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DEPARTMENT: PRECLINICAL SCIENCES

DISCIPLINE: MICROBIOLOGY

Course responsible teacher: Associated Professor Mimi Dobrea, DVM PhD

TOPICS AND REFERENCES

Compulsory bibliography

Mimi Dobrea, Course support, PPT, 2014-2015. „The morphology and physiology of the bacteria,,. The complete material was sent to the students in electronic format.

Optional Bibliography

Carter G.R., M.M. Chengappa – Essentials Veterinary Bacteriology and Mycology Ed. Lea&Febiger, London 1999.

QUESTIONNAIRE

Questions with five possible answers, of which only one is correct.

The plasmids are made up of:

- A. DNA extrachromosomal
- B. mRNA
- C. tRNA
- D. rRNA
- E. Only from intrachromosomal DNA

In nature bacteria are found:

- A. Only in the form of spores
- B. Only in the form of vegetative cells
- C. Only in the form of vegetative cells, or alternatively in the form of vegetative cells and in the form of spores
- D. Only in the form of resistance
- E. No answer is true

The slowing of bacterial multiplication in a liquid medium in the stationary phase is determined by:

- A. Depletion of nutrients from the culture medium
- B. Achieving a maximum cell concentration/volume unit
- C. Accumulation of metabolites in the culture medium
- D. Drastic increase of the pH in the culture medium
- E. All answers are wrong

The obligatory component of the envelope of a bacterial vegetative cell is:

- A. The cell wall
- B. The cytoplasmic membrane
- C. Capsule
- D. Glicocalix
- E. The cell wall and cytoplasmic membrane

The mesosomes are structures that derive from:

- A. Cytoplasmic membrane
- B. Cell wall
- C. Capsule
- D. Glicocalix
- E. Bacteria do not have mesosomes

Select the phase of multiplication of bacteria in liquid media when it is recommended to perform bacteriological examinations:

- A. Exponential or logarithmic phase
- B. Lag phase
- C. Decline phase
- D. Stationary phase
- E. Latency phase

Under the action of penicillin and lysozyme, Gram positive bacteria turn into:

- A. Spheroplasts
- B. Protoplasts
- C. R form
- D. S form
- E. M form

In Gram negative bacteria the basal corpuscle of the flagellum consists of:

- A. A single disc
- B. Two discs
- C. Three discs
- D. Four discs
- E. Gram negative bacteria do not possess the basal corpuscle

Which of the following processes indicates the end of the germination:

- A. Hydration of the sporoplasm
- B. Activation of enzymatic equipment
- C. Resumption of the multiplication
- D. Initiation of biosynthesis processes
- E. None of these processes

Peritrichous bacteria show:

- A. Some flagella at each end
- B. Some flagella at one end
- C. Several flagella arranged over the entire surface of the cell
- D. One flagellum at each end

- E. A single lateral flagellum

The sizes of bacteria are measured in:

- A. Millimeters
- B. Microns
- C. Nanometers
- D. Angstroms
- E. All answers are wrong

The cytoplasmic membrane of bacterial cell does not content sterols, except:

- A. Leptospira
- B. Mycoplasma
- C. Mycobacterium
- D. Pathogenic streptococci
- E. None variant is true

According to their location, the mesosomes can be:

- A. Vesicular, lamellar, tubular
- B. Tubular, perinuclear, septal
- C. Lateral, lamellar, septal
- D. Septal, parietal, perinuclear
- E. All answers are wrong

Select the structure of the spore which contains the DNA:

- A. protoplast
- B. Intine
- C. Cortex
- D. Exine
- E. Sporangium

The bacteria which need oxygen in a smaller concentration than in air, are including in following respiratory type/subtype:

- A. Aerobic type
- B. Strict aerobic subtype
- C. Anerobic type/strict anaerobic subtype
- D. Anerobic type/microaerophilic subtype
- E. Aerobic-anaerobic facultative type

Which bacterial species produces a microcapsule?

