - b. It is not orally bioavailable.
 - c. Can cause nephrotoxicity in patients.
 - d. It is available in a topical formulation.
29. Which of the following drugs is not indicated to treat a nail infection:
- a. Terbinafine.
 - b. Caspofungin.
 - c. Ketoconazole.
 - d. Itraconazole
30. To treat Cryptococcal meningitis a viable drug choice is:
- a. Ampicillin.
 - b. Fluconazole.
 - c. Nystatin.
 - d. Ritonavir
31. Members of the herpes virus family are:
- a. Large RNA enveloped viruses.
 - b. Cannot usually establish latency in infected hosts.
 - c. Responsible for infections such as chicken pox and mononucleosis.
 - d. All of the above
32. Which of the following is an antisense drug used to treat Cytomegalovirus retinitis:
- a. Foscarnet
 - b. Cidofovir.
 - c. Fomivirsen.
 - d. Enfuvirtide.
33. Which of the following class of drugs are NOT used to treat HIV infection:
- a. Protease inhibitors
 - b. Neuraminidase inhibitors
 - c. Reverse transcription inhibitors.
 - d. Fusion inhibitors
34. Barboor is a 45 year old AIDS patient with detectable CCR5-tropic HIV-1, and has evidence of viral replication of HIV-1 strains resistant to multiple antiretrovirals. The best drug choice for Baboor would be:
- a. Maraviroc
 - b. Acyclovir
 - c. Abacavir
 - d. cidofovir

35. An example of natural passive immunity is:
- Transplacental transfer of IgA
 - Transplacental transfer of IgG
 - Response to the MMR vaccine
 - Response to the Hep B vaccine.
36. Which of the following statements about vaccines is FALSE:
- In some cases can produce an artificial active immune response
 - Immunity is similar to the natural infection but without the risk of disease
 - Are only effective against diseases caused by viruses.
 - Are subject to various animal and human testing before introduction to the market.
37. The following are all invalid contraindications for vaccinations except:
- Pregnant women in household
 - Severe allergic reaction to pollen
 - Severe allergic reaction to a vaccine component
 - Mild illness
38. Addition of adjuvants to vaccines usually:
- Increases the amount of antigen included in a vaccine.
 - Boosts the immune response to an antigen
 - Prevents the contamination of vaccines
 - Enhances the stability of a vaccine
39. Zuzu is 8 months old and his mom forgot to take him in to get the third dose of his DTaP series recommended at 6 months. Zuzu took both the first and second doses on time. The best course of action at this time would be to:
- Start the DTaP series again.
 - Stop all other vaccinations until the DTaP series is complete
 - Administer the third dose as soon as possible and restart the series after 8 weeks.
 - Administer the third dose and continue the series as scheduled.
40. When immunizing liver transplant patients, which of the following statements is TRUE:
- When indicated, they should only receive live attenuated vaccines.
 - When indicated, they can receive both live attenuated and inactivated killed vaccines.
 - When indicated they can receive killed inactivated or polysaccharide vaccines.
 - They should never be vaccinated at all.
41. Which of the following is NOT a Toxin mediated disease:
- Whooping cough.
 - Tetanus.
 - Diphtheria.
 - Rubella.

42. Humans are the only reservoirs for the bugs that cause all of the following diseases except:
- Whooping cough.
 - Diphtheria
 - Tetanus.
 - Rubella.
43. Which of the following statements about the polio virus is FALSE:
- It is an RNA enterovirus
 - Can be spread by oral-oral and oral-fecal routes
 - Replicates in the GI tract only
 - Can causes motor neuron damage.
44. Oral Polio Vaccine (OPV) is not used in the US because
- It will interfere with virus replication in the GI tract
 - It is possible to contract and spread the polio virus from it.
 - The vaccine is not well tolerated when given orally to adults.
 - It is only affective against two of the three serotypes of polio virus.
45. The polio IPV vaccine:
- Is available as a combination vaccine with MMR
 - Only requires a single to be completely affective
 - Is available as a DTaP-HepB-IPV combination vaccine
 - Contains two of the three serotypes of the polio virus.
46. Sami is 12 months old and has not been vaccinated against *Streptococcus pneumoniae*. The best choice of vaccine to take now would be:
- PPV23 since it is cheap effective and has 23 of the ~90 serotypes of *S. pneumoniae*.
 - PCV7 because it contains 7 of the most antigenic serotypes of *S. pneumoniae*.
 - Either PPV23 or PCV7 vaccine would work fine.
 - PCV7 because it is a conjugated polysaccharide recommended for children under 2 years.
47. Which of the following statements is FALSE about Pneumococcal Disease:
- Common cause of acute otitis media in children
 - Humans are the only reservoir and transmission is mostly through respiratory droplets.
 - Caused by a gram negative bacteria that is increasingly resistant to antimicrobials
 - Shows a temporal pattern usually peaking in winter and early spring.
48. Children who are at increased risk of developing invasive Pneumococcal Disease include:
- Children with HIV infection
 - African American children

