READING TEST 17

PART A

TIME: 15 minutes

Look at the four texts, A-D, in the separate Text Booklet.
For each question, 1-20, look through the texts, A-D, to find the relevant information.
Write your answers on the spaces provided in this Question Paper.
Answer all the questions within the 15-minute time limit.
Your answers should be correctly spelt.

Text A

Galectin-3

It is well known that there is a close relation between obesity-induced insulin resistance, immune cells accumulation in white adipose tissue (WAT) and inflammation. Indeed, in obesity WAT is characterized by an increased production and secretion of a wide range of inflammatory cytokines including TNF-alpha and interleukin (IL)- 6, which may have local effects on endothelial, vasculature and target adipose tissues. Therefore, activated macrophages and other antigen presenting cells that are accumulated in elevated number in fat tissue in both types of obese actively secrete a broad spectrum of locally produced pro-inflammatory cytokines including galectin-3 (Gal-3). Gal-3 is a beta-galactoside-binding lectin belonging to a multifunctional protein family, which enhances chemotaxis of immune and antigen presenting cells, reduces insulin-stimulated glucose uptake in myocytes and adipocytes and impairs insulin-mediated suppression of glucose output in hepatocytes. Gal-3 may bind directly to the insulin receptor (IR) and thereby inhibit downstream insulin resistance signaling via diminishing interleukin-1 beta production. Therefore, Gal- 3 is a modulator of apoptosis, necrosis and fibrosis associated with extracellular remodeling.

Text B

Gal-3 is increased in obesity and mediates inflammation and fibrosis in the heart and vessels, as well as in the WAT. The most preclinical and clinical studies suggest that this protein protects from inflammation in obese, while there is a large body of evidence regarding the ability of Gal-3 to deteriorate glucose homeostasis, modulate cell adhesion and induce pro-oxidant pathways. Interestingly, the low serum Gal-3 concentrations are closely associated with insulin resistance in patients with type 2 diabetes mellitus. In contrast, an inverse correlation between serum Gal-3 and glycosylated hemoglobin in type 2 diabetes mellitus was found. In clinical settings Gal-3 strongly independently predicts all-cause mortality and CV mortality in the general population and in patients with known CV disease. In fact, in cross-sectional analyses of 2946 Framingham Heart Study participants circulating Gal-3 was associated well with abdominal adiposity, dyslipidemia, and hypertension, but Gal-3 did not predict incident CV and metabolic diseases after adjusting for cardiometabolic risk factors. Whether Gal-3 could be a predictive marker of the metabolically unhealthy obese is not clear, although Gal-3 deserves further large clinical trials to understand its role in different obese phenotypes' development.

Text C

Natriuretic peptides (NPs) are "cardiometabolic" hormones with well-established cardiovascular, renal, and endocrine abilities affecting sodium reabsorption and blood pressure regulation. Although, NP levels are markers of biomechanical cardiac stress, their role in the nature of the evolution of obese is not fully understood. These controversies affect the clearance of NPs in obese and pathophysiological mechanisms controlling the synthesis of them. While, NP secretion result in a stretch of the cardiac wall and volume overload of cardiac cavities. On the other hand, recent epidemiological and preclinical/ clinical studies have shown that the NP system acts as a deficiency in obese patients is due to worse clearance of NP receptors and neutral endopeptidases. Consequently, NP system in obese is not able to mediate a wide spectrum of cardiovascular and metabolic protective effects (i.e., vasodilation, natriuresis, diuresis, lipolysis, weight loss, lusitropy, lipid peroxidation, and also improve mitochondrial respiration and insulin sensitivity).

Text D

Brutsaert et al. have reported that higher levels of brain NP have associated with decreased risk of diabetes in middle-aged adults and that the interrelation has remained after adjustment for waist circumference, low physical activity, estimated glomerular filtration rate and high sensitive C-reactive protein level. In contrast, it is suggested that the low brain NP levels observed in obesity could causally associated with the incidence of diabetes in obese individuals. The effect of brain NPs might relate to an ability of natriuretic peptides to activate a thermogenic program in brown and white fat tissues, increase energy expenditure and inhibit food intake. Thus, NPs might play several metabolic roles in the development of different phenotypes of obesity, but their predictive role in CV disease development in obese patients is uncertain.

