Nucleoprotein Metabolism

Synopsis

- Fates of dietary Nucleoproteins/Nucleic Acids.
- De novo Biosynthesis of Purines and Pyrimidines.
- Salvage of Purines and Pyrimidines
- Catabolism of Purines and Pyrimidines

Fates Of Dietary Nucleoproteins

- Nucleoproteins are conjugated Proteins.
- containing Nucleic acids as a prosthetic group.

- Nucleoproteins are constituents of each and every living cell.

- **Food substances** of both plant and animal origin **contain Nucleoproteins or Nucleic acids** in them.

Digestion and Absorption Of Nucleoproteins

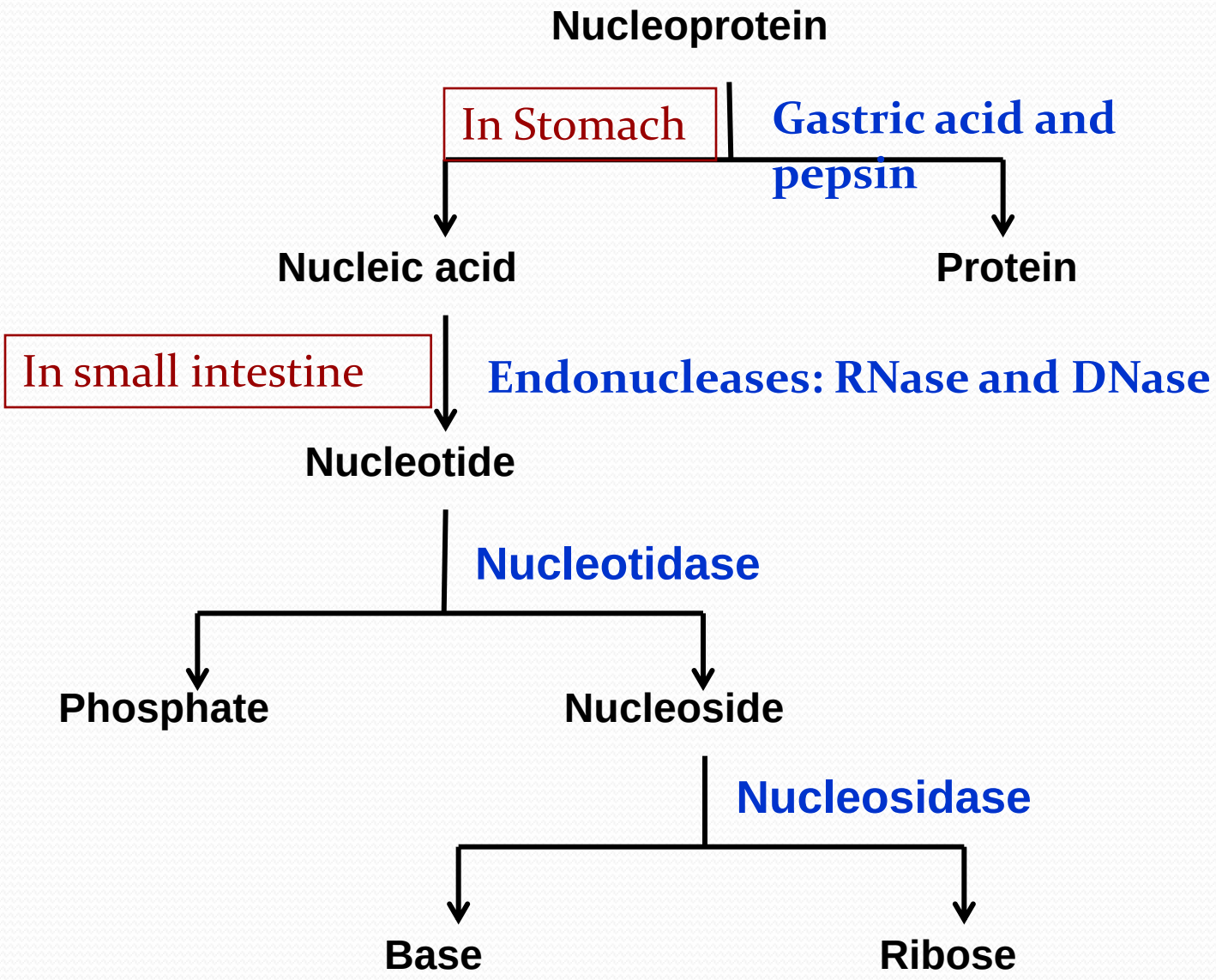
- Dietary Nucleic acids remain unchanged in mouth.
- In Stomach **gastric HCl denatures** Dietary Nucleoproteins.
- Cleaves Hydrogen bonds of Nucleic acids.

- Predominant and complete digestion of Nucleic acids takes place **in small intestine**.

- The **specific Enzymes** required for the **digestion of DNA and RNA** are present in the**Pancreatic and Intestinal juice** which specifically act and break the bonds.

- **Nucleic acids :** are digested in the small intestine by **:** Deoxyribonuclease / Phosphodiesterase to **generate Nucleotides.**
- **Nucleotides** and Nucleosides are, **degraded to** three components :
- **Nitrogen Base , Pentose and Phosphate**

Degradation of Nucleoproteins



End Products Of Nucleic Acid Digestion

- **Nitrogen Bases**:
  - Purines and Pyrimidine
- **Sugars:**
  - Ribose and Deoxyribose
- **Phosphoric Acid**

Absorption

- Dietary Purines and Pyrimidines obtained through digestion of Nucleic acids are absorbed through intestinal lumen.
- Some **unabsorbed Purines** are metabolized by intestinal microbial flora and **excreted out through feces**.

- The **absorbed Nitrogen bases are carried to Liver .**
- These are **degraded and excreted out of the body.**
- Ribose can be absorbed and catabolized to generate energy.

Nucleotides

- Nucleotides are chemically composed of
  - Nitrogen base: Purines and Pyrimidines
  - Sugar: Ribose / Deoxyribose
  - Phosphate group

Functions of Nucleotides

- **Precursors/Building blocks for DNA and RNA synthesis**
- **Essential carriers of chemical energy, especially ATP (**Energy transformation)
- **Components of the coenzymes NAD$^+$, FAD, and coenzyme A**

Can Cells Biosynthesize Nucleotides?

- Nearly all living organisms biosynthesize Purine and Pyrimidine Nucleotides through "*De novo biosynthesis pathway*"
- Many organisms also "Salvage" Purines and Pyrimidines from diet and degradative pathways.