

READING TEST 12

PART A

Gaucher Disease

Text A

Gaucher disease is the most common of the lysosomal storage disorders (LSDs), which are metabolic conditions caused by genetic defects in the lysosomal system. The lysosome is an internal cell structure that contains numerous enzymes responsible for degrading complex cellular components. LSDs result from the absence or deficiency of a lysosomal enzyme and the subsequent accumulation of the enzyme's particular substrate in the body. The incidence of LSDs is estimated to range from one in 5,000 to one in 7,000 live births. Worldwide, Gaucher disease has a prevalence estimated to range from one in 40,000 to one in 60,000 in the general population and, though it is a panethnic disorder, in the Ashkenazi Jewish population its frequency is markedly higher, ranging from one in 400 to one in 1,000 live births. Carrier frequency in those of Ashkenazi descent is estimated to be as high as one in 18.

Text B

Skeletal Manifestations

The skeletal manifestations of Gaucher disease are often the most debilitating, yet the pathogenesis of bone changes are not fully understood. Between 70% and 100% of patients with type 1 Gaucher disease have clinical or radiographic evidence of bone disease. Irreversible complications may influence long-term mobility and quality of life. The spine, pelvis, and femurs are usually affected; several different mechanisms of bone injury have been identified. The displacement of yellow marrow with red marrow because of Gaucher cell infiltration produces both physical and biochemical changes in the bone marrow microenvironment that can affect bone marrow vascularity and pressure, potentially causing thrombosis, infarction, and impaired hematopoiesis.

Text C

Osteomyelitis occurs in Gaucher disease

When osteomyelitis occurs in Gaucher disease, it is usually aseptic, though it's difficult to exclude pyogenic osteomyelitis at onset. Eventually, negative blood cultures allow clinicians to differentiate aseptic from pyogenic osteomyelitis. While it is impossible to predict major bone complications in patients with Gaucher disease, risk factors include anemia and splenectomy. In untreated patients, bone crises are reported to occur in 55% of splenectomized patients and 22% of patients with an intact spleen. Osteonecrosis is irreversible and often precipitates fracture and joint collapse.

Text D

Enzyme replacement therapy

Enzyme replacement therapy for the treatment of Gaucher disease became available in 1991 with the development of alglucerase (a placenta-derived GCase). Today, however, treatment involves the iv infusion of a recombinant GCase enzyme, which breaks down the accumulating lipid. Infusions are administered every two weeks. Three FDA-approved enzyme replacement therapies are currently available in the United States: imiglucerase (Cerezyme), velaglucerase alfa (Vpriv), and taliglucerase alfa (Elelyso). Enzyme replacement therapy has been shown to reduce the incidence of hepatosplenomegaly, normalize hematologic values, and improve osteopenia. Risks of treatment include infusion reactions and antibody formation, which has the potential to render the drug inactive. Immunoglobulin G antibodies should be monitored routinely during the first year following diagnosis, with a baseline blood sample drawn before the patient's first infusion and blood draws repeated every three to six months. If antibody production is high, there is a risk of anaphylaxis. Overall, infusions are well tolerated, with the most common adverse effects being hypersensitivity reactions, which can be managed effectively with antihistamine premedication.

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. A. condition that occurs due to an increase in the number of white cells in the blood

Answer _____.

2. Often, it is not possible to deal with complications

Answer _____.

3. Recorded to be more effective in dealing with the disease conditions

Answer _____.

4. homicide of virtually all other parts of the cell by the enzymes

Answer _____.

5. Almost fortnightly for effective management

Answer _____.

6. Not-so-common when compared to other medical conditions

Answer _____.

7. Weakening appearance

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 is the common reason for Gaucher Disease?

Answer _____.

9. Is it still clear how disease appears in its various forms or not?

Answer _____.

10. ERTs available include?

Answer_____.

11 .What can lead to anaphylaxis?

Answer_____

12. What is regarded as medically clean or without infection?

Answer_____.

13 .What happens when Gaucher cell penetrate more deeply?

Answer_____.

14 .What is regarded to be difficult when it comes to assessing the patient suffering from Gaucher Disease?

