**SELF-ASSESMENT TEST: ADVANCED LEVEL**

1. Gram-negative, non-fermenter rods:
a) use carbohydrates via conventional metabolic rutes
b) are sporulated aerobes
c) grow on TSI agar changing its color to yellow
d) include a unique genera

2. Choose which one is not a gram-negative, non-fermenter rod:
a) *Pseudomonas aeruginosa*
b) *Acinetobacter baumannii*
c) *Moraxella catarrhalis*
d) *Escherichia coli*

3. Among factors difficulting non-fermenters identification is:
a) ability of the technicians
b) the growth rate is very fast
c) low precision of comercial equipment
d) need of specific culture media

4. One tip for identification of non-fermenters is:
a) increasing rate in immunocompromised patients
b) survival in water baths, disinfectants….
c) multidrug-resistance
d) a+b+c

5. The difference of *Pseudomonas aeruginosa* from the other species is :
a) oxidase positive
b) pinkish colonies on MacConkey agar
c) non-pigment-producer
d) lack of growth on MacConkey agar

6. The most useful technique for identification of *Acinetobacter baumannii* is:
a) 16s rRNA gene sequencing
b) detection of OXA-51 carbapenemase gene
c) API 20NE
d) detection of *gyr*B gene

7. Among virulence factors in *Pseudomonas aeruginosa* is:
a) pilin
b) neuraminidase
c) alginate
d) a+b+c

8. One characteristic of nosocomial *Pseudomonas aeruginosa* isolates is:
a) persistence
b) susceptibility to antibiotics
c) tend to produce outbreaks
d) susceptibility to disinfectants

9. Concerning *Acinetobacter baumannii,* is false that:
a) is a small rod
b) non-sporulated
c) motile
d) oxidase negative

10. The natural environment of *A. baumannii* is:

a) soil
b) food
c) water
d) hospital environment

11. One characteristic of nosocomial *A. baumannii* isolates is:
a) susceptibility to disication
b) produce nosocomial outbreaks
c) susceptibility to treatment
d) susceptibility to disinfectants

12. A risk factor of adquiring an infection caused by Acinetobacter is:
a) elderly patients
b) other diseases
c) immunosupresion
d) a+b+c

13. The percentage of resistance to imipenem in Europe (SENTRY data base) shown by *A. baumannii* is:
a) 25-35%
b) 50%
c) 75%
d) 10%

14. The most common origin of *Stenotrophomonas maltophilia* is:
a) wounds
b) urinary tract infections
c) respiratory tract infections
d) bacteriemia

15. In the study of *A. baumannii* isolates from Northern Spain it is clear that:
a) there is a high clonal diversity
b) most isolates grouped into two main clones
c) clones have not changed along time
d) isolates belonged to epidemic clones

16. In the same study resistance to imipenem:
a) increased up to 100% of isolates
b) was shown only in isolates belonging to the predominant clone
c) decreased among the epidemic clones
d) was not associated with other resistances

17. The most effective antibiotic against *A. baumannii* was:
a) cefotaxime
b) meropenem
c) gentamicin
d) amikacin

18. The Hodge test is not useful to detect:
a) OXA-type carbapenemases
b) IMP-type carbapenemases
c) aminoglycoside-inactivating enzymes
d) VIM-type carbapenemases

19. Up to now, the detection of OXA-40 carbapenemase in the study:
a) reached up to 100% of isolates
b) was produced only by isolates belonging to clone I
c) showed no variations along time
d) was detected with other carbapenemases

20. The typing method considered as international golden standard is:
a) PCR-fingerprinting
b) Pulsed Field Gel Electrophoresis
c) RFLP
d) multiplex-PCR

21. In the study, *multiplex*-PCR was used to detect :
a)  *csu*E y *omp*A virulence genes
b) OXA-type carbapenemases
c) integrons
d) a+b+c

22. Plasmids in *A. baumannii* are:
a) rare
b) unique (one per isolate)
c) very frequent
d) all of low molecular weight, < 10 Kb

23. Class 1 integrons in  *A. baumannii* isolates  are:
a) rare
b)  > 2000 bp in size
c) unique (one per isolate)
d) present in almost all isolates

