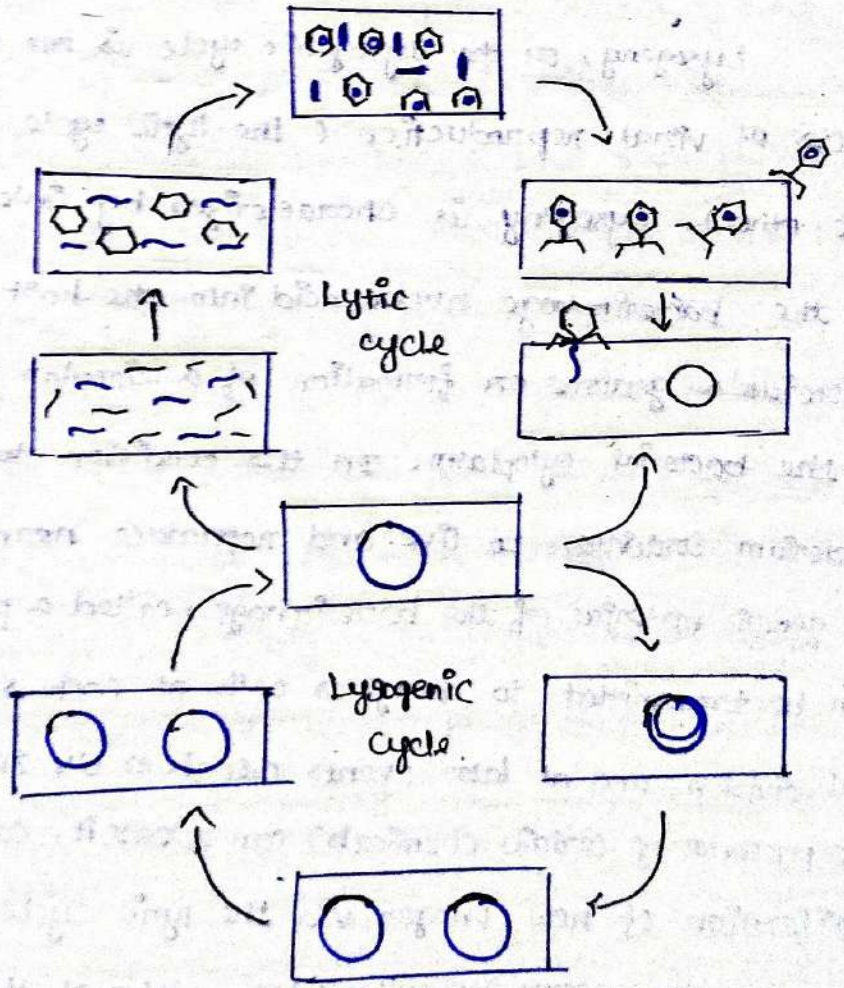
19.09.20
SATURDAY.

P19ZOO13
D.PAVITHRA
II-MSc ZOOLOGY

LYTIC CYCLE.

The lytic cycle is one of the two cycles of viral reproduction (referring to bacterial viruses or bacteriophages), the other being the lysogenic cycle. The lytic cycle results in the destruction of the infected cell and its membrane. Bacteriophages that only use the lytic cycle are called virulent phages (in contrast to temperate phages).

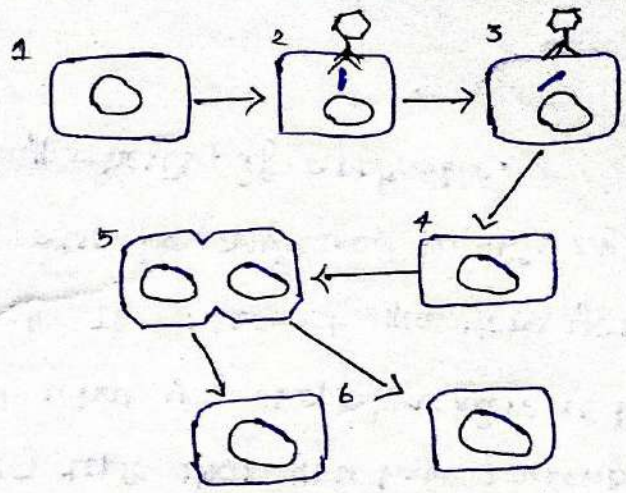


Lysogenic cycle compared to lytic cycle.

In the lytic cycle, the viral DNA exists as a separate free floating molecule within the bacterial cell, and replicates separately from the host bacterial DNA, whereas in the lysogenic cycle, the viral DNA is located within the host DNA. This is the key difference between the lytic and lysogenic (bacterio) phage cycles. However, in both cases the virus/phage replicates using the host DNA machinery.

