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Question: 1

A non-specific reaction from the immune system that attacks all invaders and includes the skin, nasal mucosa, normal flora and chemicals is which of the following?

A. acquired immunity
B. innate immunity
C. attained immunity
D. specific immunity

Answer: B

Explanation:
The correct answer to the question is "innate immunity". Let's break down why this is the case and how it differs from the other options provided, namely acquired (or specific) immunity and attained immunity.
Innate immunity, also known as non-specific immunity, is the body's first line of defense against pathogens and foreign substances. It is non-specific because it does not target specific pathogens but rather provides a broad protective response against any perceived threat to the body. This type of immunity includes physical barriers like the skin and mucosal membranes (such as those lining the nasal passages), which act as initial blockades to prevent pathogens from entering the body. It also involves various cellular responses and chemical secretions that create an unfriendly environment for pathogens. These include the acidity of the stomach, the presence of enzymes in saliva, and the mucous secretions that can trap bacteria and viruses.
In addition to these physical and chemical barriers, innate immunity also comprises certain cells that can quickly respond to invaders. These include natural killer cells, macrophages, and neutrophils, which can attack and destroy pathogens or infected cells. Importantly, the responses triggered by innate immunity are generic and are not adapted to specific pathogens. This means that while they are fast-acting, they do not 'remember' the pathogens, and their response is not enhanced upon subsequent exposures to the same pathogen.
In contrast, acquired immunity, also known as specific or adaptive immunity, involves mechanisms that target specific pathogens. This type of immunity develops as the body is exposed to diseases or when it's immunized through vaccines. It relies on the recognition of specific antigens found on pathogens, leading to a tailored immune response. Once a pathogen has been recognized, the acquired immune system 'remembers' it, which allows for a faster and more effective response upon subsequent exposures to the same pathogen. This memory is facilitated by specific cells known as lymphocytes, which include T cells and B cells.
The term "attained immunity" is not commonly used in immunology and might be a misinterpretation or misspelling of "acquired immunity." As such, it does not represent a separate category of immunity.
Finally, "specific immunity" is another term for acquired immunity, emphasizing its ability to target specific pathogens with a tailored response.

To summarize, innate immunity is the correct answer to the question as it describes the non-specific, broad-spectrum first line of defense of the immune system, including barriers like skin and mucosa, and various non-specific cellular and chemical mechanisms.

Question: 2

Those analytical patient-testing activities provided within the institution, but performed outside the physical facilities of the clinical laboratories are indicated by which of the following acronyms?

A. POCT
B. CLIA
C. HCFA
D. CMS

Answer: A

Explanation:
The correct acronym for those analytical patient-testing activities provided within the institution, but performed outside the physical facilities of the clinical laboratories, is POCT, which stands for Point of Care Testing.
POCT refers to medical diagnostic testing performed at or near the site of patient care. It is typically conducted by healthcare professionals who are not primarily lab technicians, such as nurses, perfusionists, or respiratory therapists. The main advantage of POCT is the immediacy of results, which allows for rapid clinical decisions.
Unlike traditional lab testing, which occurs in centralized labs and can take significant time for transport and processing of samples, POCT is executed close to the patient. This proximity significantly reduces the time from testing to results, which is critical in urgent care scenarios like emergency rooms, intensive care units, or in settings where immediate results are pivotal for the patient's treatment.
While POCT offers convenience and speed, it is essential to ensure that these tests meet the regulatory standards for accuracy and reliability as set by bodies like the Clinical Laboratory Improvement Amendments (CLIA) and overseen by the Centers for Medicare & Medicaid Services (CMS). These regulations ensure that regardless of where the test is performed, the quality and safety are not compromised.
The other acronyms mentioned, such as CLIA, HCFA (Health Care Financing Administration, now known as CMS), and CMS (Centers for Medicare & Medicaid Services), are related to regulatory and administrative aspects of healthcare services but do not specifically describe the type of testing outlined in the question like POCT does.

