



SNS COLLEGE OF TECHNOLOGY

Coimbatore-35

An Autonomous Institution

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DEPARTMENT OF MECHATRONICS ENGINEERING

TOPIC - BIOMOLECULES

MS.P.RADHIKA ASSISTANT PROFESSOR

DEPARTMENT OF MECHATRONICS ENGINEERING,

SNSCT, Coimbatore.

Radhika Palani Sevu



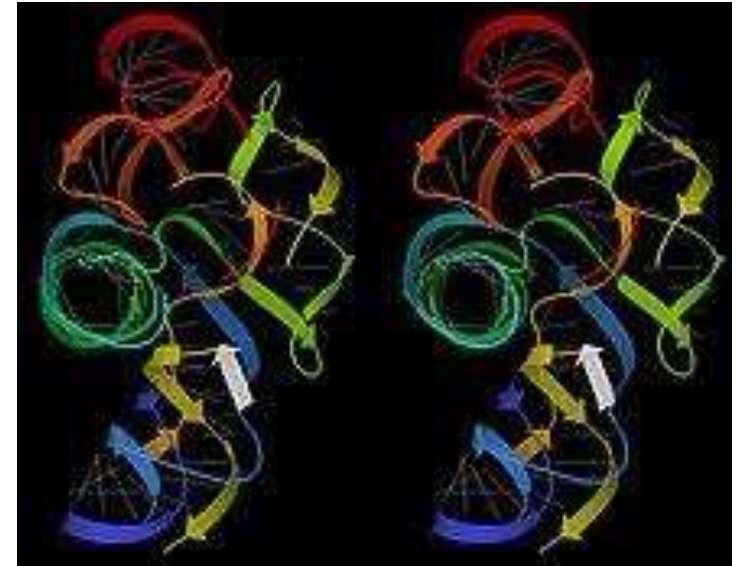
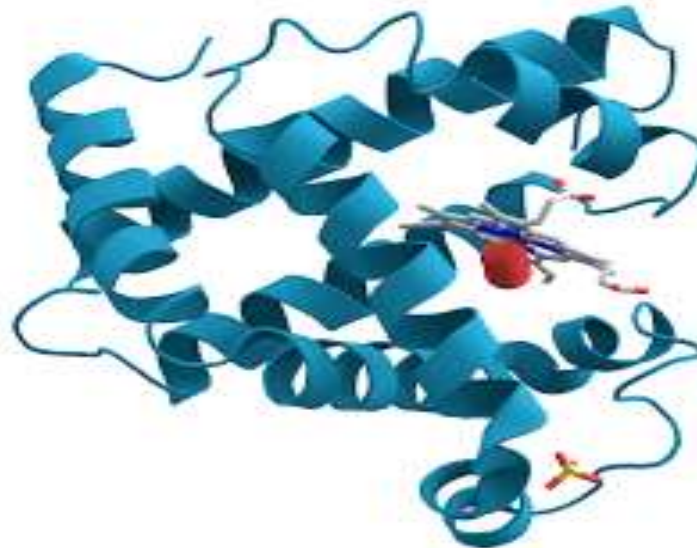
BIOMOLECULES



- A biomolecule or biological molecule is a loosely used term for molecules present in organisms that are essential to one or more typically biological processes, such as cell division, morphogenesis, or development.
- Biomolecules include large macromolecules (or polyelectrolytes) such as proteins, carbohydrates, lipids, and nucleic acids, as well as small molecules such as primary metabolites, secondary metabolites and natural products.



- Biomolecules are an important element of living organisms, those biomolecules are often endogenous, produced within the organism but organisms usually need exogenous biomolecules, for example certain nutrients, to survive.



