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Ans1: Parasites:

Parasites is defined as an animal or plant that lives in or upon another organism (host) and draws its nutrient directly from it. Eg. Include bacteria , viruses, fungi , protozoas and helminths .

ii) Endoparasite :

The endoparasites that live within the host are called endoparasites . Invaaion by such parasites is infection. Eg. Leishmania

Types of endoparasites :

a) Obligate parasites:

The parasites that cannot exist without ahost are called obligate parasites. Eg. Toxoplasma gonodii

b) Facultative parasites:

The parasites that live a parasitic or free-living exiatance when an opportunity arises are called facultative parasites. Eg. Naegleria fowleri

c) Accidental parasites:

The parasites that attack an unusal hoat are called accidental parasites. Eg. Echinococcus granulousus.

d) Abberant parasites:

The parasites that during migration in the host, reach a site where they cannot live or develop further are called abberant parasites . Eg. Toxocora

ii) Ectoparasite:

The parasite that live on the outer surface or in the superficial tissues of the host are called ectoparasites . Infection caused by ectoparasites is called infestation Eg.Lice

Q2: Protozoa:

The word protozoa is come from Greek protozoon word meaning "first animal". Protozoa are unicellular (may be multicellular) Eukaryotic microorganism .

Protozoa constitute a large group of about 65,000 species .Most of which are harmless free living and inhabits water and soil .

A few species are pathogenic in nature parasitize human and othe animals causing hundreds of million of infections in a year around the world .

Characteristics:

Mostly unicellular organism with fully functional cell .

Live freely, may be parasitic or symbiotic.

Protozoa are chemo-hetrotrops .

They are motile have locomotive organelles . Eg. Flagella and cillia for movements.

Morphology:

Protozoa are eukaryotic resemble to animal cell , contain major cell organelles (including nucleus, mitochondria) . They are microscopic in size less than 50 micro meter . Their organelles are highly specialized for feeding, reproduction and movement .

The cytoplasm of protozoa are divided into an outer layer called Ectoplasm and inner layer called Endoplasm .

Classification of protozoa :

Protozoa are classified on the basis of their motility and method of reproduction . They are classified into four main types .

i) Sarcodina :

These are protozoa with organ of locomotion as pseudopodia which means false foot . Eg . Amoeba

ii) Mastigophora :

These are protozoa with organs of locomotion as flagella . The number of flagella are different in different protozoa .

iii) Cilliata:

These are protozoa which have organs of locomotion as cillia . Cillia are small hair like structures seen .These are many in numbers on the body of animals .Eg. paramecium

iv) Sporozoa:

These are protozoa which have no organs of locomotion . The protozoa phylum has been divided into four subphyla according to revised classification of protozoa done by Holigberg in 1964 .The four subphyla are:

i) Sarcomastigophora

ii) Sporozoa

iii) Cindospora

iv) Ciliophora

Reproduction in protozoa:

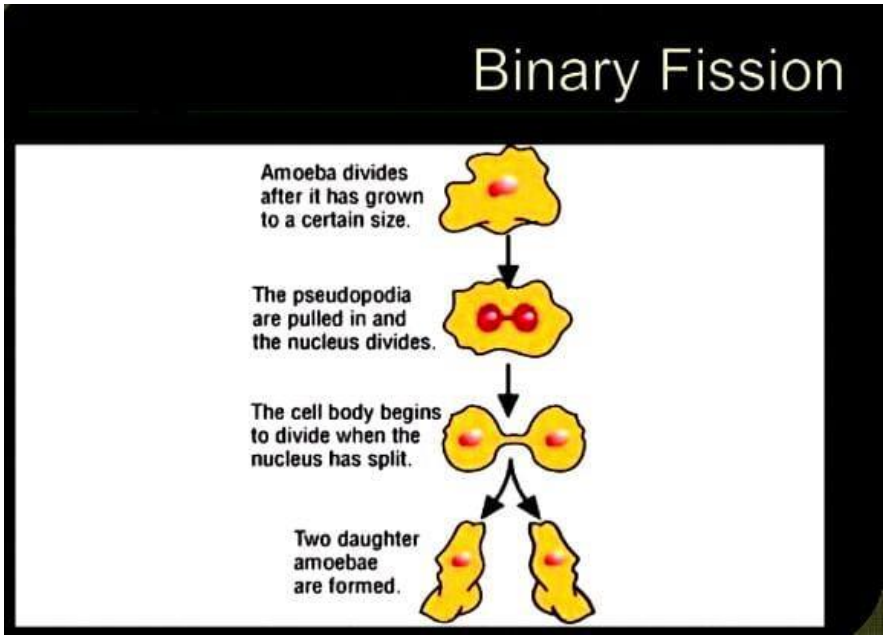
Protozoa can reproduce their off spring by both sexual and asexual methods .

