

DIAGNOSTIC TECHNIQUES AND BIOTECHNOLOGY OF THERAPEUTICS

TLC Total leukocyte count. Used to take total number of white blood cells. Instrument used is Haemocytometer.

DLC Differential leukocyte count – Used to count the total number of different white blood cells.

ESR Erythrocyte sedimentation rate – Used to determine the rate of sedimentation of blood cells. Normal ESR value is 0-5mm per hour. Increase in ESR indicates infection or inflammation in the body.

WIDAL test - Used to detect the presence of gram-negative bacteria in the blood. Test for typhoid. Test is based on the antigen-antibody interaction.

ELISA Enzyme Linked ImmunoSorbant Assay –Test used to detect the presence of specific antigen in the blood. It was devised by **Engvall and Perlmann in 1976**.The test is based on the interaction between antigens and antibodies.

Therapeutic Hormones –Artificially synthesized hormones using DNA recombinant technology .It aims commercial production of hormones using microorganisms. Egs. Human insulin – Humulin, Bovine somato tropin (BST), human growth hormone, Cortisone etc.

Interferons Antiviral proteins produced by the body cells. Isolated by **Alick Issac and Jean Lindermann in 1957**.Interferons destroy the virus by inhibiting the virus infection on the cell membrane or preventing the synthesis of viral proteins.

Commercial interferons Interferon A and Interferon B by genetic engineering in mouse.

Monoclonal antibodies Artificially produced antibodies by injecting antigen in mouse and generating polyclonal antibodies. The desired antibody is then separated and produced in large scale by hybridoma technology.

GODPOD method Glucose Oxidase Peroxidase method – Used to detect the quantity of glucose in the blood. This is an enzymatic method. Glucose oxidizes converts glucose to gluconic acid and hydrogen peroxide. The peroxide then reacts with an oxygen acceptor like hydroxy benzoate to give a colour proportional to the amount of glucose. It can be analyzed using spectrophotometer.

Berth lot method It is used to determine the blood urea. Urea is hydrolyzed by urease enzyme to ammonia .It then reacts with alkaline hypochloride and sodium salicylate in the presence of Sodium nitroprusside to form a coloured compound. The colour is proportional to the amount of urea.

BIOMEDICAL TECHNOLOGY

X-Radiography Provides detailed images of the dense parts of the body. If the body is exposed to x rays some of the rays pass through the body and fall on the X ray film. In the X ray film the dense parts appear as shadows.

CRT Cathode Ray Tube This is the monitor used in many biomedical instruments to observe the image

DSA Digital Substraction Angiography. A technique that produces clear views of the blood flow and blocks in the blood vessels.

Angiograph It is the recorded image of the internal organs observed in the DSA instrument.

CAT Computerized Axial Tomography Technique used to study the internal organs. A number of images of the internal organs are recorded and then analyzed using computer to reconstruct the image.

MRI Magnetic Resonance Imaging MRI detects the presence of water in the body parts. The patient is exposed to a magnetic field and water rich and water poor parts of the organs can be distinguished. Water poor regions indicate dead parts.

PET Positron Emission Tomography Radiolabeled materials like glucose is introduced in to the body through trip. Glucose distributes in the body and the radioactive material decay and emits positrons. This produces flashes and is recorded. This gives a 3D image. Active tissue takes more glucose than inactive tissue. This part appears as bright area in the image. This helps to detect tissue damage in brain.

Sonography It uses ultra sonic sound to detect defects in the internal organs. Ultra sonic sound with a frequency between 1 and 15 MHz is passed through the body and reflected sound is collected. The reflection depends on the density of the tissue. The reflected sound is collected by the transducer and processed by the computer to get an image.

Doppler Effect Sonography is used to detect the flow of blood through the heart. It provides pictures of the blood flow. Different colours will be formed based on the distance between the blood flow and the transducer.

ECG Electro Cardio Graph used to monitor the functioning of the heart. During heart beat electrical signals appear in the skin, which can be detected using electrodes and recorded.

EEG Electro Encephalo Graph Used to detect the functioning of brain. It detects and record the electrical waves produced by the brain.

Polygraphy Technique used to detect a persons mental state. It can be used as a lie detector. It uses various parameters like ECG, EEG, BP, skin resistance etc.

EMG ElectroMyoGraph Records muscle activity

EOG ElectroOculoGraph Records eye defects.

CCD ChargeCoupledDevice Front part of the endoscope. It has many light sensitive cells that
Produces the image of the internal organs.

Laproscope Endoscopy used to detect defects in the uterus and fallopian tubes. Using laproscopy
Sterilization can be done without surgery.

Laser surgery Surgical treatment using laser. Action of laser is localized so that it can be used to
Heal lesions without surgery.

Argon laser surgery Used in eye surgery.

Immuno suppressive drugs Used after organ transplantation or plastic surgery. Suppress the
Immune system of the body and prevents tissue rejection.
Eg. Cyclosporin

Prosthesis Modern surgery deals with implantation of artificial body parts.

Artificial pacemaker Pacemaker is the part of heart that produces heart beats. Artificial
Pace maker is a small battery operated device implanted on the chest beneath the skin .It produces electrical signals for
the heart beat for about 10 years.

Angioplasty Technique used to detect blocks in the coronary artery. A balloon catheter is introduced through the vein
of arm or leg and a white dye is sprayed to locate the block. The block is then removed by inflating a balloon connected at
the tip of the catheter.

CABG Coronary Artery Bypass Grafting Grafting of blood vessel taken from the leg in the
coronary artery to bypass the blood flow.

Cryosurgery Removal of body parts after freezing the tissue using liquid nitrogen at -196 degree.

Gene therapy Introduction of a normal gene in to a cell that contain a defective gene using a virus as vector.