24. Findings supporting the plamidic location of OXA-40 carbapenemase were:
a) detection of the gene in *Pseudomonas aeruginosa* isolates
b) detection of the gene in an *A. haemolyticus* isolate in Portugal
c) detection of the gene in an  *A. baumannii* isolate from the United States
d) a+b+c

25.  *bla* $_{OXA-40}$ gene was detected in:
a) plasmids of different sizes
b)  a 32 Kb plasmid
c)  the chromosome
d) class 1 integrons

26. The type of Insertion Sequences identified in the study were:
a)  IS*Aba* 1
b) IS*Aba* 1 y 2
c)  IS*Aba* 2
d)  IS*Aba* 1, 2 & 3

27. From the following, indicate which is a self-replicating structure:
a) plasmids
b) transposons
c) integrons
d) ninguno

28. "Consist of gene *clusters* under the control of the same promoter" :
a) plasmids
b) transposons
c) integrons
d) ninguno

29. Concerning to plasmids, indicate which of the following sentences is True:
a) single stranded, circular molecules
b) replicate independently to the chromosome
c) constant copy number
d) one bacteria can only contain one plasmid

30. The natural form of a plasmid is:
a) circular covalently closed
b) open circular
c) linear
d) a+b+c

31. Is false that the function of a plasmid is coding:
a) proteins to use unusual carbonate substrates
b) resistance to heavy metals
c) toxin synthesis
d) essential proteins for the cell

32. Plasmid incompatibility refers to:
a) two plasmids can not coexist in the same cell
b) one facilitate others replication
c) they do not share the same replication mechanism
d) they do not share partition functions

33. The use of plasmids as cloning vector is because
a) inhibit the growth of the host cell
b) they are very large
c) only prokaryotic genes can be inserted in
d) they are very small

34. Genetic *cassettes* in integrons are:
a) thousands of bases long
b) one gene without promoter
c) they can not exist as free structures
d) inserted in any direction

35. The most frequent integrons in clinical isolates are:
a) class 1
b) class 2
c) class 3
d) a+b+c

36. One disadvantage of the molecular techniques in clinical diagnosis is that:
a) it is needed a viable micro-organism
b) result depens on the phenotype
c) interpretation
d) not fast enough

37. The less useful technique for typing purposes is :
a) PCR-fingerprinting
b) Pulsed Field Gel Electrophoresis
c) Plasmid analysis
d) DNA arrays

38. Indicate wich of the following corresponds to one step of the hybridization procedure:
a) renaturalization of the target DNA
b) labeling of a single-stranded probe
c) desnaturalization of the hybridization solution
d) detection of the probe

39. Among the different formats of the hybridization technique is :
a) líquid
b) nylon membranes
c) slides

d) a+b+c

40. To detect point mutations we should use probes made of:
a) DNA
b) RNA
c) nucleotides
d) plasmids

41. Indicate the right answer concerning to DNA arrays:
a) they are based on the hybridization technique
b) only can be developed in microtitter format
c) analyse genomes partially
d) only can be made using robotics

42. Indicate the false option concerning to Pulsed Field Gel Electrophoresis applications:
a) restriction chromosomal patterns
b) low molecular weight plasmids
c) genetic mapping
d) determine the size of chromosomes

43. One disadvantage of the Polymerase Chain Reaction technique is:
a) rapidity
b) sensitivity
c) detection of fastidious organisms
d) reproducibility

44. PCR-multiplex means:
a) inclusión of more than two primers in the same reaction
b) it is not base on the conventional PCR
c) several reactions to detect several genes
d) the use of different enzymes

45. It is true that Real-Time PCR:
a) needs  at least 3 hours to obtain results
b) shows more sensitivity than convencional PCR
c) the risk of contamination is lower
d) a fluorescente dye is used for detection

**ANSWERS**

1: b
2: d
3: c
4: d
5: a
6: b
7: d
8: a
9: c
10: d
11: b
12: d
13: a
14: c
15: b
16: a
17: d
18: c
19: a
20: b
21: d
22: c
23: d
24: d
25: a
26: b
27: a
28: c
29: b
30: a
31: d
32: a
33: d
34: b
35: a
36: c
37: c
38: b
39: d
40: c
41: a
42: b
43: d
44: a
45: d