

Model answer

Clinical Biochemistry, Midterm Exam, Level 4 Credit Hours System  
Students, April 2016

Mid-term Exam in Clinical Biochemistry

Student Name: ..... Roll No: .....

10

Question One: (10x0.5=5 marks, 10 min)

Complete the following statements:

- 1- Tumor suppressor are normal genes whose absence can lead to cancer
- 2- I.G.T.T test is indicated in poor absorption of oral glucose which results in a flat tolerance curve.
- 3- Sweat chloride test used for assessment of pancreatic insufficiency and CF.
- 4- CA 15-3 is the standard marker for follow up patients with breast cancer.
- 5- D-Xylose absorption test is specific for assessing mucosal absorption of the small intestine.
- 6- AFP and hCG are usually elevated in the blood of men with testicular cancer.
- 7- Prothrombin and CK-MB or LDH are used as biomarkers of AMI. AST
- 8- Measurement of plasma insulin C-peptide can differentiate between hypoglycemia due to insulinoma and that due to exogenous insulin.

Question Two:

Write short account on each of the following statements:  
(5X1=5 marks, 20 min)

1- Fecal fat analysis (principle and clinical applications)

- Normal fecal lipids consists of 60% TG, 30% sterols & 60% fatty acids. (1)
- ↑ Fecal fats are clinically significant to the assessment of pancreatic insufficiency, small intestine disorders or biliary obstruction. (3)
- \* Qualitative: employs fat soluble stains as Sudan III, Sudan IV to stain fat globules in a microscopic slide preparation of stool. Undigested meat particles will also stained, but it distinguished by their rectangular, striated appearance.
- \* Quantitative: by gravimetric measurement. Random stool sample acidified to obtain decreased FA, lipids are extracted into an organic solvent. The solvent evaporated & the residual weighed. a quantitative range  $\leq 6g/day$

## 2- Hormones as tumor markers

\* Hormones are produced by many tumors as insulin produced by islet cell tumor, Calcitonin by thyroid carcinoma & catecholamines by pheochromocytoma.

1]  $\beta$ -HCG :- normally  $\uparrow$  in pregnancy, marker for men with testicular cancer, women with choriocarcinoma or molar pregnancy.  
Its level is  $\uparrow$  in other cancers as breast, lung, GIT.

2] Parathyroid hormone-like protein (PTHrP) :-  
 $\uparrow$  in squamous cell cancer and in breast cancer.

3] Proinsulin C-peptide :-

It differentiates cell type for endocrine-secreting tumors;  $\uparrow$  in insulinoma & islet cell

4] Thyroglobulin :-

\*  $\uparrow$  in follicular carcinoma & return to normal following treatment if all tumor is removed  
\* useful for monitoring residual disease & recurrence of follicular carcinoma.

## 3- Natriuretic peptides.

\* The body's natural reaction to the fluid expansion in CHF is to release brain or b-type natriuretic peptide (BNP) from the heart muscle of the left ventricle.

\* BNP increase urine output of the kidney  $\rightarrow$   $\downarrow$  cellular edema & the load on the left ventricle of the heart.

\* BNP serum level are  $\gg$  than 100 pg/ml in patients with CHF. Thus, BNP is a specific marker of edema due to heart failure.

\* Atrial natriuretic peptide (ANP) is released from atrium heart muscle to affect the sodium level of the fluids.

#### 4- Insulin resistance (definition and its correlations with diabetes)

- \* It is the decreased ability of target tissues, such as liver, adipose & muscle, to respond properly to normal circulating concentrations of insulin. It is characterized by uncontrolled hepatic glucose production and decreased glucose uptake by muscle & adipose tissue.
- \* It occurs when the normal amount of insulin secreted by the pancreas is not able to unlock the door to cells. To maintain a normal blood glucose, the pancreas secretes additional insulin and that lead to ↑ blood glucose or type 2 diabetes.
- \* Causes:-
  - ⊙ IR ↑ with weight gain
  - ⊙ Fat accumulation
  - ⊙ ↑ regulatory substances produced by adipocytes including leptin, resistin, adiponectin
  - ⊙ ↑ level of FFAs.
- \* Type 2 diabetes develops in IR individuals who also show impaired β-cell function. It is observed in the elderly & who are obese, physically inactive or in pregnant women.
- All individuals with type 2 diabetes and many with hypertension, CVD & obesity are IR.

#### 5- Fructosamine (clinical application)

- \* It's a laboratory test used for monitoring diabetes progression.
- \* Measurement of fructosamine: the ketonamine product of non-enzymatic glycation, indicates the extent of glycation.
- \* Glucose bound to plasma proteins undergoes a rearrangement to form fructosamine. Glycated albumin is the major contributor to serum fructosamine measurement.
- \* Glycated albumin has a shorter half-life than hemoglobin. Fructosamine are complementary to Hb A<sub>1c</sub> providing an index of glucose control over the 3 weeks prior to its measurement.



Clinical Biochemistry  
Alternative to Practical Exam

(Time Allowed 15 minutes)

Student Name: \_\_\_\_\_

Roll No: \_\_\_\_\_

Choose One Correct Answer for the Following Questions: (10 X 0.5 = 5 marks)

- 1- The integrity of glomerulus membrane and renal blood pressure determine the glomerular filtration rate.  
a- True  b- False
- 2- The best substance used for assessment of glomerular clearance would be:  
 a- Substance is filtered completely through glomerulus  
b- Substance is reabsorbed through the nephron tubule  
c- A & B  
d- None of the above
- 3- Patient with serum creatinine of 3mg/dL, volume of urine excreted 1500ml/day and urinary creatinine of 0.75g/L, the creatinine clearance is:  
a- 15.5 ml/min  
 b- 27.5 ml/min  
c- 39.5 ml/min  
 d- None of the above
- $$\frac{UV}{P} = \frac{0.75 \times 1000}{1.3} \times \frac{1500}{24 \times 60} = 3$$
- 4- ..... reagent is used for determination of albumin:  
 a- BCG at acidic pH b- BCG at alkaline pH  
c- 2, 4- dinitrophenyl hydrazine d- Bathophenanthroline
- 5- All of the following are precipitating agents used in determination of HDL-cholesterol EXCEPT:  
a- Dextran sulphate b- Polyethylene glycol  
 c- Trichloroacetic acid d- Phosphotungstic acid with (MgCl<sub>2</sub>)
- 6- For determination of serum protein, marked hyperbilirubinemia doesn't cause interference  
a - True  b- False
- 7- The most common type of diabetes among older adults is:  
a- IDDM  b- NIDDM c- GDM

b  
a  
b  
a  
c  
b  
b  
d  
d  
a