

Answer key – Quiz 4

1. In a typical eukaryotic cell, histones and DNA exist in a **1:1** 'mass ratio'.

Histones are the chief protein components of chromatin. They act as spools around which DNA winds, to form the nucleosome. The nucleosome core particle consists of approximately **147** base pairs of DNA. There are a total of six classes of histones (H1, H2A, H2B, H3, H4, and H5) organized into two super classes as follows:

- **Core histones** – H2A, H2B, H3 and H4
- **Linker histones** – H1 and H5

2. **Tyrosine** is not a basic amino acid.

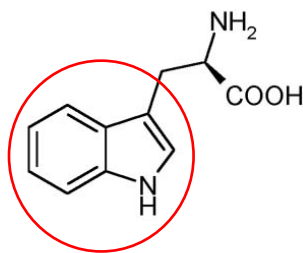
3. Trypsin is a **serine protease** found in the digestive system, where it breaks down proteins. Trypsin cleaves peptide chains at the carboxyl side of the amino acids **lysine and arginine**, except when either is followed by proline.

4. **Phosphatidylserine** is a phospholipid component, usually kept on the inner-leaflet or the cytosolic side of cell membranes by an enzyme called **translocase**. But it is redistributed to the extracellular surface during apoptosis, by a hypothetical protein known as **scramblase**.

5. **Fluorescence recovery after photobleaching (FRAP)**. All the other techniques /methods are used to study protein-protein interactions.

6. A cofactor is a **non-protein** chemical compound that is bound (either tightly or loosely) to an enzyme and is required for catalysis. **Magnesium, zinc and cobalt** are the co-factors for hexokinase, carbonic anhydrase and Vitamin B₁₂, respectively.

7. **Tryptophan** contains indole functional group.



8. Molarity, M = moles/liter (or)
$$\frac{1000 \times \text{wt in grams}}{\text{Molecular wt} \times \text{volume in mL}}$$

100 g of compound is required to make a 1Litre solution of 1 Molar concentration.

9. **Monocytes** are **NOT** "Professional Antigen Presenting Cells" (APC). An antigen-presenting cell (APC) or accessory cell is a cell that displays foreign antigen complexed with MHC on its surface. T-cells may recognize this complex using their T-cell receptor (TCR).

10. Vander waal's bond < electrostatic bond < hydrogen bond < covalent bond

Bond type	Energy (kJ/mol)
Covalent, e.g. C-C	350
Electrostatic	15
van der Waal's	10
Hydrogen	21

- Electrostatic interactions are formed between positive and negative ions. The bond is non-directional, meaning that the pull of the electrons does not favor one atom over another.
- Vander Waals forces (London forces) are weak forces between temporary dipoles. These forces may be attractive or repulsive. They are also non-directional.
- A hydrogen bond results when a hydrogen atom that is covalently bound to an electronegative atom (e.g. O, N, S) is shared with another electronegative atom. A hydrogen bond is directional toward the electronegative atom.

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