Questions 1-7

For each question, 1-7, decide which text (A, B, C or D) the information comes from. You may use any letter more than once.

In which text can you find information about;

1. Role of this metabolic hormones is not yet certain.

Answer _____

2 .Perform its role when there is a deficiency.

Answer_____

3. Higher and lower level of the metabolic hormones.

Answer _____

4. Known to affect the interior surface of blood vessels and lymphatic vessels.

Answer _____

5. Worsening relative sugar equilibrium.

Answer _____

6 .Introduction to carbohydrate-binding lectin whose expression is associated with inflammatory cells.

Answer _____

7 .May have a direct impact on hemoglobin to which glucose is bound.

Answer _____

Questions 8-14

Answer each of the questions, 8-14, with a word or short phrase from one of the texts. Each answer may include words, numbers or both.

8. What defines the rate of myocardial relaxation?

Answer_____

9. What are more associated with insulin resistance?

Answer _____

10. What can have the potential to have direct impact on insulin resistance?

Answer _____

11. What defines an abnormal amount of lipids?

Answer _____

12. What are the markers of biomechanical cardiac stress?

Answer_____

13 .What is associated with programmed cell death?

Answer_____

14. What causes the cardiac wall to stretch and volume overload of cardiac cavities?

Answer_____

Questions 15-20

Complete each of the sentences, 15-20, with a word or short phrase from one of the texts. Each answer may include words, numbers or both.

15. _____ can be associated with a significantly increased risk for coronary heart disease.

16 .higher levels of brain NP can be connected with the decreased risk of_____

17 .The term_____ is referred to the thickening and scarring of connective tissue, usually as a result of an injury.

18. It is still not clear that Gal-3 is a _____ of the metabolically unh.ealthy obese

19. Excretion of sodium in the urine is a common condition and is called _____

20. NPs may not mediate _____ of lipids.

PART B

In this part of the test, there are six short extracts relating to the work of health professionals. For questions 1-6, choose the answer (A, B or C) which you think fits best according to the text.

1 What is correct about liver toxicity from sulfasalazine?

Hepatotoxicity can arise either from direct toxicity of the drug or its metabolites.

In rare cases, it can be immune mediated.

Immune-mediated toxicity is believed to be due to an idiosyncratic delayed-type hypersensitivity reaction.

Liver toxicity from sulfasalazine

Liver toxicity from sulfasalazine is a rare but serious side effect. It can range from mild elevation in LFTs to hepatic failure and cirrhosis. The occurrence of severe liver toxicity such as acute hepatitis as seen in our patient is <1%. After reaching the gut, sulfasalazine is broken down by the colonic bacteria into its metabolites, i.e., sulfapyridine and 5-aminosalicylic acid. Sulfapyridine is absorbed in the gut and eliminated after acetylation by enzyme N-acetyltransferase which can have variable activity based on the patient's genotype. Patients who have genotypes for slow acetylation are found to be more predisposed to sulfasalazine-induced liver toxicity. Injury can be hepatocellular which presents with disproportionate elevation in serum aminotransferases or cholestasis which presents with disproportionate elevation in alkaline phosphatase. Both patterns of liver injury can have elevation in bilirubin and abnormal tests for liver synthetic function.

2 Adiponectin;

Is a protein hormone which is involved in regulating glucose levels.

Can have positive impact on CAD.

Plays a role in the development of insulin resistance.

Adiponectin

Adiponectin accounts for 0.01% of plasma protein with a half-life of 2.5 h; normal adiponectin plasma level is 5-10 μg/mL with higher levels in females than males due to sexual dimorphism. Adiponectin plasma forms are of two types, high-molecular-weight and low-molecular-weight. In addition, high-molecular-weight adiponectin levels are positively associated with CAD and negatively associated with risk of type 2 diabetes mellitus (DM), but this is not true to the low-molecular-weight adiponectin. Adiponectin serum levels are inversely correlated with body mass index (BMI), visceral obesity, and insulin resistance (IR); thus, it is regarded as an indicator and predictor of noninsulin dependent DM, insulin resistant, and overt hyperglycemia.

3 NFâ€˜induced pulmonary toxicity;

Is more common among women.

Is rare, but a serious toxic side effect may occur.

Can have the potential to negatively affect lungs.