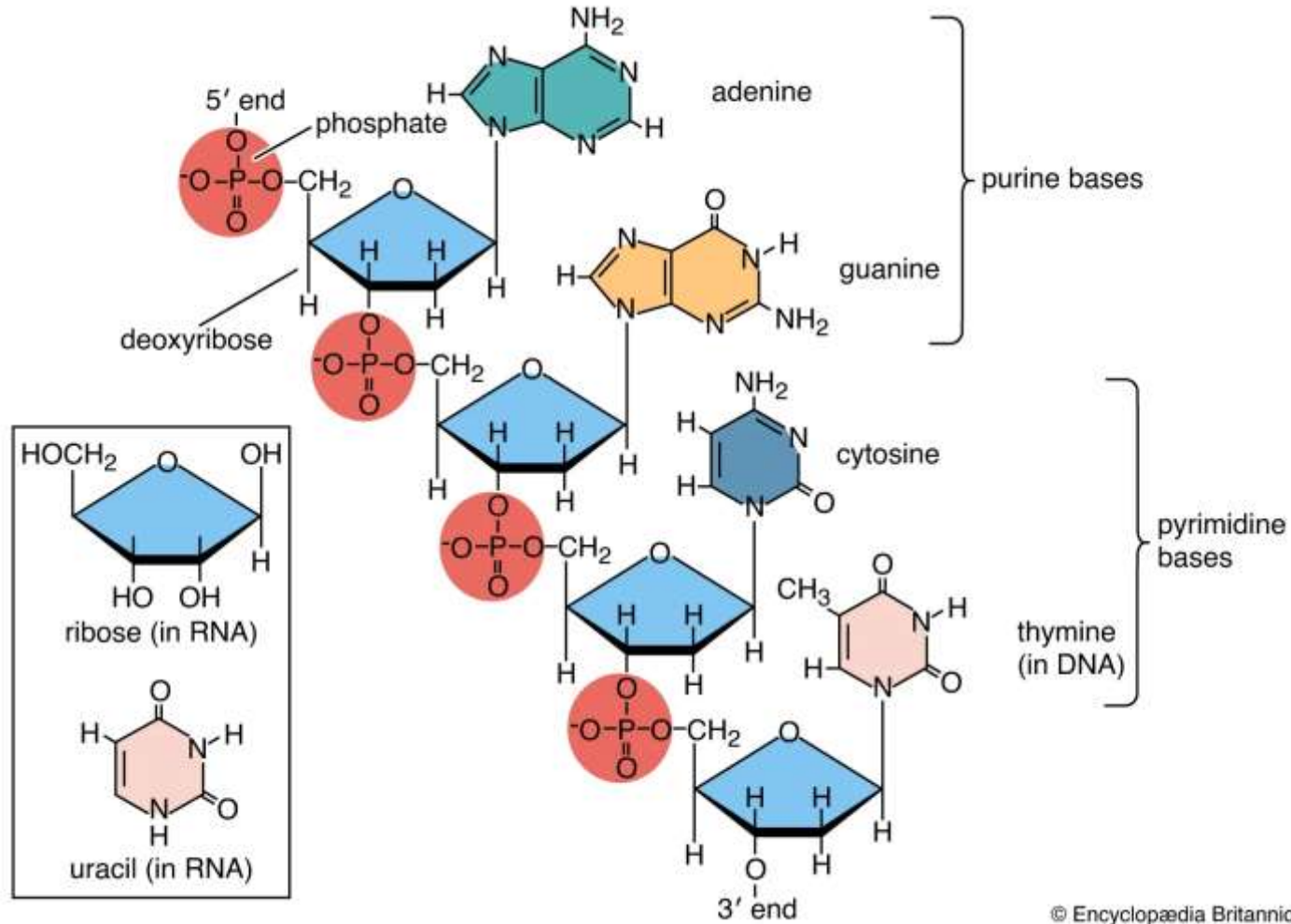


BIOMOLECULES



- Biology and its subfields of biochemistry and molecular biology study biomolecules and their reactions.
- Most biomolecules are organic compounds, and just four elements—oxygen, carbon, hydrogen, and nitrogen—make up 96% of the human body's mass.
- But many other elements, such as the various biometals, are also present in small amounts.
- The uniformity of both specific types of molecules (the biomolecules) and of certain metabolic pathways are invariant features among the wide diversity of life forms; thus these biomolecules and metabolic pathways are referred to as "biochemical universals"

Radhika Palani Sevu



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BIOMOLECULES STRUCTURE

Radhika Palani Sevu



FUNCTIONS OF LIPIDS IN BODY



- Lipids function as an energy reserve, regulate hormones, transmit nerve impulses, cushion vital organs, and transport fat-soluble nutrients. Fat in food serves as an energy source with high caloric density, adds texture and taste, and contributes to satiety
- Storing Energy. The excess energy from the food we eat is digested and incorporated into adipose tissue, or fatty tissue. ...
- Regulating and Signaling. ...
- Insulating and Protecting. ...
- Aiding Digestion and Increasing Bioavailability.



