Medical and Pharmaceutical Applications of Microbial Biodiversity (MPAMB)

Teaching Unit, 2019-2020

Master 2, Fundamental and Applied Microbiology

Session 1-Examination, Feb. 12th, 2020

1. What is the vector of Lyme disease ?

>hard ticks of the genus Ixodes

2. What are the main bacterial agents of central nervous system diseases, are they all preventable, how ?

Neisseria meningitidis, Streptococcus pneumoniae, Listeria monocytogenes
Vaccine, vaccine, behaviour

3. Please could you Cite a bacterium with linear replicons ?

Borrelia species possess linear chromosomes and plasmids

4. Please could you cite some intra-cellular bacterial pathogenic agents

Mycobacterium tuberculosis, Rickettsia prowazekii, Chlamydia trachomatis or pneumophila

5. Why is leptospirosis considered as an emerging disease ?

because of demographic changes (more people living in slum areas) and climatic changes (more frequent extreme climatic events such as hurricanes and heavy rainfalls)

6. what is a zoonotic disease ? please cite some zoonotic diseases

disease that can be transmitted from animals to humans; leptospirosis is a zoonosis

7. What are the most frequent bacteria responsible of Sequellae in survivors of CNS infections ?

S. pneumoniae >>> H. influenzae > N. meningitidis

8. what is the main risk factor for transmission of leptospirosis ?

exposure of fresh water contaminated by the urine of animal reservoirs

9. What are the specific sampling and tests to be run to detect a CNS infection ? How could these test be falsely negative ? Do you know new tests that are able to specifically simultaneously detect viral and bacterial pathogens responsible of CNS infections

Cerebro-Spinal-Fluid (CSF) sampling by lumbar puncture
• cytological examination leucocytes count* • bacteriological examination : direct exam and coloration (bacteria present in >60% cases) • biochemical examination glucose in CSF is down ⬇️, and proteins in CSF are up⬆️ • if possible perform Hemoculture, film array

10. cite at least 1 specific feature found in spirochetes ?

spiral-shaped morphology, endoflagellum, linear replicons

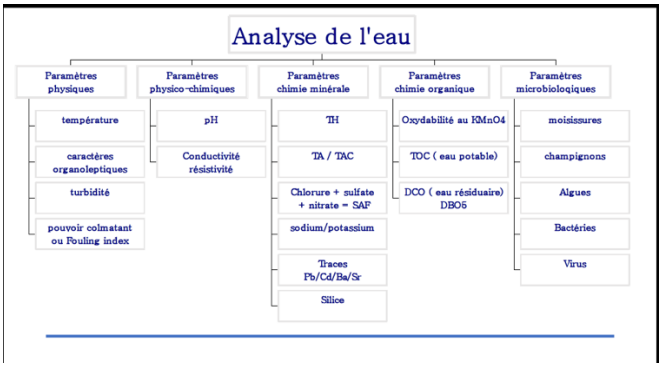
11. what are the main factors you may know relatively to the importance of bacterial-host interactions in Neisseria meningitidis infections

Bacterial virulence, host-susceptibility, previous viral infection environmental factors (dry, heat, irritating factors),

12. in 2020, what are, in resource-rich countries, the main technologies that are used in clinical microbiology laboratories. What can they be used for ? What are the main conceptual differences between these technologies relative to the classical microbiology diagnostic scheme ?

NGS and MS, yes for DST, one required culture the other not.

13. What are, with a list as exhaustive as possible and according to a given classification (physical, physico-chemical, mineral and organic chemistry, microbiology), the main parameters that are analyzed in waters ?



14. How many different types of water are they in pharma industries ?, what are the references documents in USA and in EU ? what are the specifications of these warer for endotoxins and viable germs ?

Purified water,
Germes aérobies viables totaux
PE / USP < 100 UFC / ml for purified water
< 10 UFC / 100 ml for highly purified water
< 10 UFC / 100 ml for injectable water
Endotoxines
PE / USP
ND : non detectable in purified water
< 0,25 UI / ml in highly purified water
< 0,25 UI / ml in injectable warer

15. What are the principal targets of antbacterial drugs ?, give an example for each class if possible

Cell wall synthesis inhibitors
Cell membrane synthesis disruptors
Folate synthesis inhibitors
Protein sysnthesis infhbitors
Inhibition of DNA dependant RNA polymerase
RNA synthesis inhibitors

16. from a general perspective, what are Institutional actions objectives to control AMR and how.

1. Improving awareness and understanding of AMR
2. Strengthening surveillance and research
3. Reducing the incidence of infections
4. Optimizing the use of antimicrobial agents
5. Consent to sustainable investment to fight AMR

17. Provide an historical evolutionary framework to detect Salmonella serotypes, from start of typing until today. What did it rely upon initially ? and today ? How was the link done between change of methods ?

Kaufman-White-Le Minor serotyping, then MLST, then CRISPR, then cg MLST