

Which base is found in RNA but not DNA ?

1. Cytosine
2. Uracil
3. Adenine
4. Thymine

In the DNA Double Helix, complementary base pairs are held together by:

1. N-glycosidic bonds
2. hydrogen bonds
3. ionic bonds
4. peptide bonds.

The three pyrimidine bases in are:

1. Cytosine, Thymine and Uracil
2. Adenine, Uracil and Guanine
3. Adenine, Thymine and Guanine
4. Thymine, Guanine and Cytosine.

A DNA strand has the sequence A-C-A-G-C-C-G-T-A. What would be its complementary strand ?

1. T-G-T-C-G-G-C-A-T
2. U-G-U-C-G-G-C-A-U
3. A-C-A-G-C-C-G-T-A
4. G-T-G-A-T-T-A-C-G

Antibiotics are most effective against:

1. bacteria
2. viruses
3. fungi
4. worm parasites.

The DNA molecules of different species differ in their:

1. phosphate backbone
2. sequence of bases
3. type of nucleotides
4. all of the above.

The number of hydrogen bonds that hold the Adenine - Thymine base pair together is:

- a) 5
- b) 3
- c) 2
- d) 4.

The difference between DNA and RNA is:

1. The RNA sugar phosphate backbone contains ribose rather than deoxyribose.
2. DNA molecules are double stranded while RNA molecules are single stranded for the most part.
3. Thymine in DNA is replaced by Uracil in RNA.
4. All of the above.

The DNA molecule is a polymer. Its monomer units are:

1. nucleic acids
2. amino acids
3. nucleosides
4. nucleotides.

The total length of a DNA molecule in the human genome when fully outstretched is approximately:

- a) 1.8 meters
- b) 1.8 millimeters
- c) 1.8 centimeters
- d) varies from person to person.

Because one original strand of the double-stranded DNA helix is found in each daughter cell (after cell division), the DNA replication process is:

1. semiconservative
2. derivative
3. conservative
4. dispersive.

The technique Rosalind Franklin used to determine the structure of DNA was:

1. centrifuge analysis
2. X-Ray diffraction
3. bacteriophages
4. none of the above.

The single stranded molecule that is transcribed from a DNA template (i.e. a photocopy of a specific section of the DNA molecule) and is subsequently used to manufacture proteins is:

1. mRNA
2. tRNA
3. rRNA
4. snRNA.

How does the sequence of a strand of DNA correspond to the amino acid sequence of a protein? This concept is explained by the central dogma of molecular biology which states that:

1. DNA is replicated and sections of the replica are used to make protein.
2. DNA is used to make RNA which is used to make protein.
3. Protein is manufactured directly from DNA without any intermediate.
4. None of the above.

A nucleoside consists of:

1. a phosphate group, a pentose sugar and a nitrogenous heterocyclic base
2. a pentose sugar and a oxygen base
3. a hexose sugar and a nitrogenous heterocyclic base
4. a pentose sugar and a nitrogenous heterocyclic base.

Each nucleotide in a DNA molecule consists of:

1. a sulphonyl group, a pentose sugar, and a nitrogenous heterocyclic base
2. a phosphate group, a pentose sugar and a nitrogenous heterocyclic base
3. a phosphate group, a hexose sugar and a nitrogenous heterocyclic base
4. a phosphate group, a pentose sugar, and a oxygen base.

The Double Helix structure of DNA was first described by:

1. Watson and King
2. James Watson, Francis Crick and Maurice Wilkins
3. Peter Mitchell
4. Oswald Avery.

The scientist(s) who developed a technique to sequence DNA and later won a Nobel prize for their achievement in 1980 is(are):

1. Harold Varmus and Rodney Porter
2. Walter Gilbert and Frederick Sanger
3. Clara Bloomfield
4. Arnold Levine and Gerald Edelman.

One of the surprises uncovered by the Human Genome Project was the surprisingly small number of genes that humans possess. The number is approximately:

- a) 10,000
- b) 35,000
- c) 80,000
- d) 60,000.

The scientist who reported that DNA composition is species specific was:

1. Hamilton Smith
2. Erwin Chargaff
3. Herbert Boyer
4. Sidney Brenner.

What are the respective sizes of a virus and a plant cell?

- A. 3 mm, 30 mm
- B. 30 nm, 30 μm
- C. 30 μm , 30 nm
- D. 3 cm, 30 cm.

Which of the following is not a part of the cell theory?

- A. All animals are formed by cells.
- B. Reproduction requires vegetative duplication or the sexual mixing of gametes.
- C. Cells are the smallest form of life.
- D. Abnormal cells self destruct by apoptosis.

What type of microscope would allow you to study the orderly sequence of events that lead to the separation of chromosomes during mitosis? (Chromosomes are found inside of the cell's nucleus.)

- A. scanning electron microscope
- B. light microscope
- C. transmission electron microscope
- D. long-range telescope.

Cells that have stopped dividing and are differentiating are:

1. cancer cells
2. in the G2 phase of the cell cycle
3. in the G1 phase of the cell cycle
4. in the S phase of the cell cycle
5. in the M phase of the cell cycle.

What DOES NOT normally happen during gastrulation?

- A. Three embryonic germ layers are established.
- B. A cavity forms inside the developing embryo that will become the primitive gut.
- C. The embryo increases dramatically in size.
- D. Embryonic germ layers begin to be committed toward distinct developmental fates.
- E. Cell migrations are a prominent feature of this developmental stage.