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. The_____ have the capacity to exterminate various other cell structures.

16. With the appearance of red marrow, the_____ and_____ often get affected more badly and may lead to infarction.

17 .The two of the common conditions that can occur due to Gaucher may include _____ and _____.

18 .It is requisite to monitor_____ during the first year.

19. Enzyme replacement therapy is known to be more effective in curtailing down the_____ and improving osteopenia.

20. Studies reveal that there are various other _____ which can make the conditions worse.

PART B

Questions 1-6

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 ----- is an epidemic of infectious disease that has spread across a large region

Disease Transmission

Bioterrorism

Pandemics

Emerging infectious diseases

Emerging infectious diseases impact healthcare providers in the United States and globally. Nurses play a vital role in protecting the health of patients, visitors, and fellow staff members during routine practice and biological disasters, such as bioterrorism, pandemics, or outbreaks of emerging infectious diseases. One vital nursing practice is proper infection prevention procedures. Failure to practice correctly and consistently can result in occupational exposures or disease transmission. Infection prevention education based on existing infection prevention competencies is critical to ensure adequate knowledge and safe practice both every day and in times of limited resources.

2 What is the risk of passing CMV to the baby during pregnancy?

A Baby gets infected quickly

B There is more risk if the infection is primary

C Low risk in the first two trimester compared to the third trimester.

Transmission

In general, 1 of every 150 to 200 babies in the USA is born with congenital CMV. This makes CMV the most frequent congenital viral infection. Though this seems like a large percentage of births, only 1 in 5 of these infants born with congenital CMV will experience any adverse symptoms or long-term issues.

The virus has the potential to travel through the mother's blood and pass through the placenta, infecting the developing baby.

If the pregnant lady contracts the virus (primary infection) during pregnancy: It is more likely to pass on CMV to the baby if it is primary infection during the pregnancy. If the mother has a primary CMV infection during pregnancy, there is approximately a 40% chance of passing the virus to the baby.

The risk of transmission from mother to baby is highest if she gets a primary CMV infection in the third trimester (40-70%) and is lowest if the primary infection begins in the first or second trimesters (30-40%).

3 The following table talks about

A Medication

B Preventive measure

C Effects of Disease

Allergic Rhinitis

Indicated as immunotherapy for short ragweed (*Ambrosia artemisiifolia*) pollen-induced allergic rhinitis (with or without conjunctivitis) confirmed by positive skin test or in vitro testing for ragweed-specific IgE antibodies

Initiate treatment 12 weeks before the expected onset of ragweed pollen season and maintain it throughout the season 18-65 years: 1 tablet SL qDay; give the 1st dose in physician's office and observe for 30 min > 65 years: Not approved

4 What is wrong?

- A Not effective with respect to QRS complex
- B Mental disease occurs more often
- C Medication shall be used again and again

Atropine IV/IM (Rx) - Warnings

Caution in hepatic/renal impairment, BPH, CHF

Not for effective treatment of type II second or third-degree AV block with or without a new wide QRS complex

Use caution in autonomic neuropathy, myocardial ischemia, heart failure, paralytic ileus, hepatic impairment, hiatal hernia associated with reflux esophagitis, hyperthyroidism, myasthenia gravis, and renal impairment

Heat prostration can occur in a high environmental temperature

Psychosis reported in sensitive individuals and with excessive doses

When a recurrent use of atropine is essential in patients with coronary artery disease, total dose should be restricted to 2 to 3 mg (maximum 0.03 to 0.04 mg/kg) to avoid detrimental effects of atropine-induced tachycardia on myocardial oxygen demand

5 The notice is giving information about

health and safety hazards

Effectiveness of PPE

Insufficient supplies of PPE

Shortages of PPE

Multiple studies have found that the U.S. hospitals and healthcare agencies lack sufficient PPE and even stockpiles have not provided adequate or correct supplies to give healthcare personnel necessary PPE during past events. During the 2014 Ebola outbreak, PPE availability was severely limited, leading to potential occupational exposures and healthcare personnel infection. When respirators are limited, remaining supplies can be worn for extended periods of time or re-used between patients. However, extending the use or re-using respirators puts nurses at risk of exposure due to auto-inoculation when removing contaminated equipment or from reduced compliance during long-term wear.