- A. Clostridium perfringens
- B. Pasteurella multocida
- C. Klebsiella pneumoniae
- D. Bacillus anthracis
- E. Streptococcus pneumoniae

Clostridium tetani is including in the following respiratory type:

- A. Aerobic type
- B. Strict aerobic subtype
- C. Anaerobic type/strict anaerobic subtype

- D. Anaerobic type/microaerophilic subtype
- E. Aerobic-anaerobic facultative type

The bacterial ribosomes have the sedimentation constant:

- A. 20 S
- B. 70 S
- C. 50 S
- D. 30 S
- E. 40 S

Bacillus subtilis is including in the following respiratory type:

- A. Anaerobic type
- B. Strict aerobic subtype
- C. Anerobic type/strict anaerobic subtype
- D. Anerobic type/microaerophilic subtype
- E. Aerobic-anaerobic facultative type

Select the bacterial forms without cell wall:

- A. Vegetative forms
- B. Spore forms
- C. L forms
- D. S forms
- E. R forms

The pigment pyocyanin is synthesized by:

- A. Pseudomonas aeruginosa
- B. Staphylococcus aureus
- C. Corynebacterium equi
- D. Serratia marcescens
- E. None of these species

The specific location of the Clostridium tetani spore is:

- A. Subterminal
- B. Central
- C. Terminal
- D. Lateral
- E. None of these locations

The structural elements of a bacterial spore from inside to outside are the following:

- A. Sporal protoplast, intine, cortex, exine
- B. Intine, sporal protoplast, cortex, exine
- C. Cortex, exine, sporal protoplast, intine,
- D. Exine, sporal protoplast, intine, cortex,
- E. Sporal protoplast, exine, cortex, intine

The main multiplication process of the bacteria is:

- A. Conjugation
- B. Branching
- C. Elementary bodies

- D. Binary fission
- E. Budding

The active metabolic form of the bacteria is:

- A. Vegetative cell
- B. Spore
- C. Vegetative cell and the spore
- D. Sporangium
- E. None answer is true

Bacterial cytoplasmic membrane contains:

- A. Phospholipids (amphipathic)
- B. Peptidoglycan
- C. Lipide A
- D. Teichoic acid
- E. Lipoteichoic acid

The chemical composition of the bacterial pili is:

- A. Phospholipids
- B. Peptidoglycan
- C. Polysaccharides
- D. Nucleic acids
- E. Protein

Select the wrong statement about the F pili:

- A. They have an axial channel
- B. They contain molecules of pilin
- C. They are involved in conjugation
- D. They form a bridge between donor and acceptor cells
- E. They are involved in sporogenesis process

The majority of bacteria contain:

- A. A variable number of chromosomes
- B. Only one chromosome
- C. The chromosome is not a compulsory structure of bacteria
- D. The bacteria do not have chromosomes
- E. All answers are wrong

The type of movement of mobile bacteria is determined by the sense of rotation of disc:

- A. S
- B. M
- C. P
- D. L
- E. None of these discs

The biochemical structure of the cytoplasmic membrane contains:

- A. One simple layer of phospholipids
- B. A bilayer of proteins
- C. A bilayer of carbohydrates

- D. A bilayer of phospholipids
- E. One simple layer of lipids

Which bacterial species synthesize a polypeptide capsule:

- A. *Bacillus anthracis*
- B. *Klebsiella pneumoniae*
- C. *Streptococcus pneumoniae*
- D. *Pasteurella multocida*
- E. None of these species

The smallest bacteria are included in the genus:

- A. *Clostridium*
- B. *Pasteurella*
- C. *Staphylococcus*
- D. *Bacillus*
- E. All answers are wrong

The periplasmic space is met:

- A. Only in mycoplasmas
- B. Only in Gram positive bacteria
- C. Only in Gram negative bacteria
- D. All bacteria
- E. Only in spore forming bacteria

The ribosomes from biochemical point of view contain:

- A. Ribonucleoproteins
- B. Phospholipids
- C. Polysaccharides
- D. Inorganic polymers
- E. All answers are wrong

The largest bacteria from veterinary bacteriology are included in the genus:

- A. *Clostridium*
- B. *Pasteurella*
- C. *Brucella*
- D. *Salmonella*
- E. *Staphylococcus*

