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 Biotechnology

 Bch202

1. Vitamins can be broadly classified into 2 main categories based on their solubility
2. Fat soluble vitamins
3. Water soluble vitamins

Biochemical importance include helping regulate cell growth, reproduction and digestion

1. Thymine- TDP is the coenzyme that is connected with the energy releasing reaction in carbohydrates metabolism; the enzyme dehydrogenase catalyses ( oxidative decarboxylation) the irreversible conversion of pyruvate to acetyl co-A

Riboflavin- FMN is the coenzyme that participates in many redox reaction responsive for energy production

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Base | Nucleoside | Nucleotide | Abbreviation  | Nucleic acid |
| Purine |  |  |  |  |
| Adenine | AdenosineDeoxyadenosine | AdenylateDeoxyadenylate | AmpDamp | RNA DNA  |
| Guanine | GuanosineDeoxyguanosine | GuanylateDeoxyguanylate | Gmp Dgmp | RNA DNA  |
| Pyrimidines |  |  |  |  |
| Cytosine | CytidineDeoxycytidine | CytidylateDeoxycytidylate | Cmp Dcmp  | RNADNA |
| Thymine | Deoxythymine | Deoxythymidylate | Dtmp  | DNA  |
| Uracil | Uridine | Uridylate | Ump | RNA  |



5. When a person shifts from a bright light to a dim light rhodopsin stored are depleted and vision is impaired. However within a few minutes known as dark adaptation time rhodopsin is resynthesied and vision is impaired. Dark adaptation time is increased in vitamin A deficient individuals.

6. Vitamin D is the unnamed vitamin and is absorbed in the small intestine for which bile is essential; vitaminD enters the circulation bound to plasma -alpha globulin and is distributed through the body

7. Acid hydrolysis cleaves susceptible Purine N- glycosyl bond in both DNA and RNA , when RNA is boiled in dilute acid adenine and guanine are released leaving an apurin acid which maybe further hydrolysis to a mixture of pyrimidine nucleotides. The pyrimidine are more resistant to acid hydrolysis

Alkali hydrolysis of RNA produces a mixture of 2 and 3 prime nucleotides of cyclic mono phosphate intermediate

8. The double helix structure was proposed by James Watson and Franck’s crick in 1953 and it can be compensated to a twisted ladder; the two strands are anti parallel; the width is 20degreeA; each strand of DNA has a hydrophilic deoxyribose phosphate backbone; each turn if the helix is 34 degrees A; the two poly nucleotide chains are of identical but complementary to each other due to base pairing

9.

|  |  |  |
| --- | --- | --- |
|  | RNA  | DNA  |
| Sugar moiety | Ribose  | Deoxyribose |
| Nitrogenous bases | Adenine guanine cytosine and uracil | Adenine guanine thymine and cytosine |
| Pairing | Adenine pairs with uracil | Adenine pairs with thymine  |
| Number of strand | One | Two |
| Reaction with alkali | Hydrolyeses | No effect |

10. Functions

1. Nucleotides are activated precursors of DNA and RNA
2. Nucleotides of adenine acts as carrier of methy group in the form of S-adenoyl methionine
3. ATP is a universal currency if energy in biological system
4. Gtp is involved in protein synthesis as source of energy
5. Adenine nucleotides are components of 3 major enzymes NAD+, FAD+, CoA
6. Nucleotides are metabolic regulators e.g C-AMP and c GMP