Question: 3

Which of the following is NOT a polychrome stain?

A. Wright
B. Heinz body
C. May-Grunwald
D. Jenner

Answer: B

Explanation:
To answer the question "Which of the following is NOT a polychrome stain?" it is essential to understand what a polychrome stain is compared to a monochrome stain. A polychrome stain involves the use of multiple dyes that produce various colors in the staining process, allowing for the differentiation of different cellular components or structures within a sample. In contrast, a monochrome stain uses a single dye, resulting in all stained components appearing the same color. Among the options provided (Wright, Heinz body, May-Grunwald, Jenner), the correct answer is "Heinz body." The Heinz body stain is indeed a monochrome stain. Specifically, it involves the use of brilliant cresyl blue or new methylene blue, which are dyes used to stain denatured hemoglobin in blood cells. This staining helps in identifying Heinz bodies, which are inclusions within red blood cells that indicate cell damage, particularly in conditions such as G6PD deficiency.
In contrast, the other stains mentioned are examples of polychrome stains: 1. **Wright Stain** - This is a commonly used polychrome stain in hematology for performing differential blood counts. It stains blood cells in multiple colors, allowing for the differentiation of various types of cells such as erythrocytes, leukocytes, and platelets. 2. **May-Grunwald Stain** - Often used in conjunction with Giemsa stain, it is a polychrome method used primarily for staining blood smears. It helps in distinguishing cellular components by staining them in different hues. 3. **Jenner Stain** - Similar to the May-Grunwald stain, Jenner stain is used for blood film and is polychromatic, providing a range of colors that facilitate the identification of different blood cell types.
Therefore, the answer "Heinz body" is correct as it is not a polychrome stain but a specific application of a monochrome staining technique used for identifying damaged red blood cells, which is distinctly different from the multi-color staining characteristics of the other options listed.

Question: 4

Which of the following statements about transfusion reactions is not true?

A. Delayed reactions occur within 48 hours of the transfusion.
B. Acute reactions occur rapidly, within hours of the transfusion.
C. Transfusion reactions can be caused by bacteria, viruses or parasitic organisms.
D. Immune-mediated transfusion reactions are due to RBC or HLA antigens and antigen-antibody reactions.

Answer: A

Explanation:
Transfusion reactions are adverse events that can occur following the transfusion of blood products and are categorized based on their timing and underlying mechanisms. Understanding the timing of these reactions is crucial for accurate diagnosis and management.
The statement "Delayed reactions occur within 48 hours of the transfusion" is not true and represents a misunderstanding of the nature of delayed transfusion reactions. Delayed transfusion reactions typically manifest days or weeks after the transfusion, not within 48 hours. These reactions can include delayed hemolytic transfusion reactions, transfusion-associated graft-versus-host disease, and post-transfusion

purpura, among others. They are often immune-mediated and occur when the immune system of the recipient reacts to antigens on the transfused blood cells over a prolonged period.
In contrast, reactions occurring within 48 hours are generally classified as acute transfusion reactions. These can range from mild allergic reactions to more severe complications such as acute hemolytic reactions, febrile non-hemolytic reactions, or transfusion-related acute lung injury (TRALI). Acute reactions are immediate and typically require prompt recognition and management to prevent serious outcomes.
Another category of transfusion reactions is caused by infectious agents such as bacteria, viruses, or parasites that might be present in the transfused blood. These are not confined to a specific time frame and can occur either as acute or delayed reactions depending on the incubation period of the infectious agent and the immune response of the recipient.
Furthermore, immune-mediated transfusion reactions are primarily due to the recipient's immune system reacting against red blood cell (RBC) or human leukocyte antigen (HLA) antigens present on the transfused blood cells. These reactions can be either acute or delayed, depending on the specific immune mechanisms involved and the time it takes for the immune system to recognize and react to these antigens.
In summary, the statement that "Delayed reactions occur within 48 hours of the transfusion" is incorrect because delayed transfusion reactions typically occur days to weeks after the transfusion. It is important for medical professionals to understand the correct timing and types of transfusion reactions to effectively monitor and manage patients receiving blood transfusions.