IMPORTANT FUNCTION OF PROTEIN BODY



- Growth and Maintenance
- Acts as a Messenger
- Provides Structure
- Maintains Proper p H
- Balances Fluids
- Bolsters Immune Health

Transports and Stores Nutrition.



IMPORTANT FUNCTION OF NUCLEIC ACID

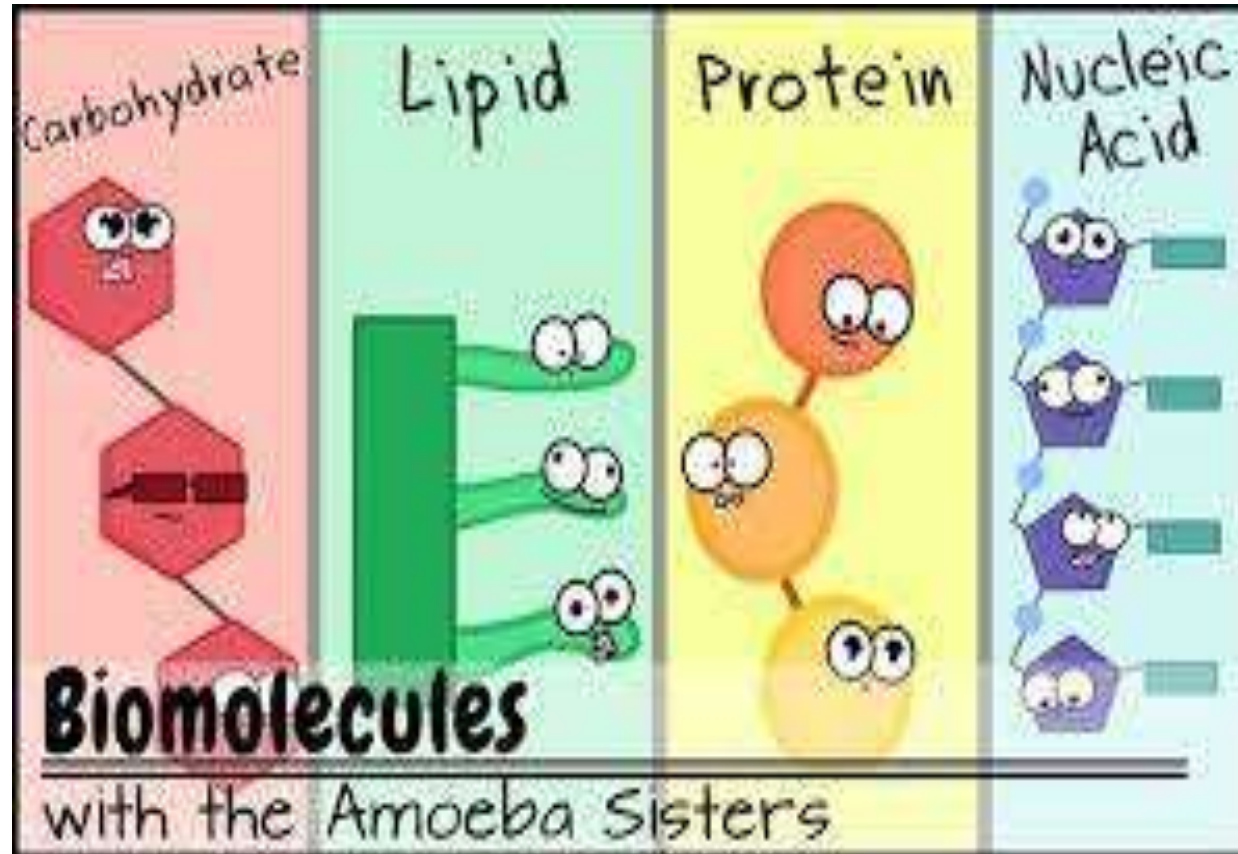
- Four main functions of nucleic acids:
 - (i) DNA is responsible for the transmission of inherent characters from one generation to the next. This process of transmission is called heredity.
 - (ii) Nucleic acids (both DNA and RNA) are responsible for protein synthesis in a cell