The sarcina is a group of:

- A. Two cocci
- B. Three cocci
- C. Four cocci
- D. Eight cocci
- E. All answers are wrong

The bacteria of which genus contain many lipids:

- A. *Staphylococcus*
- B. *Listeria*
- C. *Mycobacterium*

- D. Clostridium
- E. Bacillus

Select the correct variant about the content in water of bacterial cell:

- A. 75 – 85 %
- B. 12 – 20 %
- C. 5 – 30 %
- D. 40 – 60 %
- E. 50 – 60 %

Select a spirochete:

- A. Staphylococcus
- B. Pseudomonas
- C. Salmonella
- D. Streptococcus
- E. Leptospira

Carotenoid pigments protect the bacterial cell against:

- A. Electromagnetic waves
- B. Antibiotics
- C. Chemotherapeutics
- D. Disinfectants
- E. Light waves, especially UV

The generation time (the interval between two divisions) in majority of bacteria is:

- A. 2- 3 minutes
- B. 20- 30 minutes
- C. 24 hours
- D. 60 minutes
- E. 930-1080 minutes

How is the diameter of the spore in Clostridium genus compare to the transversal diameter of the vegetative cel :

- A. Larger than it
- B. Equals
- C. Smaller
- D. Depending on the species (sometimes larger sometimes smaller than it)
- E. All answers are wrong

All bacterial spores are destroyed to:

- A. 120°C wet heat and 180°C dry heat
- B. 100°C wet heat and 112°C dry heat
- C. 65°C wet heat and 80°C dry heat
- D. 120°C wet heat and 180°C dry heat
- E. 112°C wet heat and 120°C dry heat

Which bacterial species synthesize a mucous (diffuse) capsule:

- A. Bacillus anthracis
- B. Klebsiella pneumoniae

- C. *Streptococcus pneumoniae*
- D. *Escherichia coli*
- E. *Pasteurella multocida*

Stopping of the bacterial multiplication in a liquid medium, during the decline phase is determined by:

- A. Depletion of the nutrients from the culture medium
- B. The medium becomes toxic
- C. Accumulation of metabolites in the culture medium
- D. Drastic decrease of the pH of the culture medium
- E. All answers are correct

Basal corpuscle of the flagella of Gram positive bacteria is made up from:

- A. Four discs
- B. Three discs
- C. Two discs
- D. One disc
- E. None answer is true

Which components are compulsory for the bacterial cell?

- A. Wall cell, nuclear material, ribosomes, capsule
- B. Cytoplasmic membrane, capsule, ribosomes
- C. Cytoplasmic membrane, ribosomes, nuclear material
- D. Capsule, flagella, ribosomes
- E. Wall cell, capsule, cytoplasmic membrane

Which statement about the bacterial cell wall is wrong?

- A. Maintains the shape of the cell
- B. Mediates the transport of different substances between the medium and the cell
- C. Osmotic barrier
- D. The support for different receptors
- E. Compulsory component of the bacteria

Select the true statement about the bacterial cytoplasm:

- A. It is a facultative component
- B. Has cytoplasmic currents
- C. Has gel consistency
- D. Contains mitochondria
- E. Contains endoplasmic reticulum

Lophotrichous bacteria have:

- A. One single polar flagellum
- B. Many flagella on one end
- C. Many flagella to each end
- D. Many flagella on the all surface of the cell
- E. All answers are wrong

The cellulose is in the chemical composition of the bacteria:

- A. Only in the vegetative cells

- B. Only in spores
- C. In the vegetative cells and in spores
- D. Bacteria do not contain cellulose
- E. All statements are wrong

Select the wrong statement about the heterotroph nutritive type:

- A. Organic carbon is the carbon source
- B. Organic nitrogen is the nitrogen source
- C. The energy sources are the biochemical reactions
- D. The saccharides can be carbon source
- E. CO₂ can be carbon source

The bacterial episomes are:

- A. Groups of ribosomes
- B. They appear during the intense synthesise process in the cell
- C. They contain ribonucleoproteins
- D. They are integrative plasmids
- E. All answers are wrong

