

SARDAR PATEL UNIVERSITY
M.Sc. (Home Science) III Semester (FN/FBT)

External Theory Examination

Date: 5/12/2012, Wednesday

2.30 p.m to 5.30 p.m

PH03CFDN01/PHO3CFBT03: Molecular Nutrition

Total Marks: 70

Q.I Choose the correct answer from the given options:

(8)

1. Vitamin essential for PARP function and DNA repair
 - a. Niacin
 - b. Folic acid
 - c. Vitamin E
 - d. None of the above
2. Cells that do not have vitamin D nuclear receptor
 - a. Intestinal cells
 - b. Osteoblasts
 - c. Osteoclasts
 - d. Kidney cells
3. Which of the following is not a lipid signaling compound
 - a. Calmodulin
 - b. TLB4
 - c. Ceramide
 - d. DHEA
4. Proinflammatory nuclear factor is
 - a. TNFalpha
 - b. PPARγ
 - c. TGFβ
 - d. PGI2
5. Folic acid is required for
 - a. Apoptosis
 - b. Cell proliferation
 - c. Cell differentiation
 - d. All of the above
6. Form of Vitamin A used for dim light vision
 - a. Retinol
 - b. Retinoic acid
 - c. 11 cis retinal
 - d. trans retinal

(P.T.O)

(-2-)

7. Most cellular proteins are degraded by
 - a. Lysosomes
 - b. Ubiquitin-proteasome system
 - c. Calpain-caspase
 - d. All of the above
8. Gut flora is not affected by
 - a. Obesity
 - b. Antibiotics
 - c. Dietary resistant starch
 - d. Vitamin D

QII. Give reasons for the following : (any seven)

(14)

1. Intestinal mucosa normally does not allow absorption of antigens and microorganisms.
2. Prolonged breastfeeding is recommended for infants who have high IgE in blood.
3. Undernutrition/PEM show increased immunoglobulin but are prone to infection.
4. Zinc plays a major structural role.
5. Eicosapentaenoic acid (EPA) is less inflammatory than arachidonic acid.
6. DNA breaks /okasaki fragments are seen in folic acid deficiency.
7. Vitamin D analog are used for psoriasis and colon cancer.
8. Cardiomyopathy seen in Selenium deficiency could be due to virulent form of virus (coxsackie).
9. Xylulose-5 -phosphate is crucial for activation of carbohydrate responsive element binding protein (ChREBP).
10. GLUT2 may play a role in the glucose dependent control of L- PK expression.

QIII. Answer the following : (any three)

(12)

1. What do you understand by the term Transcriptomics? With examples explain how this technology can be used to prevent or treat nutrition related problem?
2. What is the difference between (i) nutrigenomics and nutrigenetics (ii) Genetics and epigenetics.
3. Give the role of iron, zinc and folic acid in cell proliferation.
4. Write the process of signaling and execution of apoptosis.
5. Discuss Ced 3 and Ced 4 gene for apoptosis.
6. Discuss apoptosis in colorectal adenocarcinoma cells exposed to high doses of β - carotene.

QIV. Answer in brief : (any three)

(12)

1. mTOR pathway functions to confirm sufficient level of amino acids to support protein synthesis and growth. What is this pathway and how does it affect protein synthesis?
2. Vitamin A affects gene transcription as Retinoic acid (RA) acting through RARs and RXR. Give:
 - i. List of RARs and RXRs, why so many RARs?
 - ii. How does RA affect gene transcription?
3. Vitamin A has an important role in organogenesis and embryo development. Severe deficiency as well as excess both results in malformations. What are the reasons/mechanisms?
4. Epidermis 7-dehydrocholesterol is converted to cholecalciferol (vitamin D₃) under UV exposure? However Vitamin D receptor (DR) ligand is 1, 25 cholecalciferol. Where and how is this made?
5. Explain high resolution X-ray crystal structures of the ligand binding domain of RARs and RXRs.
6. Explain Vitamin A signal transduction pathway.
7. Explain *in vivo* the footprinting method for amino acid deprivation.
8. What do you understand by epigenetics? Can any nutrient deficiency modify the effect in the same and how?

QV. Discuss the following : (any three)

(12)

1. Iron Response element (IRE) present on mRNA(s) of ferritin and transferrin receptor (TfR) are responsible for regulating intracellular iron levels. How does intracellular iron bring about this regulation?
2. Give four major functions of zinc and list at least five enzymes in which zinc participates.
3. What is the non-coenzymatic role of NAD where PARP uses it as a substrate?
4. Discuss differentiation of immune cell function and cell-cell interaction by the immune microenvironment.
5. Explain in brief regulatory effects of micronutrients on immune response.
6. Discuss parabiotic animal experiment for leptin and obesity.
7. Explain how leptin regulates important macrophage function.

Q.VI Write a short note on the following: (any four)

(12)

1. Peptide mass analysis
2. Mammalian cell cycle
3. Tumor Necrosis Factor
4. Food allergy
5. Probiotic
6. Intestinal immune system