Question: 5

Which of the following statements about chlamydia is correct?

A. It contains both DNA and RNA and is susceptible to antibiotics.
B. It produces ATP.
C. It has a gram positive-like cell wall.
D. It is an obligate extracellular, non-motile parasite.

Answer: A

Explanation:
The question pertains to the characteristics of the bacterium Chlamydia, specifically regarding its genetic material and susceptibility to antibiotics. The correct statement among the options is that Chlamydia contains both DNA and RNA and is susceptible to antibiotics. Let's explore why this statement is accurate and clarify some details about Chlamydia.
Chlamydia is a genus of bacteria that is known for being an obligate intracellular pathogen. This means that it can only grow and reproduce within the cells of a host organism, which includes humans and other mammals. The inability of Chlamydia to thrive outside a host cell classifies it as an obligate intracellular parasite.
Regarding its genetic composition, Chlamydia contains both DNA and RNA. Like most bacteria, its genetic information is primarily encoded in DNA, which serves as the blueprint for its structure and function. RNA plays a critical role in translating this genetic information into proteins necessary for the bacterium's survival and replication within the host cell.
Chlamydia's cell wall structure is somewhat similar to that of Gram-negative bacteria, which is characterized by a thin peptidoglycan layer located between an inner cytoplasmic cell membrane and an

outer bacterial membrane. This structure can be identified through a Gram stain test, although Chlamydia might not always stain well due to its unique lifecycle and intracellular habitat.
One notable metabolic limitation of Chlamydia is its inability to produce adenosine triphosphate (ATP), the primary energy carrier in cells, on its own. This deficiency underlines its dependence on host cells for nutrients and energy, as it must hijack the host's metabolic pathways to obtain the ATP necessary for survival and multiplication.
In terms of treatment, Chlamydia is susceptible to antibiotics, particularly those effective against Gram-negative bacteria. Tetracyclines and macrolides, such as azithromycin and doxycycline, are commonly used to treat Chlamydia infections. These antibiotics disrupt various cellular processes, including protein synthesis, which is crucial for the bacterium's growth and survival inside host cells.
Understanding these aspects of Chlamydia's biology helps in diagnosing and treating infections caused by this bacterium, ensuring effective medical responses to one of the most common sexually transmitted infections worldwide.

Question: 6

When specimens are accessioned it means that they:

A. have been identified and logged
B. have been received
C. are stored
D. none of the above

Answer: A

Explanation:
The term "accessioned" in the context of laboratory operations refers to the process of formally recognizing and logging in specimens that are received for analysis. This is a crucial step in the lab workflow because it ensures that each specimen can be uniquely identified and tracked throughout the testing process. The act of accessioning typically involves assigning a unique identifier to each specimen, which is then entered into a laboratory information system (LIS). This identifier is used to log all relevant details about the specimen, including the source, the type of test to be performed, and the date of receipt.
Larger laboratories often have dedicated areas specifically designed for the receipt and accessioning of specimens. These areas are equipped with the necessary tools and technology to efficiently handle a large volume of specimens from various sources. Upon arrival, specimens are first accessioned; this involves confirming their identity, recording necessary data in the lab's management system, and preparing them for the subsequent stages of processing. This methodical approach not only helps in maintaining the integrity and traceability of specimens but also enhances the overall efficiency of the laboratory operations.
Once specimens are accessioned, they are typically moved to different sections of the laboratory where specific tests are conducted. The initial step of identifying and logging the specimens is crucial as it minimizes errors and ensures that the right tests are performed on the right specimens. This step also helps in preventing mix-ups and loss of specimens, which are critical in maintaining the accuracy and reliability of laboratory results.
In summary, when specimens are accessioned in a laboratory setting, it chiefly means they have been received, identified, and logged into the system. This is a foundational step in the lab's workflow which

supports the systematic tracking and management of specimens, thereby aiding in the delivery of accurate and timely test results.