IMPORTANT FUNCTION OF NUCLEIC ACID

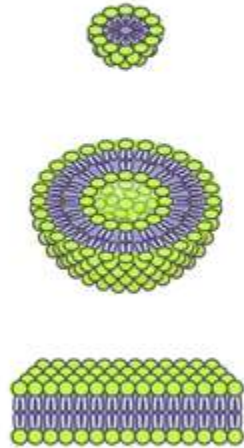


- (i) DNA structure is dominated by the well-known double helix formed by Watson-Crick base-pairing of C with G and A with T.
- (ii) This is known as B-form DNA, and is overwhelmingly the most favorable and common state of DNA; its highly specific and stable base-pairing is the basis of reliable genetic information storage.
- (iii) RNA, in contrast, forms large and complex 3D tertiary structures reminiscent of proteins, as well as the loose single strands with locally folded regions that constitute messenger RNA molecules.
- (iv) Those RNA structures contain many stretches of A-form double helix, connected into definite 3D arrangements by single-stranded loops, bulges, and junctions.

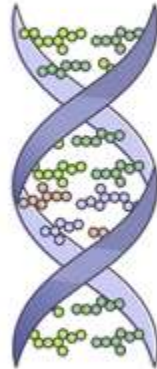




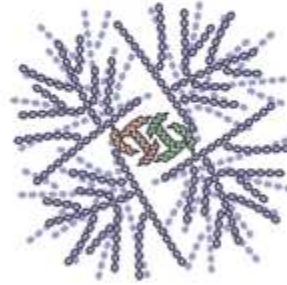
BIOMOLECULES



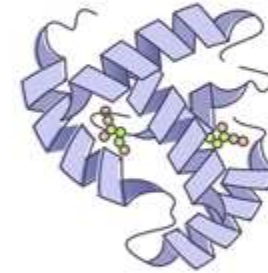
LIPIDS



NUCLEIC ACID



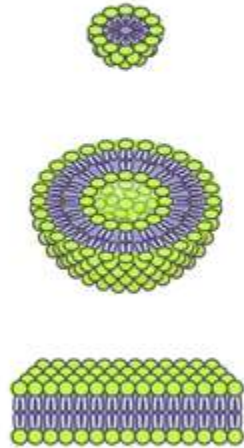
CARBOHYDRATES



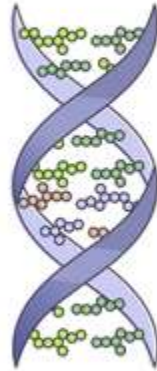
PROTEINS



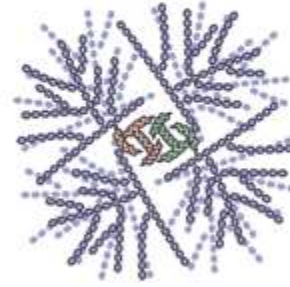
BIOMOLECULES



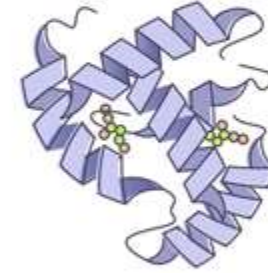
LIPIDS



NUCLEIC ACID



CARBOHYDRATES