6 According to the table given, which is correct?

- A The mean age in diabetics is significantly greater than that in non-diabetics
- B more than 60% are male
- C The difference of BMI in diabetics and non-diabetics is very less

Summary statistics of subjects classified in diabetic and non-diabetic subgroups based on FBS >126 mg/dl.				
Categorical Variable		Non-diabetics	Diabetics	Univariate P-value
		Frequency	(%) Frequency (%)	
Sex	Female	296 (56.3)	51 (64.6)	0.171
	male	229 (43.7)	28 (35.4)	
Marriage status	Married	456 (86.9)	77 (97.47)	.006
	single	69 (13.1)	2 (2.53)	
Education	Illiterate	35 (6.7)	11 (13.92)	.072

	Primary	164 (31.2)	25 (31.65)	
	Diploma	226 (43)	34 (43.04)	
	Academic	100 (19.1)	9 (11.39)	
Jobs	No job	49 (9.3)	6 (7.59)	0.102
	Self employee	116 (22.1)	13 (16.46)	
	Employee	147 (28)	17 (21.52)	
	Housekeeper	204 (38.8)	43 (54.43)	
	Student	9 (1.7)	--	
Self-reported diabetes	Yes	30 (5.71)	60 (75.95)	<0.001
	No	495 (94.29)	19 (24.05)	
Family history of diabetes	Yes	129 (24.57)	33 (41.77)	0.001
	No	308 (58.67)	29 (36.71)	
	Don't know	88 (16.76)	17 (21.52)	
Numeric variables		Mean (SD)	Mean (SD)	
Age		43.8 (14.6)	52.9 (11.3)	<0.001
BMI		24.5 (3.8)	26.2 (4.08)	<0.001
FBS		91.2 (12.4)	200.4 (77.3)	<0.001
A1c		5.61 (0.73)	7.88 (1.92)	<0.001

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: Healthy Lifestyle without Prescribing Weight Loss

One of the leading approaches to improving metabolic health and thereby preventing diabetes is recommending to individuals that they lose weight. However, because of homeostatic responses to energy loss, this lifestyle recommendation may not always lead to desired long-term metabolic health. It is true that in the short term, weight loss can improve insulin sensitivity. Consuming fewer carbohydrates, increasing activity, and/or temporarily reversing leptin resistance by decreasing the size of fat cells can improve glucose tolerance. Leptin is a long-term fullness hormone produced by fat cells that also has euglycemic properties. When leptin signals the hypothalamus that adequate fat stores are present, messages are sent to eat less, expend more energy, and normalize glucose levels. However, too much fat triggers as yet unknown chemical messengers, making the hypothalamus resistant to leptin.

Regaining lost weight after a diet often leads to another weight loss attempt. With repetitive loss and gain of 10-50 pounds, a pattern of weight cycling emerges. Weight cycling is a high-risk behavior for the development of Type 2 diabetes (T2D), as regained weight is more metabolically unhealthy because it preferentially deposits as visceral fat. Visceral adipose tissue, as opposed to subcutaneous adipose tissue, produces more inflammatory factors, as well as resistin and visfatin, hormones that are linked to insulin resistance. In summary, while all weight gain can lead to negative metabolic changes, regained weight is especially likely to promote insulin resistance and inflammation.

Emotional eating often results in consumption of excess food or poor food choices and often leads to weight gain. Beginning a stressful new job or going through a

divorce are just two examples of life events that can spur emotional eating. Asking patients if they have noticed a change in their eating habits, and if that coincided with any other changes in their lives, should be part of the history if weight gain has occurred. If the patient acknowledges overriding fullness cues and eating more than usual, the underlying stress, emotional pain, depression, and/or anxiety could be helped in a variety of ways.