Question: 7

Which of the following is a type of functional granule in platelets that contains von Willebrand's factor?

A. dense core granule
B. alpha granule
C. cytoplasmic granule
D. submembrane granule

Answer: B

Explanation:
The correct answer to the question regarding which type of functional granule in platelets contains von Willebrand's factor is the alpha granule. Platelets, which are small blood cell fragments crucial for blood clotting, contain different types of granules that play roles in the clotting process and wound repair. Platelets primarily contain two types of granules: alpha granules and dense (or dense core) granules. Each type of granule stores different substances that are released during the platelet activation process, contributing to blood clot formation and the healing of injured tissues.
Alpha granules are the most abundant type of granule in platelets. They store a variety of proteins that are essential for clotting and tissue repair. Key components of alpha granules include fibrinogen, which is vital for clot formation; von Willebrand's factor, which helps platelets stick to the blood vessel walls and to each other; platelet-derived growth factor, which aids in healing; PF4 (platelet factor 4), which inhibits anticoagulant mechanisms; and several other proteins that modulate inflammation and wound healing.
On the other hand, dense granules contain smaller molecules that also contribute to the clotting process but are distinct in their composition and function from alpha granules. Dense granules primarily store ADP and ATP, which promote platelet aggregation; calcium, which is crucial for various enzymatic processes in clotting; and serotonin (5-HT), which causes vascular smooth muscle contraction and aids in reducing blood flow to the injured area.
In summary, while both alpha and dense granules are essential for the functions of platelets in hemostasis, it is specifically the alpha granules that contain von Willebrand's factor. This factor is critical for the initial steps of platelet adhesion to the damaged endothelium and the subsequent formation of a platelet plug, marking it as a key component in the prevention of excessive bleeding.

Question: 8

A urine specimen used for monitoring insulin therapy in persons with diabetes mellitus is which of the following?

A. random specimen
B. first morning specimen
C. three-glass collection
D. 2-hour postprandial specimen

Answer: D

Explanation:
The correct answer to the question regarding the type of urine specimen used for monitoring insulin therapy in persons with diabetes mellitus is the "2-hour postprandial specimen."
In the management of diabetes mellitus, particularly in individuals who are on insulin therapy, it is crucial to monitor how well the body is processing sugar. This monitoring helps in adjusting insulin doses accurately to prevent both hyperglycemia (high blood sugar levels) and hypoglycemia (low blood sugar levels). One effective method to assess the body's response to insulin is through the 2-hour postprandial glucose test.
The "2-hour postprandial specimen" involves collecting urine to test its glucose content 2 hours after the patient has consumed a meal. The procedure for collecting this specimen starts with the patient voiding (emptying their bladder) just before they eat a regular meal. By voiding before the meal, any glucose present in the urine collected later will clearly reflect the body's response to that specific meal, rather than any prior meals or snacks.
After the meal, a timer is set for two hours. Once the two hours have elapsed, the patient then collects another urine sample. This post-meal timing is critical as it captures the peak blood sugar levels that occur after eating, which provides valuable information on how effectively the insulin or other glucose-regulating medications are working.
The urine collected is then tested for glucose. Elevated levels of glucose in this specimen can indicate that the patient's current insulin therapy may not be adequately controlling their blood sugar levels post-meal, prompting adjustments in their treatment plan.
While other types of urine specimens like random specimens, first morning specimens, or three-glass collections have their uses in medical diagnostics, they are not specifically tailored towards monitoring the efficacy of insulin therapy post-meals in diabetic patients. The 2-hour postprandial specimen is particularly valuable in this regard because it directly measures the body's response to a typical dietary intake and the corresponding insulin administration.
Hence, for the purpose of monitoring and adjusting insulin therapy in diabetes management, the 2-hour postprandial urine specimen is the most informative and appropriate choice.