At what stage of animal development do cells first move from the surface of the embryo into the interior, resulting in a two- or three-layered embryo?

- A. zygote formation
- B. blastulation
- C. neurulation
- D. gastrulation
- E. metamorphosis.

Which embryonic germ layer has the fate of forming the brain and nervous system:

- A. mesoderm
- B. archenteron
- C. endoderm
- D. blastocoel
- E. ectoderm.

The sheet of cells in the blastula of a developing animal embryo is called the:

- A. blastocoel
- B. blastoderm
- C. blastoplast
- D. blastopore
- E. mesenchyme.

The ability to distinguish "self" antigens from "non-self" (foreign) antigens is called:

1. compatibility
2. tolerance
3. autoimmunity
4. immunological equilibrium.

Homo sapiens arose about:

1. 250,000
2. 1.8 million
3. 4 to 4.5 million
4. 60 million years ago.

The following are autoimmune diseases EXCEPT:

1. rheumatoid arthritis
2. lupus erythematosus
3. colon cancer
4. rheumatic fever.

During which period of embryonic development is the embryo most sensitive to the effects of externally derived agents such as alcohol, psychoactive drugs, etc.:

1. first trimester
2. second trimester
3. third trimester
4. all periods have equal sensitivities.

All of the cellular events of development such as division, differentiation, movement, and even death are most accurately described as the result of:

1. unknown causes and unpredictable sequences
2. chance events which follow the laws of probability and statistics
3. gene activation and gene repression events
4. removal and addition of DNA in certain regions of the chromosomes.

Allergies are associated with which class of immunoglobulin?

1. IgM
2. IgG
3. IgA
4. IgE

During prophase of mitosis, the nuclear membrane disappears.

- a) True, it occurs early in prophase.
- b) True, it occurs late in prophase.
- c) False, it is not associated with prophase.

Is crossing over (swapping of segments of DNA between homologous chromosomes) seen in mitosis?

- a. Yes, it is a normal part of mitosis.
- b. No, crossing over is not associated with mitosis.
- c. Yes, but it only occurs in fetal cells.
- d. None of the above.

During which stage of mitosis does DNA replication occur?

- a. Prophase
- b. Anaphase
- c. Metaphase
- d. None of the above.

At what phase in the cell cycle does DNA replication occur?

- a. G1
- b. S
- c. G0
- d. M.

Which of the following is NOT correct?

- a. Mitosis is also known as karyokinesis.
- b. Cytokinesis is a part of mitosis.
- c. Metaphase occurs before anaphase.
- d. None of these.

In meiosis the chromosome number is reduced to the haploid number in a diploid animal.

- a. Yes, and this is a normal part of mitosis, too.
- b. Yes.
- c. No, it remains at the diploid number.
- d. None of the above.

During which stage of meiosis does DNA replication occur?

- a. Prophase I
- b. Prophase II
- c. Metaphase I
- d. None of the above.

In which stage of meiosis does crossing over occur?

- a. Anaphase I
- b. Metaphase II
- c. Zygotene
- d. Prophase I.

What is the value of pi to 10 decimal places?

- a. 3.1415968324
- b. 3.1415926535
- c. 3.1415931586
- d. 3.1415986542.

What is meant by the term, "pairing of homologous chromosomes?"

- a. It indicates that two different chromosomes (different genes on each) come together.
- b. It indicates that two identical chromosomes (same genes with the same DNA sequences in each gene) come together.
- c. It indicates that two similar chromosomes (same genes, but with potentially different DNA sequences in each gene) come together.
- d. It is irrelevant, as this does not occur as part of meiosis.

Prokaryotes include:

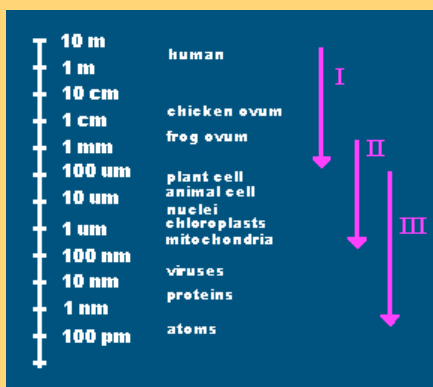
- A. plants and animals
- B. bacteria and fungi
- C. bacteria and blue-green algae
- D. protists and blue-green algae.

From the following, select the statement that is true:

- A. All cells have a cell wall.
- B. Animal cells contain microtubules but plant cells do not contain microtubules.
- C. The Golgi apparatus is found only in animal cells.
- D. Chloroplasts are found in plant cells but not in prokaryotic or animal cells

In the figure on the left, the arrows labelled I, II, & III represent the resolving power of:

- A. the electron microscope, the human eye, and the light microscope.
- B. the light microscope, the electron microscope, and the human eye.
- C. the scanning electron microscope, the transmission electron microscope, and the light microscope.
- D. the human eye, the light microscope, and the electron microscope.



Select the FALSE statement about glycolysis:

- A. Glycolysis is the breakdown of one molecule of glucose into two molecules of pyruvate.
- B. Glycolysis occurs in the cytosol or cell sap.
- C. Glycolysis occurs within mitochondria.
- D. Glycolysis occurs in both aerobic and anaerobic organisms.