The polysaccharide O from the structure of cell wall of Gram negative bacteria has the role of receptor for:

- A. Bacteriophage
- B. Lectins
- C. Enzymes
- D. Vitamin A
- E. Complement

The component parts of the flagellum are the following:

- A. Basal corpuscle, hook (joint), the filament
- B. Basal corpuscle and the filament
- C. Hook or joint and the filament
- D. The helical filament that contains flagellin
- E. All answers are wrong

Streptococcus pneumoniae:

- A. It is drop or flame in shape
- B. It forms group of two (diplo)
- C. The group has the aspect of 8
- D. The group has a common capsule
- E. All answers are true

The heterotrophic bacteria, according to the species can use the following substances, except:

- A. Carbon dioxide
- B. Glucose
- C. Sucrose
- D. Starch
- E. Lactose

Select a specific substance of the spore:

- A. DNA
- B. Ribosomes
- C. Dipicolinic acid
- D. Free water
- E. Calcium

How many spores are formed inside of a sporogenic vegetative cell?

- A. Two spores
- B. One spore
- C. Three spores
- D. A variable number of spores
- E. Four spores

The flagellin from the chemical composition of flagellum represents:

- A. The antigen O
- B. The antigen K
- C. The antigen H
- D. The antigen Vi
- E. The viral antigen

The immobile bacteria, without flagella are named:

- A. Atrichous
- B. Peritrichous
- C. Lophotrichous
- D. Amfitrichous
- E. Monotrichous

Select the incorrect statement according to the heterotrophic bacteria:

- A. Some use amino acids
- B. Some use peptones
- C. Some use macromolecules of proteins
- D. Some use urea
- E. Some use ammonia

Select a bacterial species that is coffee bean in shape:

- A. *Neisseria gonorrhoeae*
- B. *Streptococcus pneumoniae*
- C. *Enterococcus*
- D. *Corynebacterium*
- E. All answers are wrong

Vibrio cholerae has only one flagellum on one end. In which group is it included?

- A. Lophotrichous
- B. Atrichous
- C. Peritrichous
- D. Amfitrichous
- E. Monotrichous

Which of the following bacteria has a true capsule?

- A. *Pasteurella multocida*
- B. *Klebsiella pneumoniae*
- C. *Bacillus anthracis*
- D. All answers are true
- E. All statements are wrong

Using Gram staining method, Gram positive bacteria are colored in:

- A. Red
- B. Blue
- C. Violet
- D. Green
- E. Yellow

The plasmids that have an independent existence and temporarily can integrate into chromosome are:

- A. Episomes
- B. Ergosomes
- C. Mesosomes
- D. Ribosomes
- E. Inclusions

The majority of plasmids are:

- A. Supercoiled, circular double- stranded DNA molecules
- B. Uncoiled, circular double- stranded DNA molecules
- C. Supercoiled, circular single- stranded DNA molecules
- D. Supercoiled, circular double- stranded RNA molecules
- E. Supercoiled, circular single- stranded RNA molecules

Which component of the bacterium has role in the protein synthesis?

- A. Episomes
- B. Vacuoles
- C. Mesosomes
- D. Ribosomes
- E. Inclusions

The roles of the cytoplasmic membrane are:

- A. Selective biological filter
- B. In the replication of bacteria
- C. In the respiratory process of bacteria
- D. The place of enzymatic system
- E. All variants are correct

Which component of the Gram negative bacteria has the role of endotoxin:

- A. Polysaccharide O
- B. LPS (lipopolysaccharides complex)
- C. Periplasmic space
- D. Layer of peptidoglycan
- E. Cell membrane

Protoplasts are obtained by treatment of which type of bacteria with lysozyme or penicillin?