- c. Children who have a cochlear implant
 - d. All of the above.
49. *Neisseria meningitidis* can be treated with penicillin.
- a. The above statement is TRUE
 - b. The above statement is FALSE.
50. Which of the following statements about Meningococcal Conjugate Vaccine (MCV) is TRUE:
- a. Administered orally
 - b. Only active in children over 5 years old
 - c. It is a polysaccharide conjugated to the diphtheria toxoid.
 - d. Contains serogroups A, C and W-135.
51. Meningitis can be a clinical manifestation of infection with both *Neisseria meningitides* and *Streptococcus pneumoniae*:
- a. The above statement is TRUE
 - b. The above statement is FALSE
52. If an unvaccinated child develops a cough, stepwise fever to 103 °F, rash that started on the head and face before spreading to the trunk, and red watery eyes. The child most likely has:
- a. Rubella
 - b. Measles
 - c. Mumps
 - d. Diphtheria
53. Which of the following statements about the measles mumps and rubella (MMR) vaccine is FALSE:
- a. A dose in children younger than 12 months is a valid dose
 - b. Can usually be used in children with allergies to egg protein.
 - c. Can cause joint pain in ~25% of patients.
 - d. Can be administered at the same time as the varicella vaccine.
54. A child born with Congenital Rubella Syndrome may suffer from:
- a. Mental retardation
 - b. Liver and spleen damage
 - c. Cataracts.
 - d. All of the above.
55. The vaccine that is part of the recommended childhood vaccination schedule with the first dose usually administered at birth is:
- a. MMR
 - b. IPV
 - c. DTaP
 - d. None of the above

56. Which of the following vaccines is a live attenuated virus and therefore should not be routinely administered to pregnant women and patients with a severely compromised immune system:
- a. MMR
 - b. IPV
 - c. HepB
 - d. DTaP
57. Which of the following statements about the varicella vaccine is TRUE:
- a. Contains a different antigen than the Herpes Zoster vaccine.
 - b. It is available as a combination MMR-V vaccine
 - c. It contains a conjugated polysaccharide as the antigen.
 - d. Recommended for routine vaccination at 2, 4, 6 and 12 months with a booster dose at 4-6 years.
58. Which of the following statements about the Herpes Zoster vaccine is FALSE:
- a. It is recommended for patients 60 years or older.
 - b. It can be administered at the same time as a flu shot.
 - c. To be effective an annual dose is required
 - d. It is possible to vaccinate even if the patient has a prior history of shingles.
59. Postherpetic neuralgia is painful condition that can occur as a complication of:
- a. Both chicken pox and shingles.
 - b. Chicken pox but not shingles
 - c. Shingles
 - d. Taking the varicella vaccine.
60. To avoid a possible breakthrough infection from the varicella vaccine it should be:
- a. Administered at the same time as the MMR vaccine but at different sites.
 - b. Administered at least 30 days after the MMR vaccine
 - c. Administered within 28 days of the MMR vaccine
 - d. Both a and b are correct.
61. All of the following groups are considered high risk groups for contracting Hepatitis B except:
- a. IV drug users.
 - b. Heterosexuals with multiple partners
 - c. Gay men
 - d. Certain ethnic groups including Native Americans living in Arizona.
62. If a mother in labor is positive for the Hepatitis B HBsAg and HBeAg antigens then to avoid transmission of the HepB virus to her child the best action would be to:
- a. Give the first dose of HepB vaccine and HepB immunoglobulin within the first 12 hours of birth.

