1. what are the components of mucopolysaccharides and their significance.

→ Mucopolysaccharide are unbranched heteropolysaccharide chains which are formed by repeating disaccharide units. on the basis of components they are classified as.

* Hyaluronic acid.
* chondroitin sulphate.
* Dermatan sulphate.
* Keratan sulphate.
* Heparin.
* Heparan sulphate.

significance

→ It gives consistency to vitreous humor, contributes to tensile strength, and elasticity of cartilage and tendons.
→ involved in tissue repair, shock absorber.
→ used in treatment of traumatic or postoperative oedema.
→ used in the treatment of osteoarthritis
→ contributes to the tensile strength and elasticity of cartilage, tendons, ligaments and walls of aorta.
→ acts as blood ~~clearing~~ lipid clearing activity.
→ Plays a role in maintaining the overall shape of the eye.
→ carcinogenesis, infection wound repair.
→ an anti-coagulant widely used when taking blood in-vitro for clinical studies
→ large, highly hydrated molecule which in joints can act as cushion to absorb mechanical shock.
→ It acts as transparency of cornea.

* It regulates a wide range of biological activities including developmental processes, angiogenesis, blood coagulation;

→ It plays a significant role in maintaining the glomerular filtration barrier.

Q.4. what are Enediol and their role in Benedict test

→ The reducing carbohydrate containing free aldehyde or keto group. which in mild alkali condition ~~not~~ undergoes tautomerization to form Enediols. They are powerful reducing agents. reduces cupric ions to cuprous oxide.

Significance

→ They are used to estimate % of sugar. in the principle of Benedict Test.

Q.5 Explain why less than 5 carbon atoms sugar does not give Molish's Test.

→ In Molisch's Test only cyclic ring structural sugar is answered and as in triose and tetrose the molecules are not existing in ring structure so it does not give Molisch's Test.

Q.6. what are sugar alcohol and their importance.

→ when carbohydrates are treated with reducing agents such as sodium amalgam the aldehyde or ketone group is reduced to alcohol and hence is known as sugar alcohol.

significance

→ It is used to reduce intracranial tension by forced diuresis.

→ It is thought to decrease brain volume by decreasing overall water content to reduce blood volume by vasoconstriction.

→ It also improves cerebral perfusion by decreasing viscocity or altering red blood rheology.

Q.7 Acarbose is which type of carbohydrate and its role in human being?

→

Q.8 what is lactulose and its role in constipation and hepatic encephalopathy?

→ It is synthetic, undigested and non-absorbable disaccharide made from galactose and fructose.

→ It causes a laxative effect in the colon that helps in prevention of constipation.

→ It prevents the hepatic encephalopathy by the action of acidic pH which destroys urease-producing bacteria involved in the production of ammonia.

Q.9. Mention contribution of negative charges component and their role in GAG.

→ negative charged component gives viscosity to our body fluids and have naturally good biological action.

GAG's contain -ve charged group
↓
Repulsion from each other

- slippery action. [Hyaluronic acid, Mucous]
- shock absorbent. [Synovial fluid, vitreous humor, extracellular matrix]

Q.10. why amino sugar are acetylated in GAG and its role?

→

Q.11 which mucopolysaccharide is present in glomerular basement membrane and its role?

→ Heparan sulphate is present in glomerular basement membrane.

Role → It keeps the GBM in an open state, facilitating passage of proteins through glomerular capillary wall.

Q.12 write components and significance of sialic acid.

→ The components of sialic acids are both glycoproteins and gangliosides. It is derived from m

→ These are derivatives of amino-sugar. It is obtained from modified monosaccharide of N-acetyl glucosamine and N-acetyl manosamine. They are constituent of both glycoprotein and gangliosides.

Significance

→ It is used for determination of life span of cell. like RBC.

→ It mediates variety of essential biological function including wound healing and collagen synthesis.

→ It acts as preventive antioxidant in plasma. It means scavenging of free radical from plasma

→ It is also a constituent of mucopolysaccharide.

Q.13. components and significance of glycosides.

→ The condensation of monosaccharides to monosaccharides or monosaccharides with non-carbohydrates such as alcohol or phenol group forms - glycosides.

components

Glycone
* condensation b/w two monosaccharide on hydrolysis gives two molecule of monosaccharide.
e.g. Maltose, lactose

Aglycone
* It is formed by condensation of monosaccharide and non-carbohydrate like Phenol, steroid.
e.g. → maltose + methanol.

Significance
→ They normalize all cardiac functions, prompting increase of systolic output, tolerability of physical.
→ used in sodium pump inhibitors.
→ used in treatment of tuberculosis.

Q.14. Derivatives of monosaccharides and their importance?
→ These are also called as modified monosaccharide.
* Glycosides - Formed by condensation of monosaccharide with monosaccharide or monosaccharide with non carbohydrate such as alcohol or phenol group forms glycoside.
* importance → used in sodium pump inhibitors.
→ used in treatment of tuberculosis.
→ used in normalizing cardiac functions prompting increase in systolic output, tolerability of physical.

* Formation of Ester.

→ Esterification can take place between hydroxyl group of sugar and other compound like, phosphate, acetate & propionate.

Significance

→ It activates and initiates the metabolism of sugar.