- A. Gram positive bacteria
- B. Gram negative bacteria
- C. L forms of bacteria
- D. S forms of bacteria
- E. R forms of bacteria

Defective wall bacteria include the following except:

- A. S forms of bacteria
- B. L forms of bacteria
- C. Protoplasts
- D. Spheroplasts
- E. Mycoplasma

Select the correct statement about the bacterial flagella:

- A. in Gram positive bacteria the blepharoplast (basal corpuscle) is made from 2 discs
- B. in Gram negative bacteria the blepharoplast (basal corpuscle) is made from 4 discs;
- C. M disc is located in the cytoplasmic membrane
- D. P disc is placed in peptidoglycan layer
- E. All answers are true

In which phase of bacterial growth in liquid medium, the activity of cells is the most intense?

- A. Phase of decline
- B. Lag phase
- C. Stationary phase
- D. Exponential phase
- E. Phase of adaptation of bacteria to the medium conditions

Which are the triggering factors for sporulation:

- A. Depletion of nitrogen
- B. Exposure to suboptimal temperature
- C. High cells density
- D. Depletion of carbon
- E. All these factors

What happens in the first phase of the sporulation?

- A. Spore septum formation
- B. Cortex formation
- C. Spore maturation
- D. The lysis of mother cell
- E. Chromosome replication

What happens in the last phase of the sporulation?

- A. Spore septum formation
- B. Cortex formation
- C. Spore maturation
- D. Lysis of the mother cell
- E. Chromosome replication

Which factors participate in the resistance of the spore?

- A. Keratin like protein
- B. Calcium dipicolinate
- C. Low free water content
- D. Impermeability of spore coat
- E. All these factors

At what level of the bacterial envelope (shell), the L disc of the blepharoplast (basal corpuscle) is located?

- A. Outer membrane
- B. Peptidoglycan
- C. Cytoplasmic membrane
- D. Above the cytoplasmic membrane
- E. All variants are wrong

Select the correct statement about the bacterial vacuoles:

- A. They are intracytoplasmic structures
- B. They are more common in the old bacterial cells
- C. They can be inorganic polymers
- D. They can be organic polymers
- E. All answers are correct

Which bacteria are baseball bat or cracker in shape?

- A. *Bacillus anthracis*
- B. *Corynebacterium*
- C. *Fusobacterium*
- D. *Streptococcus pneumoniae*
- E. *Neisseria gonorrhoeae*

Select the correct statement about the bacterial inclusions:

- A. They are intracytoplasmic structures
- B. They are more common in the old bacterial cell
- C. They can be inorganic polymers
- D. They can be organic polymers
- E. All answers are correct

Which structure of the bacterial spore corresponds with the bacterial cell wall of the vegetative cell?

- A. Cortex
- B. Intine
- C. Sporangium
- D. Exine
- E. Protoplast

Select the prokaryotic microorganisms:

- A. Filamentous fungi
- B. Yeasts
- C. Bacteria
- D. Viruses

E. Prions

Which structure of the bacterial spore corresponds with the cytoplasmic membrane of the vegetative cell?

- A. Cortex
- B. Intine
- C. Sporangium
- D. Exine
- E. Sporal protoplast

Select a bacterial species which is mobile to 20-25°C and immobile to 37°C:

- A. *Streptococcus pneumoniae*
- B. *Listeria monocytogenes*
- C. *Staphylococcus aureus*
- D. *Bacillus anthracis*
- E. All responses are wrong

The phase of multiplication of the bacteria in liquid medium which the cell divisions are absent is:

- A. Exponential phase
- B. Lag phase
- C. Stationary phase
- D. Decline phase
- E. Cell divisions take place in all these phases

Select the correct order of the shells of an encapsulated bacterium from outside to inside:

- A. Capsule, wall cell, cytoplasmic membrane
- B. Capsule, cytoplasmic membrane, wall cell,
- C. Wall cell, capsule, cytoplasmic membrane
- D. Cytoplasmic membrane, wall cell, capsule,
- E. Cytoplasmic membrane, capsule, wall cell,

Select one from the following structures that is absent from bacteria:

- A. Ribosomes
- B. Cytoplasmic membrane
- C. Nuclear apparatus
- D. Cytoplasm
- E. Endoplasmic reticulum

The capsule of the most bacteria is formed from:

- A. Proteins
- B. Phospholipids
- C. Polysaccharides
- D. Peptides
- E. Lipids

Which from the following substances has a negative chemotactic effect for heterotroph bacteria?