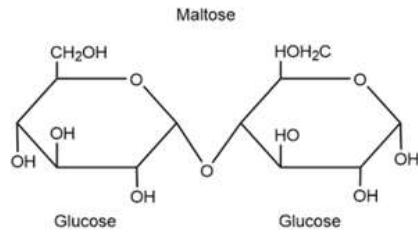


PROTEINS

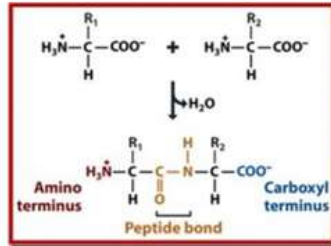


Biomolecules

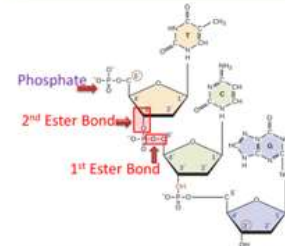
Carbohydrates



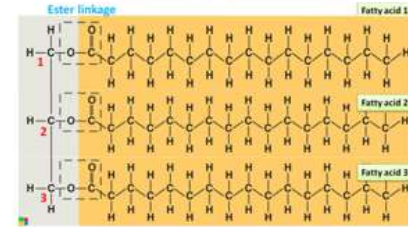
Proteins



Nucleic acids



Lipids



Monomers	Monosaccharides joined by glycosidic bond	Amino acids joined by peptide bond	Nucleotides joined by phosphodiester bond	Fatty acids and glycerol joined by ester bond
Examples	Starch, Cellulose	Insulin, Collagen	DNA, RNA	Fats, Oils, waxes
Elements	C,H,O	C,H,O,N, S	C,H,O,N,P	C,H,O
Functions	Energy source Structural component Reserve food	Enzyme, structure movement, defence hormones	Stores genetic information	energy source, insulation, membrane components, hormone



ENZYMES



- Enzymes are proteins that act as biological catalysts by accelerating chemical reactions.
- The molecules upon which enzymes may act are called substrates, and the enzyme converts the substrates into different molecules known as products.
- Almost all metabolic processes in the cell need enzyme catalysis in order to occur at rates fast enough to sustain life



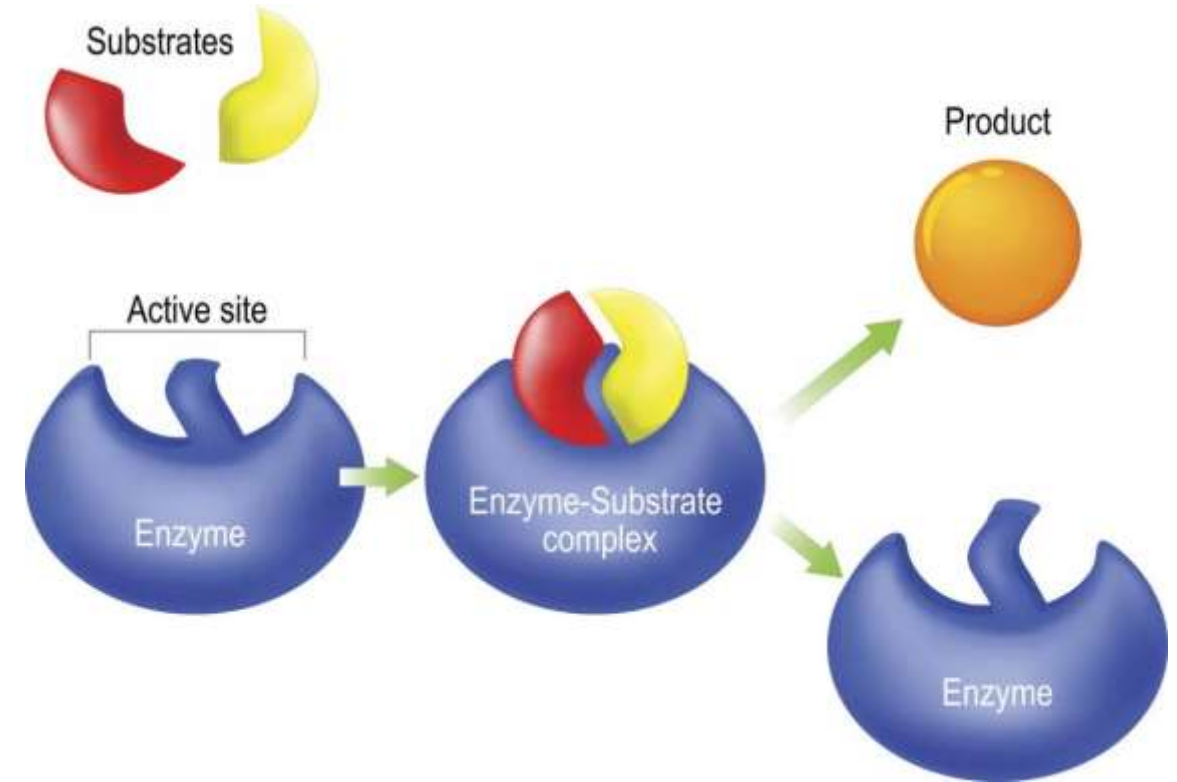
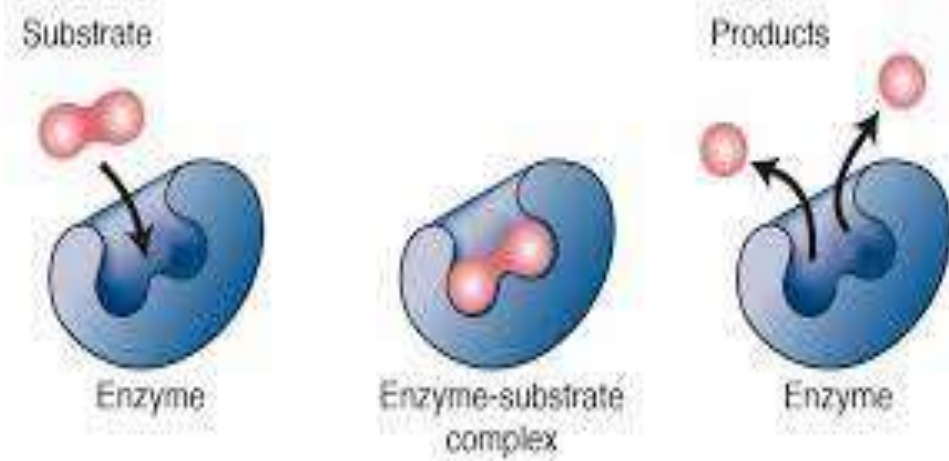
IMPORTANT FUNCTION OF ENZYMES