LYSOGENY CYCLE.

Lysogeny, or the lysogenic cycle is one of two cycle of viral reproduction (the lytic cycle being the other). Lysogeny is characterized by integration of the bacteriophage nucleic acid into the host bacterium's genome on formation of a circular replicon in the bacterial cytoplasm. In this condition the bacterium continues to live and reproduce normally. The genetic material of the bacteriophage, called a prophage, can be transmitted to daughter cells at each subsequent cell division, and at later events (such as by radiation or the presence of certain chemicals) can release it, causing proliferation of new phages via the lytic cycle. Lysogenic cycles can also occur in eukaryotes, although the method of DNA incorporation is not fully understood.



Lysogenic cycle :

1. The prokaryotic cell is shown with its DNA, in green, 2. The bacteriophage attaches and releases its DNA, shown in red, into the prokaryotic cell. 3. The phage DNA then moves through the cell to the host's DNA. 4. The phage DNA integrates itself into the host cell's DNA, creating prophage. 5. The prophage then remains dormant until the host cell divides 6. After the host cell has divided, the phage DNA in the daughter cells activate, and the phage DNA begins to express itself. Some of the cells containing the prophage go on to create new phages which will move on to infect other cells.

28.09.20
WEDNESDAY.

P19Z0013
D.PAVITHRA
II-M.SC ZOOLOGY

Gram-Positive bacteria:

In bacteriology, gram-positive bacteria are bacteria that give a positive result in the Gram stain test, which is traditionally used to quickly classify bacteria into two broad catagories according to their cell wall.

2) Gram-negative bacteria:

Gram negative bacteria are bacteria that do not retain the crystal violet stain used in the Gram staining method of bacterial differentiation. They are characterized by their cell envelopes, which are composed of a thin peptidoglycan cell wall sandwiched between an inner cytoplasmic cell membrane and a bacterial outer membrane.

3) Lytic cycle:

The lytic cycle is one of the two cycles of viral reproduction, the other being the lysogenic cycle. The lytic cycle results in the destruction of the infected cell and its membrane. Bacteriophages that only use the lytic cycle are called virulent phages.

4) Lysogenic cycle:

Lysogeny, or the lysogenic cycle, is one of two cycles of viral reproduction. Lysogeny is characterized by integration of the bacteriophage nucleic acid into the host bacterium's genome or formation of a circular replicon in the bacterial cytoplasm.

5) peptidoglycan cell wall:

The vast majority of the domain Bacteria have a rigid cell wall composed of peptidoglycan. The peptidoglycan cell wall surrounds the cytoplasmic membrane and prevents osmotic lysis. Peptidoglycan is composed of interlocking chains of building blocks called peptidoglycan monomers.

Microbiology.
01.10.20
THURSDAY

P19Z0013
D-PAVITHRA
II-M.Sc ZOOLOGY

Scope of microbiology:

The scope in this field is immense due to the involvement of microbiology in many fields like medicine, pharmacy, diary, industry, clinical research, water industry, agriculture, chemical technology and nanotechnology.

The study of microbiology contributes greatly to the understanding of life through enhancements and intervention of microorganisms. There is an increase in demand for microbiologists globally.

Genetics:

Mainly involves engineered microbes to make hormones, vaccine, antibiotics and many other useful products for human being.

Agriculture:

The influence of microbes on agriculture; than prevention of the diseases that mainly damage the useful crops.

Food science:

It involves the prevention of spoilage of food and food borne diseases and the uses of microbes to produce cheese, yoghurt, pickles, and beer.

Immunology:

The study of immune system which protect the body from pathogens.

Medicine:

deals with the identification of plans and measures to cure diseases of human and animals which are infectious to them.

Industry:

It involves use of microbes to produce antibiotics, steroids, alcohol, vitamins and amino acids etc.

15.10.20
THURSDAY.

P19Z0013
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ETHANOL PRODUCTION

Although there are various ways ethanol fuel can be produced, the most common way is via fermentation.

The basic steps for large-scale production of ethanol are: microbial (yeast) fermentation of sugars, distillation, dehydration (requirements vary, see Ethanol fuel mixtures, below), and denaturing (optional). Prior to fermentation, some crops require saccharification or hydrolysis of carbohydrates such as cellulose and starch into sugars. Saccharification of cellulose is called cellulolysis (see cellulosic ethanol). Enzymes are used to convert starch into sugar.