Glucocorticoids are known to reduce inflammation and are universally associated with both weight gain and metabolic changes including hyperglycemia. While the benefits of short-term steroids may outweigh the risks, for longer term usage, non-steroidal anti-inflammatories or disease-modifying drugs could be used. While the only class of antihypertensives to cause weight gain are beta blockers, both beta-blockers and thiazolidinediones can cause dysglycemia. The two classes of antihypertensives that may prevent weight gain and improve insulin sensitivity are ACE-inhibitors and angiotensin receptor blockers (ARBs).

Sleep hygiene can help to get sleep on time as well as sleeping more deeply. Patients should be apprised of the need to avoid caffeine for 7 hours, and alcohol for 2 hours before bedtime. Also turning off of “blue light” an hour before bedtime is a good way to help increase the natural sleep hormone melatonin. For patients who still find it difficult to fall asleep or stay asleep, recommending melatonin supplements can help. If restorative sleep still evades the patient, it is important to assess for obstructive sleep apnea (OSA), a major impediment of deep, restful sleep and is associated with obesity.

A reduced activity could be a result of fatigue, chronic pain, old injuries, or newly developing arthritis. For those suffering from pain, referral to an appropriate specialist may be indicated. Physical therapy can also help to maximize their mobility and to find an exercise that is also enjoyable, sustainable, and suitable for their limitations. Research shows that threats to health, such as lack of food, sleep, or long periods of exertion, are perceived by homeostatic sensors as threats to human survival. Dieting, which often requires ignoring hunger may be perceived as a threat, whereas intuitive eating, which honors internal cues is perceived as reassuring to the body. This alternative approach to dieting was started by lay

health writers in the 1980's and has dieticians more likely to use intuitive eating than restrictive practices.

By having patients make sure they have healthy and delicious food available for when ideal hunger sets in (neither starving nor hardly hungry) so they can eat until they are satisfied, which is a key for visceral eating. Whether an advance practice nurse or a nutritionist helps guide the patient, this non-dieting approach to eating helps patients replace an antagonistic relationship with the body for a nurturing one.

Text 1: Questions 7-14

7 The first paragraph talks about;

- A. Fat Triggers
- B .How to lose weight?
- C .Healthy lifestyle
- D .Nature of Leptin

8 The second paragraph talks about;

- A. Risks associated with weight gain
- B .Risks associated with weight loss
- C .Weight loss likely to lead to weight gain
- D .Unhealthy weight recycling

9 The third paragraph gives more information about;

- A. Emotional eating
- B .Stress eating
- C .Emotional or stress eating
- D .Behavioral responses

10 What do we learn about medication in the fourth paragraph?

- A .Glucocorticoids are very effective
- B .Recommends only the use of non-steroidal anti-inflammatories
- C .Medications can lead to dysglycemia
- D . it brings in more benefit to make use of steroids when the conditions are to be dealt with immediately

11 The information in the fifth paragraph is more related to;

- A. Sleep v/s Weight loss
- B .New lifestyle recommendations
- C .How to improve metabolic health?

D .Sleep and Weight gain

12 The word impediment in the fifth paragraph is close to;

- A. Demagogue
- B .Restriction
- C .Disrupting
- D. Retardation

13 The information in the sixth paragraph throws light on;

- A. Importance of exercise
- B. Importance of diet
- C. Importance of exercise and diet
- D. Healthy weight recycling

14 The word visceral in the last paragraph refers to;

- A Intuitive
- B Direct
- C Unnatural
- D Happy

Text 2: X-Ray Diffraction Imaging (XDI) Scanner In Diagnostic Radiology

X-ray diffraction imaging (XDI) scanner has been developed for security screening applications by Morpho Detection GmbH in Hamburg, Germany. The main rationale for developing this XDI scanner is the existence of explosive materials whose densities overlap those of common materials, such as water, leading to unacceptably high false alarm rates for scanners employing merely transmission x-ray data. As the x-ray diffraction probes molecular structure, XDI yields more features for material identification than transmission x-rays, leading to higher detection rates and lower false alarm rates.