- A. Amino acids
- B. Carbohydrates
- C. Lipids

- D. Peptides
- E. Hydrogen ions

Which bacteria contains teichoic acids:

- A. Gram negative
- B. Mycoplasma
- C. Gram positive
- D. Leptospira
- E. Salmonella

At what level of the bacterial envelope (shell), the L disc of the blepharoplast (basal corpuscle) of the mobile Gram positive bacteria is located?

- A. Outer membrane
- B. Peptidoglycan
- C. Cytoplasmic membrane
- D. Periplasmic space
- E. These bacteria don't have L disc

Select the function of bacterial ribosomes:

- A. They represent reserve substances
- B. They are implicated in chemotaxis
- C. They represent the site of protein synthesis
- D. They are implicated in aerotaxis
- E. None answer is true

The ability of some bacteria to present themselves differently in terms of shape, size and group is called:

- A. Polyribosomes
- B. Aerotaxis
- C. Polymorphism
- D. Chemotaxis
- E. Germination

Minichromosomes are:

- A. Multiple chromosomes in some bacteria
- B. Small pieces of RNA
- C. Sex pilus
- D. Plasmids
- E. All statements are wrong

Teichoic acids:

- A. They are characteristic of Gram negative bacteria
- B. Lipoteichoic acids are anchored to the cell wall
- C. Teichoic acids are fixed to the cytoplasmic membrane
- D. They protect bacteria against phagocytosis
- E. All statements are true

Select the wrong statement about the bacterial flagella:

- A. The origin of the filament is the M disc

- B. Rotational energy is provided by protons (hydrogen ions) crossing the membrane
- C. Rotation of the filament clockwise determines the moving of bacterium in a straight line
- D. Flagella contain protein molecules of flagellin
- E. Flagellin has antigenic properties

Select the compulsory structures from the bacterial cytoplasm:

- A. Plasmids, inclusions, chromosome
- B. Chromosome, ribosomes
- C. Ribosomes, plasmids
- D. Plasmids, inclusions, chromosome, vacuoles
- E. Plasmids, inclusions, chromosome, vacuoles, ribosomes

The phospholipids molecules are placed in the double layer of the membrane:

- A. With the hydrophilic end to the outside
- B. With the hydrophobic end to the outside
- C. With the hydrophilic ends face-to-face
- D. Only those on the inner layer with the hydrophobic ends to the outside
- E. All statements are wrong

It can be stated about the proteins into the cytoplasmic membrane:

- A. Intrinsic proteins are usually transmembrane
- B. Extrinsic proteins are exposed only on the external surface
- C. Extrinsic proteins are exposed only on the internal surface
- D. All membrane proteins are transmembrane
- E. All statements are wrong

It can be stated about the cell wall:

- A. It is an optional structure
- B. It is located on the outside of the cell membrane
- C. It has pores
- D. It contains peptidoglycan
- E. All statements are correct

Select the correct statements regarding to the role of the bacterial capsule:

- A. Protect the cell against the desiccation
- B. Represents a virulence factor
- C. It has an antigenic role
- D. It is involved in the adhesion of the bacterium to the solid supports
- E. All statements are correct

Which type of RNA is not present in the bacterial cell?

- A. Transport RNA
- B. Mitochondrial RNA
- C. Messenger RNA
- D. Ribosome RNA
- E. Soluble RNA

Select the incorrect statement regarding to the membrane role:

- A. It is a mechanical filter

- B. It is the site of the bacterial respiratory processes
- C. It is involved in the synthesis of the peptidoglycan
- D. Synthesis and secretion of the exoenzymes
- E. It is the site of enzymatic systems

The bacterial transport systems are located in:

- A. Cell wall
- B. Capsule
- C. Membrane
- D. Cytoplasm
- E. Ribosomes

Tinctorial affinity of the bacteria is determined by the chemical composition of:

- A. The capsule
- B. The membrane
- C. The wall
- D. The mesosomes
- E. The chromosome

Select the incorrect statement regarding to the bacterial enzymes:

- A. The exoenzymes are released into the extracellular environment
- B. The constitutive enzymes are synthesized under certain environmental conditions
- C. Adaptive enzymes are synthesized in the presence of the substrate
- D. Endoenzymes remain in the bacterial cell
- E. Exoenzymes act outside the cell

Tinctorial affinity of the bacteria is determined by the chemical composition of:

- A. The capsule
- B. The membrane
- C. The wall
- D. The mesosomes
- E. The chromosome

The specific location of the Bacillus anthracis spore is:

- A. Subterminal
- B. Central
- C. Terminal
- D. Lateral
- E. None of these locations

Select the bacterial genus which includes acid fast bacteria:

- A. Mycobacterium
- B. Staphylococcus
- C. Streptococcus
- D. Salmonella
- E. Bacillus

How many types of proteins has the small subunit of ribosomes:

- A. 21

- B. 34
- C. 2
- D. 1
- E. The number is variable

How many types of RNA has the small subunit of ribosomes:

- A. 21
- B. 34
- C. 2
- D. 1
- E. The number is variable

How many types of RNA has the large subunit of ribosomes:

- A. 21
- B. 34
- C. 2
- D. 1
- E. The number is variable

Select the correct statement about the cytoplasm:

- A. It is a gel-like structure
- B. Here the cell replication is carried out
- C. It is the place where the cell growth is carried out
- D. It is the place for metabolic reactions of the cell
- E. All statements are true

Select the incorrect statement regarding to the bacterial cytoplasm:

- A. The cytoplasm contains mitochondria
- B. It contains ribosomes
- C. Some species contains plasmids
- D. It can contain inclusions
- E. It is a compulsory structure of bacterial cell

Select a bacterial species that is drop or flame in shape:

- A. *Neisseria gonorrhoeae*
- B. *Streptococcus pneumoniae*
- C. *Enterococcus*
- D. *Corynebacterium*
- E. All answers are wrong

Which is correct about the bacterial nucleoid:

- A. It has not nuclear membrane
- B. It has not nucleolus
- C. The majority of bacteria contains a single chromosome
- D. The chromosome and plasmids forms the genome
- E. All statements are correct

Using Gram staining method, Gram negative bacteria are colored in:

- A. Red

- B. Blue
- C. Violet
- D. Green
- E. Yellow

In which phase of bacterial replication in liquid medium, because of a maximum density of bacteria is reached, some bacteria produce toxins.

- A. Stationary phase
- B. Exponential phase
- C. Lag phase
- D. Declin phase
- E. Logarithmic phase

The bacterial nuclear material:

- A. The majority of bacteria have one chromosome
- B. The Brucella Genus have 2 circular chromosomes,
- C. Borrelia burgdorferi has one linear chromosome
- D. The nucleoid does not have nuclear membrane
- E. All statements are correct

Which microorganisms are prokaryotic:

- A. ARN viruses
- B. ADN viruses
- C. Bacteria
- D. Yeasts
- E. Fungi

Select the chromogenic species of bacteria:

- A. Staphylococcus aureus
- B. Pseudomonas aeruginosa
- C. Corynebacterium equi
- D. Mycobacterium tuberculosis
- E. All responses are correct

The specific location of the Clostridium perfringens spore is:

- A. Subterminal
- B. Central
- C. Terminal
- D. Lateral
- E. None of these locations

Select the correct statement about the roles of cytoplasmic membrane:

- A. Synthesis of murein
- B. Synthesis and excretion of exoenzymes
- C. In bacterial replication
- D. Maintains constant pH
- E. All of these functions

Select a species that includes bacteria from strict aerobic respiratory subtype:

- A. Staphylococcus aureus
- B. Salmonella typhimurium
- C. Mycobacterium tuberculosis
- D. Fusobacterium necrophorum
- E. Escherichia coli

Which microorganisms contain in their wall chitin or glucans?