Fermentation:

Ethanol is produced by microbial fermentation of the sugar. Microbial fermentation currently only works directly with sugars. Two major components of plants, starch and cellulose, are both made of sugars - and can, in principle, be converted to sugars for fermentation. Currently, only the sugar (eg. sugar cane) and starch (eg. corn) portions can be economically converted.

There is much activity in the area of cellulosic ethanol, where the cellulose part of a plant is broken down to sugars and subsequently converted to ethanol.

Distillation:

For the ethanol to be usable as a fuel, the yeast solids and the majority of the water must be removed. After fermentation, the mash is heated so that the ethanol evaporates. This process, known as distillation, separates the ethanol, but its purity is limited to 95-96% due to the formation of a low-boiling water-ethanol azeotrope with maximum (95.6% m/m (96.5% V/V) ethanol and 4.4% m/m (3.5% V/V) water). This mixture is called hydrous ethanol and can be used as a fuel alone, but unlike anhydrous ethanol, hydrous ethanol is not miscible in all ratios with gasoline, so the water fraction is typically removed in further treatment to burn in combination with gasoline in gasoline engines.

DEHYDRATION:

There are three dehydration processes to remove the water from an azeotropic ethanol/water mixture. The first process, used in many early fuel ethanol plants, is called azeotropic distillation and consists of adding benzene or cyclohexane to the mixture. When these components are added to the mixture, it forms a heterogeneous azeotropic mixture in vapor-liquid-liquid equilibrium, which when distilled produces anhydrous ethanol in the columns bottom, and a vapor mixture of water, ethanol, and cyclohexane/benzene.

27.10.20
TUESDAY

P19ZOO13
D. PAVITHRA
II - M.Sc ZOOLOGY

1) Antibiotics by vaccines

Antibiotics used during vaccine manufacture include neomycin, polymyxin B, streptomycin and gentamicin. Only minute quantities remain in vaccines. These small quantities of antibiotics have never been clearly found to cause servere allergic reactions.

2) Antibiotics by enzymes:

Chloramphenicol
Chlortetracycline
Penicillin streptomycin
Trypsin
Vancomycin.

3) Antibiotics by Vitamins:

The vitamins studied in combination with the antibiotics were vitamin B1 (thiamine), B2 (riboflavin), B6 (pyridoxine), B12 (methylcobalamine). C (ascorbic acid), A (retinol), D (cholecalciferol), E (α-tocopherol) and K (menadione).

4) Production by microbes:

Industries use microorganisms that produce enzymes in accordance with their business objectives. In another step, the sugars obtained will be fermented by yeasts (eg, saccharomyces cerevisiae) and thus producing ethanol and CO_2. This ethanol produced will be used as fuel and is a sustainable source of energy.

05.11.20
THURSDAY.

PA9Z0013
D-PAVITHRA
II-M.Sc., ZOOLOGY

Production of antibiotics.

Production of antibiotics is a naturally occuring event, that thanks to advances in science can now be replicated and improved upon in laboratory settings. Due to the discovery of penicillin by Alexander Fleming, and the efforts of Florey and Chain in 1938, large-scale, Pharmaceutical Production of antibiotics has been made possible. As with the initial discovery of penicillin, most antibiotics have been discovered as a result of happenstance. Antibiotic production can be grouped into three methods: as more and more bacteria continue to develop resistance to currently produced antibiotics, research and development of new antibiotics, research and development of new antibiotics continues to be important. In addition to research and development into the production of new antibiotics, repackaging delivery systems is important to improving efficacy of the antibiotics that are currently produced. Improvements to this field have seen the ability to add antibiotics directly into implanted devices, aerosolization of antibiotics for direct delivery, and combination of antibiotics with non antibiotics to improve outcomes. The increase of antibiotic resistant strains of pathogenic bacteria has led to an increased urgency for the funding of research and development of antibiotics and a desire for production of new and better acting antibiotics.

Fermentation:

Industrial microbiology can be used to produce antibiotics via the process of fermentation, where the source microorganism is grown in large containers (100,000 - 150,000 liters or more) containing a liquid growth medium. Oxygen concentration, temperature, pH and nutrient levels must be optimal, and are closely monitored and adjusted if necessary. As antibiotics are secondary metabolites, the population size must be controlled very carefully to ensure that maximum yield is obtained before the cells die. Once the process is complete, the antibiotic must be extracted and purified to a crystalline product. This is easier to achieve if the antibiotic is soluble in organic solvent. Otherwise it must first be removed by ion exchange, absorption or chemical precipitation.