Question: 9

Which of the following diseases is characterized by infiltration of lymphocytes and plasma cells into the liver?

A. primary biliary cirrhosis
B. autoimmune chronic hepatitis (AI-CAH)
C. Graves disease
D. Hashimoto's disease

Answer: B

Explanation:

Autoimmune chronic hepatitis (AI-CAH) is a progressive inflammatory liver disease marked by the infiltration of lymphocytes and plasma cells into the liver. This infiltration leads to liver damage and, over time, can cause severe liver dysfunction and cirrhosis.
In autoimmune chronic hepatitis, the body's immune system attacks liver cells, believing them to be harmful invaders. This autoimmune response is primarily mediated by T cells, a type of white blood cell that normally helps protect the body against infections and cancers. In AI-CAH, however, these T cells attack the liver cells, causing inflammation and damage.
The disease is characterized by several immunological markers, including the presence of autoantibodies such as antinuclear antibodies (ANA) and smooth muscle antibodies (SMA). The diagnosis of AI-CAH often involves detecting these antibodies in the blood, along with elevated liver enzyme levels, which indicate liver inflammation.
Histologically, the liver of a person with AI-CAH shows a characteristic pattern of inflammation, primarily around the liver's portal areas. These areas contain infiltrates made up predominantly of lymphocytes and plasma cells. Over time, if untreated, this persistent inflammation leads to the destruction of the liver architecture, progressing to fibrosis and eventually cirrhosis.
Treatment of AI-CAH typically involves immunosuppressive medications to reduce liver inflammation and slow the progression of the disease. Corticosteroids, such as prednisone, are commonly used, often in combination with other immunosuppressants like azathioprine. The goal of treatment is to induce remission and prevent long-term complications, including liver failure and the need for liver transplantation.
In contrast, other conditions listed, such as primary biliary cirrhosis, Graves' disease, and Hashimoto's disease, involve different mechanisms and areas of autoimmune attack. Primary biliary cirrhosis primarily affects the bile ducts within the liver, while Graves' disease and Hashimoto's disease target the thyroid gland, manifesting in different symptoms and requiring distinct treatments from AI-CAH.

Question: 10

The subclass of helminths comprising true tapeworms is which of the following

A. trematodes
B. filarial parasites
C. nematodes
D. cestodes

Answer: D

Explanation:
The correct answer to the question "The subclass of helminths comprising true tapeworms is which of the following?" is "cestodes."
Cestodes, often referred to as tapeworms, belong to the class Cestoda within the phylum Platyhelminthes. These parasites are distinguished by their elongated, flat, segmented bodies and a lifestyle predominantly anchored within the intestines of their hosts, which include humans and other animals. Unlike other helminths that may have external movement or reside in tissue, cestodes are specifically adapted to an intestinal environment.
The structure of a tapeworm is specialized for attachment and absorption. At the anterior end is the scolex, which is equipped with hooks, suckers, or both, enabling the tapeworm to anchor securely to the

intestinal wall of the host. This prevents them from being dislodged by peristaltic movements of the host's gut. Following the scolex is a neck region from which new segments, or proglottids, are produced. Proglottids make up the bulk of the tapeworm's body and are essentially a series of reproductive units. Each proglottid contains a complete set of both male and female reproductive organs, which allows the tapeworm to self-fertilize or cross-fertilize with other tapeworms in the host. As they mature, these proglottids move posteriorly, becoming gravid (filled with eggs) before eventually detaching and exiting the host through feces to continue the lifecycle.

The lifecycle of cestodes is complex, often involving intermediate hosts, where larval stages develop, and definitive hosts, where adult tapeworms reside. Humans can become hosts by consuming undercooked meat containing larval cysts, leading to infections such as taeniasis and cysticercosis, depending on the species of tapeworm.

In summary, cestodes are a distinct group of helminths characterized by their segmented bodies, unique attachment mechanisms, and complex reproductive strategy, all of which are adapted to a parasitic life primarily within the digestive systems of vertebrates.

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