Research topics for 1st level students

(Couse name: Nutrition and Biochemistry)

1. Digestion of carbohydrates begins in the mouth and continues along the digestive tract. Explain the diversity and specificity of enzymes in different parts of the GIT.
2. To control the energy yield from glycolysis, different steps are subjected to hormonal, allosteric or covalent regulation. Explain these regulatory mechanisms and mention their biological significance during well-fed and fasting states.
3. Carbohydrate metabolism is a multi-step process subjected to strict regulation. Discuss the biological role of TCA cycle in carbohydrate metabolism.
4. In the complete oxidation of fuel molecules, most of the ATP is produced by oxidative phosphorylation. Discuss the biological significance of electron transport chain (ETC).
5. Actual digestion of proteins begins in the stomach. Explain the diversity and specificity of enzymes and hormones in different parts of the GIT.
6. Mammalian cells have specialized systems and machineries for degrading proteins. Some are ATP-dependent while others are not. Discuss these mechanisms and their biological significance in the cell.
7. Phase 1 of amino acid catabolism involves both transamination and deamination reactions. Discuss both the biological and clinical significance of these reactions.
8. Urea cycle in the liver guarantees efficient nitrogen disposal. Discuss the role and regulation of the cycle in the human body, and the disturbances leading to hyperammonemia.
9. “Vitamin A” is a collective term used for several related biologically active molecules. Discuss the various dietary sources and biologic roles of this vitamin in human body.
10. Vitamin D, PTH and calcitonin have synchronized actions in regulating calcium and phosphate levels in the body. Discuss these actions in both physiological and pathological states.
11. Sufficient vitamin E and selenium levels in the body reduce the possibility of oxidative stress. Discuss the mechanisms behind this activity and the changes occurring in the body in case of their deficiency.

12. Vitamin K is crucial for efficient blood clotting machinery. Discuss the sources, biological roles and clinical significance of this vitamin in human body.
13. Nutritional anemia is a common manifestation of water-soluble vitamin deficiency. Discuss the different types, causes, methods of diagnosis and treatment options of nutritional anemia.
14. Beriberi is the classic syndrome of thiamin deficiency. Discuss the physiological roles of thiamin in human body and changes occurring in case of deficiency.
15. Niacin is necessary for the synthesis of a number of essential coenzymes in human body. Explain the biological roles of these niacin-based coenzymes and recent uses for niacin in medicine.
16. "Vitamin B6" is a collective term used for several related biologically active molecules. Discuss their biological significance in the body and the consequences of long-term use of high doses.
17. Folic acid is a necessary supplement for successful pregnancy. Discuss the biological importance of the vitamin and the consequences of its deficiency.
18. Regular fluoride consumption is the most effective way to prevent dental caries. Mention the various sources of fluorine and discuss its physiological significance for human health.
19. Goiter is a common complication for thyroid dysfunction. Discuss the role of iodine in preventing goiter and the effect of high doses of iodine on human health.
20. Iron-deficiency anemia is the most common micronutrient deficiency. Discuss the various functions of iron in the body and the changes seen in the body during iron deficiency.
21. Zinc is a component of more than 100 enzymes inside the body. Discuss the different dietary sources of this micromineral and the changes seen during its deficiency.
22. Copper deficiency is manifested in many organs. Discuss the possible causes and manifestations of copper deficiency.
23. Manganese is a cofactor for a number of enzymes in human body. Discuss the biological roles and the consequences of manganese overdose on human health.

24. Chromium is a component of many weight-reduction pills in the market. Discuss the dietary sources and various roles of chromium in the body (including weight reduction).
25. Molybdenum is an essential cofactor for a number of enzymes. Discuss the significance of pathways catalyzed by these enzymes and the consequences of molybdenum deficiency on each pathway.