

	<p><b>SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION &amp; RESEARCH</b></p> <p><b>SRI DEVARAJ URS MEDICAL COLLEGE</b>  <b>Tamaka, Kolar</b>  <b>Department of Biochemistry</b></p>	
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**The learning resources of the Department includes** – Black Boards, white Boards, LCD Projectors, OHP Projectors, Charts, Display Boards, Department Museum and Library, short films and pictorial depiction of the scheduled practical classes and

E- Modules.

**Following are the few examples for E - modules :**

1. A 54 yrs old woman who was bed bounded in a nursing home began to develop swelling of her left leg. She was evaluated with venous Doppler ultrasound and was found to have a deep vein thrombosis. She was immediately started on heparin to prevent the clot from further enlarging.
  - a. What is the chemical nature of Heparin?
  - b. How will it help in preventing the clot formation?
  
2. An 8 month old child presents with a history of poor growth and a chronic cough. Past history suggested that he had respiratory distress after birth. He was initially breast-fed, but due to frequent vomiting and loose bowel movements, he was changed to formula feeding. Despite trials of different types of formulas (soy, hypoallergenic, etc.), his clinical course was remarkable for bloating, diarrhea and failure to thrive. He developed a daily cough and some respiratory difficulty. At the age of 5 months he was hospitalized for respiratory distress and was diagnosed as having asthma. He continued to have loose, large, greasy, foul-smelling stools and failure to thrive. An iontophoresis of pilocarpine sweat test is now being obtained and serum chloride was 70 mEq/L.
  - a. What is your probable Diagnosis?
  - b. What is the Pathophysiology of the disease?
  
3. An 80 year old man presented with impairment of brain functions, alterations of mood and behavior. His family reported the he was having progressive disorientation and memory loss over the past six month. He has trouble handling money and paying

bills. He repeated questions, took longer to complete normal daily tasks, had poor judgement, and had developed mood and personality changes. There was no family history of dementia.

The routine urine, blood and CSF analysis did not reveal much.

After CT scan found accumulation of some of the proteins plaques in the brain, based on these findings the disease was diagnosed.

- a. What is your probable diagnosis?
- b. What is the biochemical defect in this disease?

4. A 44 year old man who had lost his job because of absenteeism, presented to his physician complaining of loss of appetite, fatigue, muscle weakness and emotional depression. On physical examination revealed enlarged liver and jaundice and hint of alcohol in his breath. The peripheral blood picture showed enlarged blood cells (Macrocytic). A bone marrow aspirate confirmed the suspicion that he had a megaloblastic anemia because it showed a greater than normal number of red and white blood cell precursors, most of which were larger than normal. Further analysis revealed that serum folic acid level was 1.2ng/ml (normal 2.5-20 ng/mL) and B12 was 253 ng/mL (normal 200-900ng/mL).

- a. What is the cause of megaloblastic anemia in this patient?
- b. What is its correlation with alcoholism?
- c. What are the other causes for Folic acid deficiency?
- d. What is the interrelationship between folic acid and Vit B12?

5. A child aged around 8 years was brought to the hospital pediatrician complaining of throat pain, on examination the child had fever, Malaise, body pains with cough and cold. The pediatrician diagnosed the condition to be upper respiratory tract infection, enlarged tonsils and pharyngitis. Mother informed to the pediatrician that child is sensitive to injection penicillin. The pediatrician advised sulfonamides instead of Penicillin, NSAIDS and antihistamines.

- a. What is the role of sulfonamides in bacterial infection
- b. Name the type of enzyme inhibition
- c. Comment on  $V_{max}$  and  $K_m$  on related enzyme inhibition

6. A man aged around 45 years reported to physician and informed him that he has come for Master Health Checkup. On clinical examination the physician confirmed him to be normal. Family history suggested both his parents are diabetic. Physician advised him to get Fasting Blood Glucose and Post Prandial blood Glucose getting done. The patient informed that he is not at any drugs. Fasting Blood Glucose values were observed to be more than Post Prandial blood Glucose (120 mg/dl and 100 mg/dl respectively).