- b. Give the HepB immunoglobulin only since the vaccine will not be useful the presence of antibodies in the blood
 - c. Give the HepB vaccine only.
 - d. Give the MMR-IPV-HepB combination vaccine.
63. To eliminate the Hepatitis B Virus Transmission in the United States, it is recommended that you vaccinate:
- a. Infants and children that are at high risk.
 - b. All infants and children except if there is a clear contraindication not to.
 - c. Healthcare workers in contact with high risk groups
 - d. Both b and c together.
64. Which of the following statements about the influenza type B virus is FALSE:
- a. Humans are the only reservoirs.
 - b. Mutates by antigenic drift only.
 - c. Characterized by its H and N subtypes
 - d. Primarily affects children.
65. In the influenza virus nomenclature such as the (A/Fujian/411/2002 (H3N2), the Fujian and the 2002 usually refer to :
- a. The region it was first isolated and year of isolation respectively.
 - b. Name of scientist who isolated the virus and the year of isolation respectively.
 - c. The strain of the virus and the year the virus caused an epidemic respectively.
 - d. The strain of the virus and the year it was isolated respectively.
66. The Trivalent inactivated influenza vaccine (TIV) usually contains:
- a. Two subtype B viruses and one subtype A.
 - b. Three subtype A viruses.
 - c. One virus from each subtype A, B and C.
 - d. Two subtype A and one subtype B virus.
67. Which of the following statements about the influenza disease is FALSE:
- a. Viremia is usually common with the influenza disease.
 - b. Severity of the disease depends on prior infection with similar variants.
 - c. Reye syndrome can be a complication of influenza.
 - d. Secondary bacterial pneumonia can be a complication of influenza.
68. The live attenuated influenza vaccine (LAIV) should NOT be given to:
- a. Patients over 50 years.
 - b. Children over 5 years.
 - c. Adolescents on chronic aspirin therapy.
 - d. Both a and c.
69. The influenza vaccine (either TIV or LAIV) is usually protective for a single flu season (almost one year) because:

- a. Manufacturers want to make money and therefore design the vaccine to last one year.
 - b. Influenza subtype C mutates rapidly and therefore the vaccine loses its effectiveness.
 - c. People with egg allergies can't take higher doses of antigen therefore an annual vaccine is needed.
 - d. Circulating viruses change every year and a new formulation containing different strains is required to combat the disease.
70. The anti-influenza agents amantadine and rimantadine are currently not recommended in the US to treat influenza in the 2008-2009 flu season because:
- a. Most circulating influenza viruses are currently the type C viruses for which these two agents are not indicated.
 - b. Many virus strains are showing resistance to both agents.
 - c. There is a shortage of these two agents and they are preserved for emergency use only.
 - d. The two drugs don't work in patients over 50 years old.
71. Hib vaccine is available in combination with which of the following vaccines:
- a. MMR.
 - b. MMR-V.
 - c. IPV.
 - d. Hepatitis B.
72. Dardoor is 18 months old that has not received his recommended Hib vaccine doses and was diagnosed with pneumonia caused by *Haemophilus influenzae* type b, you would treat Dardoor with:
- a. Ampicillin alone.
 - b. A 3rd generation cephalosporin. ← will accept b as well
 - c. Ampicillin and chloramphenicol together.
 - d. Either b or c.
73. You have made the correct choice for Dardoor's treatment in question 72 above and now he is recovering. Would you vaccinate Dardoor for Hib?
- a. No, recovery from invasive disease always confers protection
 - b. Yes, but I would wait six months for the antibodies to decrease in his body.
 - c. Yes, because children younger than 24 months may not develop protective antibodies after invasive disease.
 - d. None of the above.
74. The following statement about the rotavirus is FALSE:
- a. It is usually absorbed from the GI tract and replicates in the blood.
 - b. VP7 and VP4 antigens define the virus serotype.
 - c. Causes severe diarrhea in children less than 5 years of age.
 - d. It is very stable and may remain viable for weeks or months if not disinfected.

75. Which of the following statements about the rotavirus vaccine Rotarix is FALSE:
- a. Approved for ages 6-24 weeks.
 - b. Usually given two oral doses a 2 and 4 months with a minimum interval of 4 weeks.
 - c. The dose needs to be repeated if the child spits up or regurgitates vaccine, but the remaining doses can be administered as scheduled.
 - d. It is a live attenuated rotavirus vaccine.