CHAPTER

Chemistry of Amino Acids and Proteins

ECE 3.1: MULTIPLE MYELOMA

Date:_____

A 45-year-old man presented with continuous aching in lower back and tiredness. He had been well until 3 months back when he noticed decrease in his weight with a loss of about 8 kg. He was a non-smoker but had been suffering from recurrent episodes of respiratory tract infections for the past 2 years. Presently, he feels short of breath even after slight exertion.

On examination, he showed pallor and had a number of tender spots on bones, particularly on the spine. Blood film showed normochromic, normocytic anemia. Biochemical analyses revealed raised calcium levels with deranged renal function tests. Total serum proteins were high with low serum albumin levels. Bence-Jones proteins came out positive in urine.

Radiological examination of skull showed punched out lesions.

- 1. What is the probable diagnosis?
- 2. Explain the sign and symptoms on the basis of diagnosis.
- 3. Discuss other tests that can be done to confirm the diagnosis.
- 4. Why renal function tests were deranged in this condition?
- 5. What are Bence-Jones proteins? How are they detected?
- 6. Why is hypercalcemia seen in this patient?
- 7. Mention the treatment of this condition.
- 8. What are the prognostic indicators in this condition?

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ANSWERS TO ECE 3.1		
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ECE 3.2: ALPHA-1 ANTITRYPSIN DEFICIENCY

Date:_____

A 45-year-old male came to the hospital with complaints of dyspnea, wheezing during exertion and productive cough that typically worsen in the morning with production of clear-to-white sputum. There was family history of death of his brother earlier due to lung disease. Chest X-ray revealed panacinar emphysema. Blood plasma showed low alpha-1 antitrypsin levels.

- 1. What is your diagnosis?
- 2. Explain the relationship of emphysema with alpha-1 antitrypsin.
- 3. Name some other tests done for the diagnosis of this deficiency.
- 4. Draw normal electrophoretic pattern obtained on serum electrophoresis.
- 5. Which instrument is used for determining the concentration of different fractions obtained on serum electrophoresis?
- 6. Write the relative concentration (in %) of normal serum protein electrophoretic bands.
- 7. Give few examples of alpha-1 globulin family proteins.
- 8. What are the available options of treatment in this condition?

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ANSWERS TO ECE 3.2

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ECE 3.3: ALZHEIMER'S DISEASE

Date:_____

A 72-year-old man had a history of disorientation, memory loss, alteration in mood and behavior. He had difficulty in handling money and in completing normal daily tasks. He had poor judgment and easy irritability, aggression and forgetfulness. No family history of dementia was present. Routine investigations of blood, urine and CSF were normal. CT scan head plain showed diffuse cerebral atrophy.

- 1. What is the probable diagnosis?
- 2. Explain the biochemical basis of the disease.
- 3. What are plaques and tangles?
- 4. What is the normal mechanism of protein folding?
- 5. Enumerate the proteins that assist in protein folding.
- 6. Name few protein misfolding diseases.

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ANSWERS TO ECE 3.3

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