The XDI scanner employs the Multiple Inverse Fan-Beam (MIFB) topology (Harding et al, 2012). The MIFB topology is a multiple-focus, multiple-beam, multiple-detector extension of that originally described by Harding. These extensions increase the photon throughput by over five orders of magnitude relative to that of the original system. The MIFB topology features an x-ray multisource, comprising a linear array of 16 focal spots that are sequentially irradiated by a magnetically-deflected electron beam. The accelerating voltage is 140 kV; whereas the tube DC power is 6 kW and the beam dwell time for each focus is 200 μ s.

The inherent contrast of molecular coherent scatter from body tissues is much greater than that originating in the linear attenuation coefficient accessed by transmission radiation, when the momentum dimension is included in tissue discrimination. As each voxel is irradiated from several directions, a modest degree of transmission tomosynthesis can be reconstructed from the transmission data; The fusion of data from scatter and transmission sensors allows a significant improvement in image quality relative to that obtained when each is separately depicted; the conveyor belt speed is sufficient to allow an anatomical region, such as head, thorax or abdomen, to be scanned in only a few seconds; the measured

dose imparted in an XDI scan is negligible compared with that of the natural radiation background, taken as ~ 3 mGy / year.

The x-ray imparted by the XDI scanner was repeatedly measured with a PTW Diados E dosimeter inserted into the center of a D100 QRM thorax phantom. The thorax phantom, visible to the right of the picture, was inserted in a luggage bin that was moved by conveyor belt through the scanner. The dosimeter signal was read out through the cable. As the dosimeter was inserted into the center of the phantom, it was shielded from radiation emitted by the x-ray multisource owing to an overlying material; hence the skin dose will be significantly higher.

Tissue samples were measured by commercial x-ray diffractometers implementing angular-dispersive analysis. In this form of XRD, quasi-monochromatic radiation scattered by the sample is measured in dependence on the scatter angle. They provide excellent momentum resolution; however, they lack tomographic sensing capability and feature long scan times. These will be referred to in this publication as XRD profiles. In the other cases, the diffraction profiles were measured in the XDI scanner, implementing energy-dispersive analysis of broad-band x-radiation. Although the momentum resolution is essentially determined by the energy-resolution of the detectors and is, therefore, inferior to that of angular-dispersive technique, it offers direct tomographic analysis capability and is much faster.

In presenting the results of the NNMF factorization technique applied to x-ray diffraction profiles, the intention here is to emphasize more the methodology than its precise output. The main reason for this emphasis is that in the course of time, as more tissues are included in the analysis, the number of base-tissue profiles derived from NNMF is expected to increase. Moreover, the input data is a mixture of XRD and XDI profiles. This changes both in the number and form of the base profiles are expected when only XDI data are analyzed. Finally, the statistical accuracy of a small set of only twelve diffraction profiles is questionable. As noted earlier, the XDI scanner provides the unique chance to apply NNMF in vivo to very many voxels containing healthy and diseased tissues.

Text 2: Questions 15-22

15 According to paragraph 1, XDI scanner;

- A. is more powerful than any other scanners
- B. can provide accurate data
- C. is developed merely to deal more effectively with explosive material
- D. doesn't just transmit x-ray data

16 Paragraph 2 talks about;

- A. How the scanner works?
- B. Description of the scanner
- C. How the image is taken, altered and transmitted
- D. How it outperforms other scanners

17 Paragraph 3 talks about;

- A. Features of the scanner
- B. Scattering of data
- C. Transmission of data
- D. Scattering and transmission of data

18 Paragraph 4 talks about;

- A. Image capturing
- B. Transmission of information
- C. Radiation dose
- D. Efficiency in data capturing

19 The word close to meaning 'Depth' in paragraph 5 is;

- A. Momentum
- B. Tomographic
- C. Broad-band
- D. Angular

20 The word ` Momentum ` in paragraph 5 may mean

- A. Energy
- B. Impulse
- C. Effect
- D. Upshot

21 NNMF may increase;

- A. with an increase in tissues
- B. with the improvement in analysis
- C. with an increase in base-tissue profiles
- D. with the inclusion of base-tissue profiles from NNMF

22 In the last paragraph, ` in vivo ` may mean

- A. To apply externally
- B. Happening or existing inside a living body
- C. To be more challenging
- D. To overcome complexities