→ It prevents the diffusion of active sugar from inside cell to plasma.

→ It is used in purine & pyrimidine synthesis.
e.g- Ribulose-5-Phosphate.

* Amino sugar → Glycosylamine.
→ Glycosamine.

→ It is a sugar molecule in which hydroxyl group is replaced by amino group.

Significance:

→ used in synthesis of antibiotics.

→ it is important constituent of glycoprotein, mucopolysaccharide, cell membrane antigen.

→ it is even a constituent of chondroitin sulphate of cartilage, bone and tendon.

* Deoxy sugar.

→ The sugar which are deprived of oxygen at 2nd position is called de-oxy sugar.

Significance.

→ They contribute to the formation of genetic material in the body.

→ They are a part of blood group antigen and are present in many glycosides.

Amino-sugar acids.

→ Derivatives of amino-sugar.
→ Obtained from modified monosaccharide of N-acetyl glucosamine and N-acetyl mannosamine

Significance

→ It is a constituent of mucopolysaccharide
→ It is used for determining the life span of cell like RBC.

Ascorbic acid.

* It is a water soluble vitamin derived from glucose.

significance.

→ It mediates variety of essential biological functions including wound healing and collagen synthesis.
→ It acts as preventive antioxidant in plasma. It means scavenging of free radical from Plasma.

Q.15. secretion and role of hyaluronidase in human being?

→ Hyaluronidase an enzyme that breaks down hyaluronic acid and chondroitin sulphates.

→ It plays an important role in fertilization by removing the hyaluronic acid around the ovum, thereby allowing sperm to penetrate better.

→ It is used in vitro for seperation of cells from tissue.

→ used in treatment of traumatic or postoperative oedema.

Q.16. How heparin inhibit coagulation and its composition.

→ Heparin binds to anti-thrombin and then a conformational change in AT upon heparin-binding mediated its inhibition of factor Xa and thrombin. Formation of ternary complex between AT, thrombin and heparin leads to thrombin activation, thereby inhibiting coagulation.

composition → It is composed of alternating units of sulphated N-acetyl glucosamine and glucuronic acid or iduronic acid. linkage between

- a-1,4 -, a-1-3 and a1-4 & so on.

Q.17 Hyaluronic acid.

→. It is a polymer of disaccharide unit, it is an anionic non-sulphated glycosaminoglycan.

site of occurence

→. found in synovial fluid of joints
→ umbilical cord, vitreous humour of the eye, bone joint fluid, skin cartilage.

composition.

→ alternating units of N-acetyl glucosamine - beta 1,4 & glucuronic acid - β-1,3- N-acetyl glucosamine - β-1,4.

Biological Function.

* lubricant in the synovial fluid of joints.
*. a major component of skin.
*. involved in tissue repair, shock absorber.
*. it gives consistency to vitreous humour, contributes to tensile strength and elasticity of cartilage and tendons.

Therapeutic uses

*. used in the treatment of post-operative oedema.

Q.18 Chondroitin sulphate

→ It is a type of hetero-polysaccharide called GAGs.; It is found in proteins as part of Proteoglycan.

Chondroitin Sulphate

Chondroitin-6-Sulphate
↓
sulphate group attached to C-6 position of sugar
↓
found in humans in cartilage, bone, cornea, skin, arterial walls.

Chondroitin-4-sulphate.
↓
sulphate group attached to C-4 position of sugar.
↓
abundant in skin, in heart, valves, tendons and arterial walls.

Function:-

* contributes to tensile strength and elasticity of cartilages, tendons, ligaments and walls of aorta.
* gives resistance to compression weight bearing!

clinical significance.

* It is important to maintain structural integrity of tissue
* It is used in the treatment of osteoarthritis.

Q.19. Cyclic monosaccharides and their significance.

→ They are formed from five or more carbon atoms in aqueous solution.

→ cyclization occurs due to the formation of an in an aldose, whereas the hemiketal linkage of in a ketose.

→ mono-saccharide usually ~~~~ changes from acyclic- or open-chain form to cyclic form via a nucleophilic addition reaction between the carbonyl group & one of the hydroxyls of same molecule.

* They are of two types.

cyclic Monosaccharide

cyclic structure
Pyranose

cyclic structure
Furanose

Biological Function

* used as building blocks to form more complex sugars such as Polysaccharides.
* used to store & transmit genetic information
* Plays a important role in human metabolism particularly - glycosylation of certain proteins

Q.20 why agar is different from mucopolysaccharide.

→ Occurence

* agar are mainly distributed in plant sources whereas mucopolysaccharide is mainly distributed in human sources.

composition

agar.

* Jelly like substance made up of repititive unit of D-galactose & L-galactose,
* linear polymer.

mucopolysaccharide.

* made up of repititive sugar disaccharide unit
glycosaminoglycan.
*

21. significance of ester of sugar in human body.

* It activates & initiates the metabolism of sugar.
* It prevents the diffusion of active sugar from inside the cell to external plasma.
* It is used in purine & pyrimidine synthesis

22. why sucrose does not answer benedict test.

* It does not answer benedict test because;-
→ It is a non-reducing sugar, so they do not have free aldehyde or keto group in nature, so they do not reduce Benedict reagent, so they don't answer benedict test.