NFâ€˜induced pulmonary toxicity

NFâ€˜induced pulmonary toxicity can be seen in three different forms, that is, due to acute, subacute or chronic reaction. The acute form is the most common. Side effects occurring up to the 1st month of receiving the first treatment are classified as the acute form. Acute form develops secondary to hypersensitivity reaction with peripheral demonstrating eosinophilia and thoracic CT showing groundâ€˜glass opacity. Chronic NFâ€˜induced lung disease is seen predominantly in older women who present with respiratory symptoms after a year or more of NF therapy. Characteristic pathologic finding in chronic NF pulmonary toxicity is diffuse interstitial fibrosis, vascular sclerosis, fibrosis, and thickening of the alveolar septa, interstitial inflammation, and bronchiolitis obliterans with organising pneumonia.

4 Case Study gives information about;

A rare case of bilateral lower extremity edema in a young patient.

Talks of the effects of the low dose gabapentin therapy.

Worsening condition and management of the disease.

Case Study

A 46-year-old male with a past medical history of schizoaffective disorder and chronic lower back pain, was admitted for management of worsening depression and anxiety. He was started on gabapentin, 300mg twice daily for his back pain and anxiety symptoms. His only other medication was hydrocodone. Over the next few days, he started developing worsening bilateral lower extremity edema. He did not have any cardiovascular-related symptoms. Physical exam was only significant for 3+ pitting edema with all laboratory values and imaging being unremarkable. Gabapentin was discontinued and his lower extremity swelling improved over subsequent days. The incidence of pedal edema with gabapentin use is approximately 7 to 7.5% with all studies being in elderly patients receiving doses above 1200 mg/day. This case illustrates that lower doses of gabapentin can also cause this adverse effect. It is important to recognize this adverse effect because gabapentin is used in conditions like diabetic neuropathy, which is associated with multiple comorbidities that can give rise to bilateral leg swelling. Presence of gabapentin-induced leg swelling can thus confound the clinical picture.

5 What is correct about the survey?

Males were accounted for 53% of total participants

43% participants had a bachelor degree of pharmacy

71% were practicing as pharmacists

Two hundred and six of the 250 pharmacists completed the questionnaires, giving a response rate of 82.4%. The mean age of pharmacists was approximately 32 years with a majority in the young adult age group (20-50 years, 92.22%).	
Sociodemographic parameter	Respondents, N=206(%)
Age (yr) Mean (SD)	36
Gender Male Female	 128 78
Education qualification Graduate(B. Pharm, D. Pharm) Postgraduate(M. Pharm)	 164 42

Professional status	
Practicing Pharmacists	142
Working professional	45
Academicians	10

Working professional (involved in the manufacture, marketing, distributors, research of drugs)

6 The data clearly explains that

The majority of the patients were between the age bracket of 29 days to 24 months and

Over half of the patients were female

Male patients outnumbered female patients by 10%

Demographic data of patients		
	Number (%)	
Age		
0-28 days	7	(2.4)
29 days to 12 months	82	(27.9)
13-24 months	85	(28.9)
25-36 months	40	(13.6)
37-48 months	26	(8.8)
49-60 months	54	(18.4)
Sex		
Male	172	(58.5)
Female	122	(41.5)

PART C

In this part of the test, there are two texts about different aspects of healthcare. For questions 7-22, choose the answer (A, B, C or D) which you think fits best according to the text.

Text 1: Occupational Lung Diseases

Occupational lung diseases are a group of illnesses that are caused by either repeated, extended exposure or a single, severe exposure to irritating or toxic substances that leads to acute or chronic respiratory ailments. The rate of occupational lung conditions was highest for education and health service workers in the private sector and local government workers at 3 .8 and 5 .9 per 10,000 full-time workers, respectively. There are two broad categories of occupational lung diseases: (i) Diseases that are not occupation-specific, but are aggravated at work, such as occupational asthma (ii) Diseases related to a specific occupation, such as asbestosis, coal worker's pneumoconiosis (black lung), berylliosis (brown lung), and farmer's lung. Common occupational lung diseases include mesothelioma, occupational asthma, silicosis, asbestosis, and sick building syndrome. Adult-onset asthma can be triggered by occupational exposures.