- a. What is your opinion about this clinical scenario
- b. What are the differential diagnosis
- c. Is there any laboratory error involved in this
- d. What is the advantage of collecting blood sample in fluoride EDTA tube
- e. What is the type of enzyme inhibition you come across in this clinical case scenario
- f. Explain  $V_{max}$  and  $K_m$  for this enzyme inhibition

7. A 58 yrs old woman who was treated in the ICU with intravenous nitroprusside for hypertensive crisis for 48 hrs. BP was restored, but she had a burning sensation in her throat & mouth, followed by nausea, vomiting, excessive sweating, agitation & dyspnea. There was sweet almond smell in her breath & ABG analysis revealed severe metabolic acidosis.

- a. What is cause for the likely diagnosis?
- b. Explain the Biochemical mechanism in this case?
- c. How is it managed?
- d. What is the pathogenesis?

8. A 65 years old man presented with anaemia, weight loss and passage of bulky pale stools. On examination, he had hepatosplenomegaly. His plasma electrolytes were normal. Further laboratory test were,

Plasma total proteins: 5.2 g/dl

Albumin : 2.5 g/dl

Calcium : 6.8 mg/dl

Phosphates : 2 mg/dl

Alkaline phosphatase: 300 IU/L

His faecal fat excretion was 55g over 3 days (normal less than 21 g) & his plasma 25-hydroxy cholecalciferol was 28 nmol/L (Reference range 40-160)

- a. What is the probable diagnosis?
- b. Write the reference range for the above parameters.
- c. What functional analysis could be done in this case?
- d. How to interpret low plasma albumin?
- e. How to interpret low plasma Vit D, calcium & increased ALP levels?
- f. What is the cause for anaemia in this patient?

9. A 65 year old male patient who was unwell for a period of several weeks came to a hospital. He had loss of appetite, weakness and nausea. His eyes were dark yellow. Urine was also deep yellow but stool color was pale. He had lost 5 kgs of weight in 2 months. There was no history of fever, drug intake or alcoholism. Patient also had yellow discoloration of skin, sclera and palate.

His laboratory report was as –

Total Bilirubin – 10.2 mgs%

Indirect Bilirubin – 1.5 mgs%

Direct Bilirubin – 8.7 mgs%

SGOT – 45 IU/L

SGPT – 38 IU/L

ALP – 402 U/L

Urine Examination –

Bile pigment – Positive

Urobilinogen – Negative

Bile Salts – Positive

- a. What is your probable diagnosis?
- b. What is the biochemical defect?
- c. What is the test for estimation of bilirubin? What is the principle?

- d. Name the bile pigments. Explain why bile salts/pigments were found in urine sample.
- e. What are the causes and symptoms of biliary obstruction?

10. A 50 yrs. old house wife complains of progressive weight gain of 30 kgs in 1 year, Fatigue, postural dizziness, loss of memory, slow speech, deepening of her voice, dry skin, constipation and cold intolerance. Physical examination revealed temperature of 96<sup>0</sup>F, pulse 58 beats/min and regular, BP 110/60 mm of Hg, moderately obese, speaks slowly, has puffy face with pale, cool, dry and thick skin. Thyroid gland is not palpable.

CBC within normal

Serum T4- 3.8 µg/dl (Reference Interval: 4.5-12.5 µg/dl), Serum TSH -01 µU/ml (Reference Interval: 0.2-3.5 µU/ml), Serum cholesterol- 255 mg/dl (Reference Interval: <200mg/dl)

- a) What is your probable diagnosis?
- b) Name the amino acid which is required for the synthesis of thyroid hormones.
- c) Name biological important compounds derived from this amino acid.

Explain any two pathways related to this amino acid.