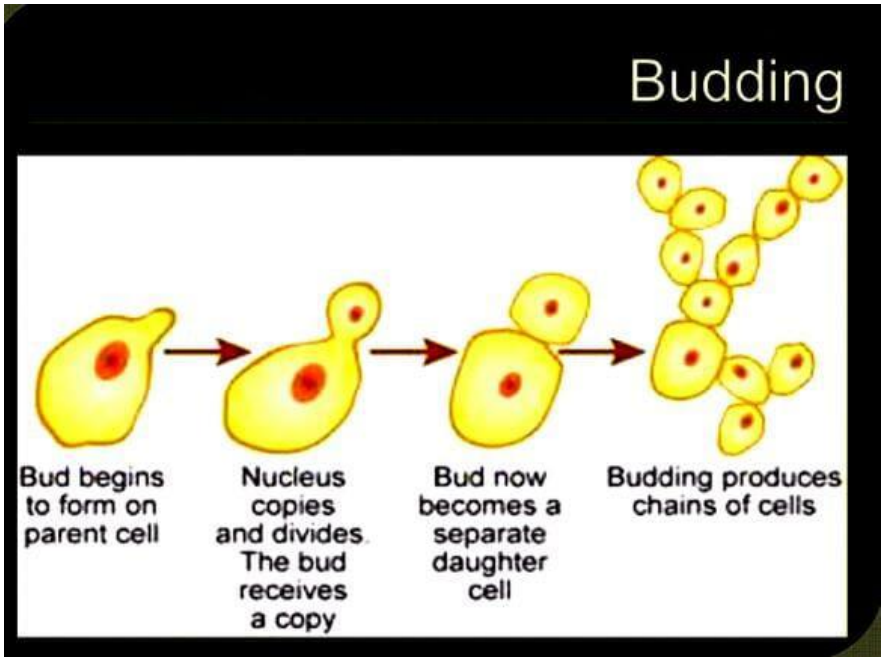
Asexual methods of reproduction are:

. Budding

. Binary fission

. schizogony or multiple fission.





Sexual methods:

. Conjugation

. Gametogony

Conjugation:

Two protozoa meet together and exchange their genetic material .

Gametogony:

Union of two sexually differentiated cells.

Ans 3:

Paramecium:

Cytoplasm:

Supports the internal structures and shape and consistency of the cell .

Cillia: movement , food intake receptors

Micronucleus :reproduction

Macronucleus : non-reproductive cell, function e.g. metabolism

Anal pores : feces secretion

Food vacuole :

Digests the food

Contractile vacuole :

Expells excess liquid on contraction

Oral groove : (cytosome) food intake through cillia (water currents)

Euglena :

Cytoplasm : supports the internal structures and shape and consistency of the cell .

Nucleus :

Contain the genetic material (brain of the cell)

Nucleolus : contributes to ribosome synthesis .

Chloroplast : photosynthesis .

Stigma (eyespot) :

Allows the cell to sense light direction and intensity qnd respond to it .

Photoreceptor :

Light-sensitive protein involved in the sensing and response to light .

Contractile vacuoles :

Expels excess water .

Flagellum :