The estimated yearly cost of occupational injuries and illnesses is between $128 and $150 billion. Although, occupational lung diseases are often incurable, they are always preventable. Improving ventilation, wearing protective equipment, changing work procedures, and educating workers are key factors for prevention. Occupational Asthma (OA) is the most common form of occupational lung disease. Occupational asthma (also known as work-related asthma) is asthma that is caused by or made worse by exposures in the workplace. Estimates suggest that 15 to 23 percent of new asthma cases in adults are work related. Four states (California, New Jersey, Massachusetts, and Michigan) tracked cases of occupational asthma over a seven-year period. During this time, the occupations with the highest percentage of asthma cases were operators, fabricators, and laborers (32.9%); managerial and professional specialty (20.2%), and technical,

sales, and administrative support jobs (19.2%). The four most common agents associated with occupational asthma were miscellaneous chemicals (19.7%), cleaning materials (11.6%), mineral and inorganic dust (11.1%), and indoor air pollutants (9.9%).

Malignant mesothelioma is a fatal type of cancer caused by exposure to asbestos. Millions of construction and general industry workers have been exposed to asbestos while on the job. Occupations associated with significantly higher mesothelioma deaths include plumbers, pipefitters, and steamfitters; mechanical engineers; electricians; and elementary school teachers. In the U.S., asbestos use peaked in 1973 but had declined by 99.8 percent in 2007. Because mesothelioma usually does not show up until 20 to 40 years after exposure, most of the deaths from the disease are the result of exposures that occurred decades ago. This long lag time means that mesothelioma deaths are expected to peak around 2010, despite the much lower current use of asbestos. From 1999 to 2005, 18,068 malignant mesothelioma deaths were reported in the U.S. Men (81%) and Caucasians (95%) accounted for the majority of these cases.

Silicosis is a disabling, dust-related disease and is one of the oldest occupational lung diseases in the world. Silicosis is caused by exposure to and inhalation of airborne crystalline silica. Dust particles from silica can penetrate the respiratory system and land on alveoli (air sacs). This causes scar tissue to develop in the lungs and impair the exchange of oxygen and carbon dioxide in the blood. Though symptoms of silicosis rarely develop in less than five years, progression of the disease can lead to extreme shortness of breath, loss of appetite, chest pains, and respiratory failure, which can cause death. Silicosis also makes a person more susceptible to infectious diseases of the lungs, such as tuberculosis. The death rate is generally low, but still too high considering that every one of these deaths could have been prevented. Because of the low number of overall deaths due to silicosis, multiple years of data are combined to provide a more accurate estimate of the burden of this disease.

Text 1: Questions 7-14

7 The rate of OLC is reported to be higher in;

Healthcare service providers (private sectors)

Professionals in the field of education.

Government officials.

Local government workers and healthcare professionals in private industries.

8 One of these groups of diseases doesnâ€™t come under OLD;

Mesothelioma and occupational asthma.

Occupational asthma and silicosis, asbestosis.

Asbestosis and mesothelioma.

Asbestosis and silicosis.

9 According to paragraph 2, OLDs are;

Incurable

Curable

Preventable but not curable

Curable and preventable

10 According to paragraph 2, â€œwork-related asthmaâ€• means;

A disease which occurs due to more work

A disease which occurs due to less work

A disease which occurs due to exposure to work

None of the above

11 Common agents which are associated with OA in the lowest percentage are;

Air pollutants

Mineral and inorganic dust

Cleaning materials

Miscellaneous chemicals

12 The root cause of malignant mesothelioma is associated with the;

Use of the asbestos in the construction field

Exposure to asbestos on a regular basis

Low-quality asbestos

None of the above

13 The use of the asbestos was almost next to naught in the year;

1997

1973

2007

2010

14 Silicosis is;

More dangerous than occupational asthma.

More dangerous than mesothelioma.

Not as fatal as occupational asthma and mesothelioma.

Not very fatal.