- Enzymes help speed up chemical reactions in the human body.
- Respiration
- Digesting food
- Muscle and nerve function etc,, among thousands of other roles.
- Each cell in the human body contains thousands of enzymes. Enzymes provide help with facilitating chemical reactions within each cell



ENZYMES

Mechanism of enzyme activity





CHROMOSOMES



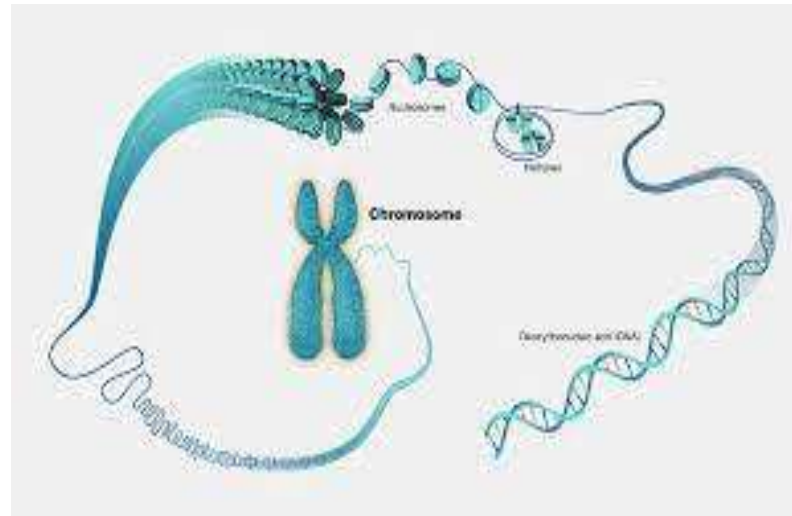
- A chromosome is a long DNA molecule with part or all of the genetic material of an organism.
- In most chromosomes the very long thin DNA fibers are coated with packaging proteins; in eukaryotic cells the most important of these proteins are the histones.
- These proteins, aided by chaperone proteins, bind to and condense the DNA molecule to maintain its integrity.
- These chromosomes display a complex three-dimensional structure, which plays a significant role in transcriptional regulation.



FUNCTIONS OF CHROMOSOMES



- The main function of chromosomes is to carry the DNA and transfer the genetic information from parents to offspring.
- Chromosomes play an important role during cell division.
- They protect the DNA from getting tangled and damaged.





Thank You