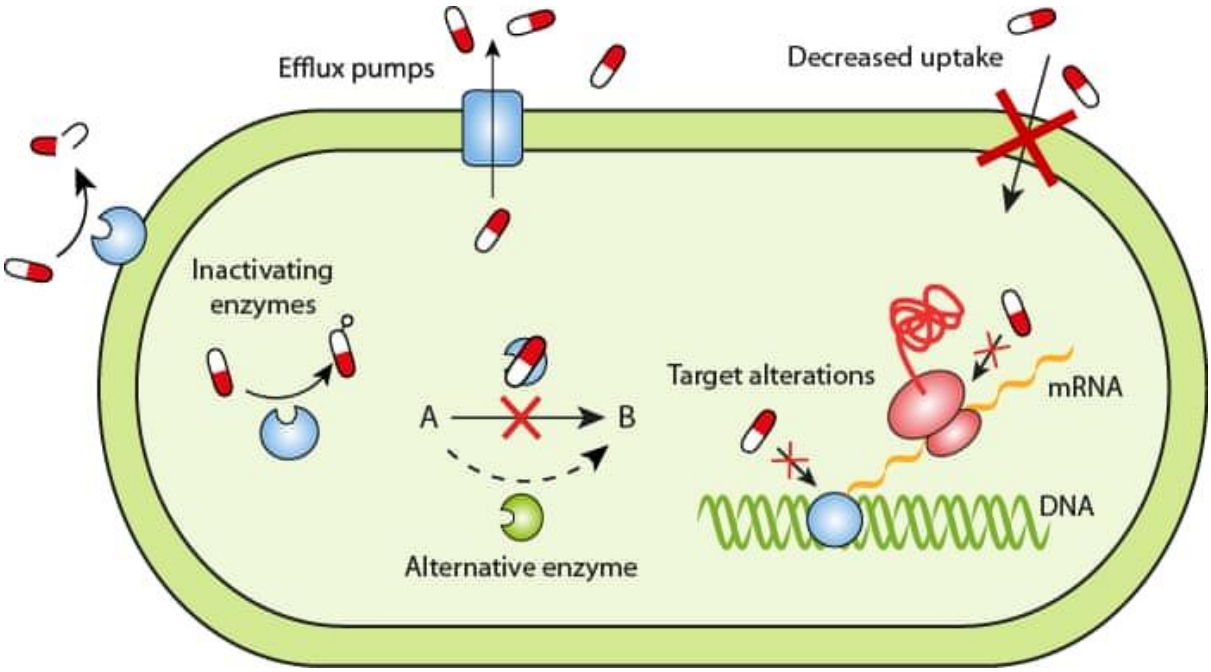
Movment.

Ans::

Antibiotic OR Antimicrobial resistance (AMR or AR) is the ability of a microbe to resist the effects of medication that once could successfully treat the microbe.The term antibiotic resistance (AR or ABR) is a subset of AMR, as it applies only to

bacteria becoming resistant to antibiotics. Resistant microbes are more difficult to treat, requiring alternative medications or higher doses of antimicrobials.

Mechanism of Resistance::::



Antibiotic resistance mechanisms

1. Stop the antibiotic from reaching its target:::

Pump the antibiotic out from the bacterial cell. Bacteria can produce pumps that sit in their membrane or cell wall. These so-called efflux pumps are very common in bacteria and can transport a variety of compounds such as signal molecules and nutrients. Some of these pumps can also transport antibiotics out from the bacterium, in this way lowering the antibiotic concentration inside the bacterial cell. In some cases mutations in the bacterial DNA can make the bacteria produce more of a certain pump, which in turn increases resistance.

Decrease permeability of the membrane that surrounds the bacterial cell. Certain changes in the bacterial membrane make it more difficult to pass through. In this way, less of the antibiotic gets into the bacteria.

Destroy the antibiotic. There are bacterial enzymes that can inactivate antibiotics. One example is β-lactamase that destroys the active component (the β-lactam ring) of penicillins, extremely important antibiotics for treating human infections. In later years, bacteria that produce extended-spectrum β-lactamases, so called ESBL-producing bacteria, have become a major problem. They can degrade a wide spectrum of β-lactam antibiotics, sometimes also the last resort drugs available for infections with these bacteria.

Modify the antibiotic. Bacteria can sometimes produce enzymes that are capable of adding different chemical groups to antibiotics. This in turn prohibits binding between the antibiotic and its target in the bacterial cell.

2. Modify or bypass the target of the antibiotic::::

Camouflage the target. Changes in the composition or structure of the target in the bacterium (resulting from mutations in the bacterial DNA) can stop the antibiotic from interacting with the target. Alternatively, the bacteria can add different chemical groups to the target structure, in this way shielding it from the antibiotic.

Express alternative proteins. Some bacteria are able to produce alternative proteins that can be used instead of the ones that are inhibited by the antibiotic. For example, the bacterium Staphylococcus aureus can acquire the resistance gene mecA and produce a new penicillin-binding protein. These proteins are needed for bacterial cell wall synthesis and are the targets of β-lactam antibiotics. The new penicillin-binding protein has low affinity to β-lactam antibiotics and is thus resistant to the drugs, and the bacteria survive treatment. This type of resistance is the basis in MRSA (methicillin-resistant Staphylococcus aureus).

Reprogram target. Sometimes bacteria can produce a different variant of a structure it needs. For example, Vancomycin-resistant bacteria make a different cell wall compared to susceptible bacteria. The antibiotic is not able to interact as well with this type of cell wall.