- A. ARN viruses
- B. ADN viruses
- C. Gram positive bacteria
- D. Gram negative bacteria
- E. Fungi

Which species has a asymmetric spore (it is on side of bacterial cell placed):

- A. Bacillus anthracis
- B. Clostridium tetani
- C. Bacillus laterosporus
- D. Clostridium botulinum
- E. Clostridium perfringens

The tetrad is a group of:

- A. Two cocci
- B. Three cocci
- C. Four cocci
- D. Eight cocci
- E. All answers are wrong

The majority of vegetative cells are destroyed at the temperature:

- A. 30°C
- B. 40°C
- C. 50°C
- D. 60°C
- E. None of these values of temperatures

How many types of proteins has the large subunit of ribosomes:

- A. 21
- B. 34
- C. 2
- D. 1
- E. The number is variable

The smallest bacteria are included in the genus:

- A. Clostridium
- B. Staphylococcus
- C. Bacillus
- D. Brucella
- E. All answers are wrong

Which component of bacterial cell contains ribonucleoproteins:

- A. The plasmids
- B. The wall
- C. The ribosomes
- D. The nucleoid
- E. The membrane

Select a genus that includes large bacteria:

- A. Salmonella
- B. Staphylococcus
- C. Escherichia
- D. Bacillus
- E. Streptococcus

Select the pathogenic bacterial species:

- A. Bacillus anthracis
- B. Mycobacterium tuberculosis
- C. Listeria monocytogenes
- D. Clostridium tetani
- E. All these bacteria are pathogenic

Select a species that includes bacteria from strict aerobic respiratory subtype:

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- D. Fusobacterium necrophorum
- E. Escherichia coli

Select the wrong statement about the heterotroph nutritive type of bacteria:

- A. Organic carbon is the carbon source
- B. Organic nitrogen is the nitrogen source
- C. The energy sources are the biochemical reactions
- D. The saccharides can be carbon source
- E. NH_3 can be nitrogen source

Select the wrong statement about the heterotroph nutritive type:

- A. Organic carbon is the carbon source
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- D. The saccharides can be carbon source
- E. CO_2 can be carbon source

What does peptide part of the peptidoglycan of the most bacteria contain?

- A. L-alanine
- B. D-glutamine
- C. L-lisine
- D. D-alanine
- E. All responses are correct

Which component of the bacterium is the result of an amplification of the membrane?

- A. Episomes
- B. Vacuoles
- C. Mesosomes
- D. Ribosomes
- E. Inclusions

In which bacterial component we can meet poli-beta-hidroxiturata?

- A. Episomes
- B. Vacuoles
- C. Mesosomes
- D. Ribosomes
- E. Inclusions

Select the correct statement about the bacterial vacuoles:

- A. They are intracytoplasmic structures
- B. They are more common in the old bacterial cell
- C. They can be inorganic polymers
- D. They can be organic polymers
- E. All answers are correct

Spheroplasts are obtained by treatment of which type of bacteria with lysozyme or penicillin?

- A. Gram positive bacteria
- B. Gram negative bacteria
- C. L forms of bacteria
- D. S forms of bacteria
- E. R forms of bacteria

In which phase of bacterial growth in liquid medium, the bacteria try to adapt to the new medium conditions?

- A. Phase of decline
- B. Logarithmic phase
- C. Stationary phase
- D. Exponential phase
- E. Lag Phase

Another name for plasmids is:

- A. Mesosomes
- B. Ribosomes
- C. Minichromosomes
- D. Ergosomes
- E. Fimbriae

Which bacterial species is the largest bacterium known in veterinary medicine?

- A. Clostridium septicum
- B. Treponema pallidum
- C. Borrelia burgdorferi
- D. Pasteurella multocida
- E. Listeria monocytogenes

Select the correct statement about the teichoic acids:

- A. Lipoteichoic acid are covalently linked to the membrane
- B. Teichoic acid are covalently linked to the peptidoglycan
- C. They represent the major surface antigen of Gram positive bacteria
- D. They contain ribitol and glycerol residues
- E. All statements are correct

The microorganisms which require increased concentration of CO₂ are named:

- A. Microaerophilic
- B. Aerotolerant
- C. Strict anaerobic
- D. Capnophilic
- E. Strict aerobic

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