NAME: AGADA EMMANUELLA NKEM

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**Answer**

1. (D)Membrane structure

1. Fatty acids are carboxylic acids

2. The sterol nucleus of steroid is called a **Gonane** ring

3. Transport dietary lipids from intestine to peripheral tissues and liver

4. **functional characteristics of nucleus**

The nucleus is spherical in shape and situated near the center of the cell and the major functional role of the nucleus is that of:

1) **Replication:** Synthesis of new DNA.

2) **Transcription:** The synthesis of the three major types

of RNA: Ribosomal RNA (rRNA), Messenger RNA (mRNA), Transfer RNA (tRNA).

**Functional characteristics of mitochondria**

1) Mitochondria are called ***“*Power Plant”**of the cell since

they convert energy to form ATP that can be used by

cell.

2) A mitochondrion is a double-membrane organelle that are fundamentally different in composition and function.

**The outer membrane** forms a smooth envelope.It is freely permeable for most metabolites.

**The inner membrane** is folded to form ***cristae,***which give it a large surface area and are the siteof ***oxidative phosphorylation.*** The componentsof the electron transport chain are located on theinner membrane.

3) The space within the inner membrane is called the

***mitochondrial matrix.*** It contains the enzymes of the:

— Citric acid cycle

— β-oxidation of fatty acid

— Some other degradative enzymes.

4) Mitochondria contain DNA (mtDNA) which

encodes a few polypeptides involved in oxidative phosphorylation.

**Functional characteristics of endolasmic recticulum**

1) Endoplasmic reticulum is the interconnected network

of tubular and flat vesicular structures in the

cytoplasm

2) Endoplasmic reticulum forms the link between

nucleus and cell membrane by connecting the cell

membrane at one end and the outer membrane of

the nucleus at the other end

3) A large number of minute granular particles called

Ribosomesare attached to the outer surface of many

parts of the endoplasmic reticulum, this part of the

ER is known as **rough** or **granular ER** Which functionsin the biosynthesis of protein.

4) The Part of the ER, which has no attached ribosomes is the smooth endoplasmic reticulum functions in the synthesis of steroid hormones and cholesterol. It is the site of the metabolism of certain drugs, toxic compounds and carcinogens (cancer producing substances).

5. Glycolipids as their name implies, are sugar containing lipids. Glycolipids consist of alcohol **sphingosine.** The amino group of sphingosine is esterified by a fatty acid and one or more sugar units are attached to the hydroxyl group of sphingosine. Glycolipids are widely distributed in every tissue of the body, particularly in nervous tissue such as brain.

**Classification of Glycolipids**

There are four classes of glycolipids

1. Cerebrosides

2. Sulfatides

3. Globosides

4. Gangliosides.

**Cerebrosides** (Ceramide + Monosaccharides)

Cerebroside is the simplest glycolipid in which there is only one sugar residue, either **glucose**or **galactose**linked to ceramide and named as **glucocerebroside** and **galactocerebroside** respectively. Galactocerebroside is found in nerve tissue membrane. whereas glucocerebroside is the predominant glycolipid of extraneural (non-neural) tissues, where it acts as a precursor for the synthesis of more

complex glycolipids, e.g. gangliosides.



**Structure of cerebroside**

**Sulfatides** (Ceramide + Monosaccharide + Sulfate) Sulfatides are cerebrosides in which the monosaccharide contains a sulfate ester.

**Globosides** (Ceramide + Oligosaccharide)

Globosides contain two or more sugar molecules attached to ceramide. These glycolipids are important constituents of the RBC-membrane and are the determinants of the A,B,O blood group system

**Gangliosides:**(Cerebroside + Oligosaccharides + N-acetylneuraminic acid, NANA)

Gangliosides are complex glycolipids, derived from glucocerebroside. Ganglioside contains oligosaccharides and one or more molecules of sialic acid***,*** which is usually Nacetylneuraminic acid (NANA)attached to ceramide. Several types of gangliosides such as **GM1, GM2,** **GM3,** etc. have been isoloted from brain and other tissues. The simplest ganglioside found in tissues is GM3. G represents Ganglioside, M represents mono which indicate presence of one residue of NANA and subscript number assigned on the basis of chromatographic migration of ganglioside