Some bacteria are naturally resistant to certain antibiotics. Imagine for example an antibiotic that destroys the cell wall of the bacteria. If a bacterium does not have a cell wall, the antibiotic will have no effect. This phenomenon is called intrinsic resistance. When a

bacterium that was previously susceptible to an antibiotic evolves resistance it is called acquired resistance.

Solution of the problem OR Prevention and control::

Antibiotic resistance is accelerated by the misuse and overuse of antibiotics, as well as poor infection prevention and control. Steps can be taken at all levels of society to reduce the impact and limit the spread of resistance.

Individuals:::

1 To prevent and control the spread of antibiotic resistance, individuals can:

2 Only use antibiotics when prescribed by a certified health professional.

3 Never demand antibiotics if your health worker says you don't need them.

4 Always follow your health worker's advice when using antibiotics.

5 Never share or use leftover antibiotics.

6 Prevent infections by regularly washing hands, preparing food hygienically, avoiding close contact with sick people, practising safer sex, and keeping vaccinations up to date.

7 Prepare food hygienically, following the WHO Five Keys to Safer Food (keep clean, separate raw and cooked, cook thoroughly, keep food at safe temperatures, use safe water and raw materials) and choose foods that have been produced without the use of antibiotics for growth promotion or disease prevention in healthy animals.

Policy makers:::

To prevent and control the spread of antibiotic resistance, policy makers can:

1 Ensure a robust national action plan to tackle antibiotic resistance is in place.

2 Improve surveillance of antibiotic-resistant infections.

Strengthen policies, programmes, and implementation of infection prevention and control measures.

3 Regulate and promote the appropriate use and disposal of quality medicines.

4 Make information available on the impact of antibiotic resistance.

Health professionals::

1 To prevent and control the spread of antibiotic resistance, health professionals can:

2 Prevent infections by ensuring your hands, instruments, and environment are clean.

3 Only prescribe and dispense antibiotics when they are needed, according to current guidelines.

4 Report antibiotic-resistant infections to surveillance teams.

5 Talk to your patients about how to take antibiotics correctly, antibiotic resistance and the dangers of misuse.

6 Talk to your patients about preventing infections (for example, vaccination, hand washing, safer sex, and covering nose and mouth when sneezing).

Healthcare industry;;

1 To prevent and control the spread of antibiotic resistance, the health industry can:

2 Invest in research and development of new antibiotics, vaccines, diagnostics and other tools.

Ans 5 :

Mechanism of Bacterial pathogenicity :

i) Invasiveness :

The ability to invade tissues .

* encompasses mechanism for *colonization (adherence and initial multiplication) ,

* production of extracellular substances which facilitate invasion (invasions) and ability to bypass or overcome host defense mechanisms.

ii) Toxigenesis :

Ability to produce toxins .

*Bacteria may produce two types of toxins :

i) exotoxins

ii) endotoxins

Exotoxins are released from bacterial cells and may act at tissue sites removed from the site of bacterial growth.

Endotoxins are cell-associated substance (classic sense , endotoxin refers to the lipopolysaccharide component of the outer membrane of Gram-negative bacteria).

Endotoxins may be released from growing bacterial cells and cells that are lysed as a result of effective host defense (e.g lysozyme) or the activities of certain antibiotics (e.g. pencillins and cephalosporins).

Hence, bacterial toxins, both soluble and cell-associated , may be transported by blood and lymph and cause cytotoxic , effects at tissue sites .

Some bacterial toxins may also act at the site of colonization and play a role in invasion .

Bacterial diseases:

i) Bronchitis

ii) Pharyngitis

Bronchitis :

Is an inflammation in the lunga that some people call a chest cold .

Symptoms:

Fatigue

Wheezing sound when breathing

Tightness or dull pain in the chest

Shortness of breath

Production of mucus (sputum) , which can be clear white, yellowish-gray or green in color rarely , it may be streaked with blood .

Causes:

Virusea usually (influenza virus)

Air pollution

Dust

Cold

Flu

ii) Pharyngitis:

It ia inflammation of the throat

This can cause a sore throat , as well as scratchiness in the throat and difficulty swallowing.

Symptoms :

Body aches

Coughing up clear , yellow ,lighy brown , or green mucus

Difficulty in breathing

Difficulty in swallowing

Dry throat

Enlarged lymph nodes

Fever and chills

Hoarse voice

Pus or white patches covwring the tonsils or throat

Throat pain

Causes :

Viral infection such as influenza

Bacterial infection such as strept throat.