Text 2: Immune System - Notes

Since inflammation in the body can lead to inflammation in the brain, we first need to understand what inflammation is. Inflammation is part of the immune system's response to defend you against microbial infections. It is the body's first line of defense against invasion by microorganisms such as bacteria and viruses, and it is activated rapidly after infection. The microbes are detected as foreign to the body by immune cells such as macrophages (literally "big eater"). When macrophages encounter and recognize a foreign microorganism they engulf the microorganism and, in addition, release a variety of cellular products into the space around them that start and regulate further defenses that include inflammation. Two classes of these products, known as cytokines and chemokines, leading to inflammation. Cytokines are chemical messengers that travel away from the cells that release them which causes alterations to the function of other cells. Chemokines also leave the cell and attract other cells into the region. Together, they alter the blood vessels near the site of infection, causing increased blood flow to the area and the entry of immune system cells.

Inflammation—swelling, redness and heat—is part of the immune system's first response to microbial infections, but this defensive response is not limited to the bodily site of infection. Soon after infection, a pattern develops that includes what is called the "acute phase response (APR)" and "sickness behavior." Fever is the most prominent feature of the APR and for good reason: many microorganisms reproduce best at humans' normal core body temperature, and many of the immune system's agents for killing them are bolstered by elevated temperature.

Sickness behaviors are well known to anyone who has had the flu. They include reductions in activity, food intake, social interaction, mood sags; difficulty in forming new memories; sleep changes; and sensitivity to pain increases (just think of how even a light touch hurts when you have the flu). These changes also reduce the energetic costs of behavior to free available energy stores to fight the infection. Fever, for example, is quite energy intensive, requiring an extra 10 to 12 percent in energy for each degree rise. It is obvious how all the sickness behaviors, with the exception of memory disruption, fit the scheme of keeping us away from our usual activities. Memory disruption serves a different purpose.

We now understand that all of the changes described above are accomplished through the CNS. Fever, for example, occurs because the set point of temperature-sensitive cells in the hypothalamus is increased. Of course, behavior, mood, and pain are all products of the CNS. This raises two issues: a) How does the CNS "know" what is going on in the peripheral immune system, and b) What kinds of changes are produced in the CNS that mediate fever and sickness behaviors? The same cytokines that participate in producing the inflammatory response in the body also initiate the communication process to the CNS. They accumulate in the bloodstream and thereby travel to the brain, where, although they are large proteins and cannot readily cross the blood-brain barrier, these chemical signals are carried across the barrier by active transport. They cross into the brain in regions where the barrier is weak, and they bind to receptors on the insides of the cerebral vascular blood vessels, thereby inducing the production of soluble mediators within the epithelial cells that can cross into the brain.

The cytokine interleukin-1 beta is released in response to pathogen recognition, and a) activates vagal fibers, b) diffuses into the brain where the barrier is weak, and c) are actively transported across. In the brain, they act on microglia, which then produce and secrete further cytokines that can act on neuronal cells, thereby producing sickness behaviors.

Often, a set of mechanisms that evolve to handle acute emergencies lead to outcomes that nature did not intend if they are engaged too long. During a normal infection, neuroinflammation and the resulting adaptive sickness behaviors persist only for several days. However, if these responses become exaggerated or prolonged, the outcomes may well become established, leading to cognitive

impairment instead of brief memory disruption, depression instead of reduced mood, fatigue instead of inactivity, and chronic pain instead of acute pain. That is, physiology can become pathology when a set of processes designed to be relatively brief becomes prolonged.

Text 2: Questions 15-22

15 The first line of defense implies;

Macrophages

Immune system

Inflammation

All of the above

16 Chemical messengers have;

The ability to change the functioning of other cells.

A greater level of mobility.

No capacity to move further away from cells.

None

17 APR develops;

At the time of infection.

After the infection.

After curing of the infection.

Before or after infection.

18 Fever occurs due to;

The increase in the growth of the microbes.

A powerless immune system.

The multiplication of the microbes, supported by the temperature of the human body.

none

19 One of the following is not associated with sickness behaviors;

Loss of appetite and reduction in social interaction.

Reduction in social interaction and sleeping hours.

Change in mood and body language.

Body language and sleeping disorder.

20 Cytokines are described as;

Messenger cells.

Protein bodies and messenger cells.

Immune response bodies.

None

21 Cytokines cross the barrier;

Through active transport.

By bridging the blood-brain barrier.

By penetrating into the blood vessels.

Through the bloodstream and lymph vessels.

22 What happens if the responses become exaggerated?

Loss of memory may take place.

Reduction in normal mood may be noted.

Cognitive impairment occurs.

Acute pain may begin.