M.SC
Semester
III Core
Course XI
Bio-Inorganic Chemistry

TOPIC:- Copper Metabolism

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Biochemical functions

- Copper is an essential constituent of several enzymes.
- These include cytochrome oxidase, catalase, tyrosinase, superoxide dismutase, monoamine oxidase, ascorbic acid oxidase, ALA synthase, phenol oxidase and uricase.
- Copper is involved in many metabolic reactions.

- Copper is necessary for the synthesis of hemoglobin (Cu is a constituent of ALA synthase, needed for heme synthesis).
- Lysyl oxidase (a copper-containing enzyme) is required for the conversion of certain lysine residues of collagen & elastin to allysine which are necessary for cross-linking these structural proteins.

- **Ceruloplasmin serves as ferroxidase & is involved in the conversion of iron from Fe^{2+} to Fe^{3+}**
- **Copper is necessary for the synthesis of melanin & phospholipids**
- **Development of bone & nervous system (myelin) requires Cu.**

- Certain copper-containing non-enzymatic proteins have been identified, although their functions are not clearly known.
- These include hepatocuprein (storage form in liver), cerebrocuprein (in brain) and hemocuprein (in RBC).
- Hemocyanin, a copper protein complex in invertebrates, functions like hemoglobin for O_2 transport.