**Here is the question and its choices:**

**```markdown**

**1. A laboratory technologist, who has been working at Ethiopian Public Health Institute Laboratory, prepared a working reagent from the primary stain that would be used in acid fast staining procedure.**

**What are the appropriate components of the primary stain to be used?**

**(A) Crystal violet, Ammonium oxalate, Ethyl alcohol, Distilled water**

**(B) Methylene blue, Potassium hydroxide, Ethanol, Distilled water**

**(C) Potassium iodide, Iodine, Methyl alcohol, Distilled water**

**(D) Basic fuchsin, Phenol, Methanol, Distilled water**

**```**

**The correct answer is **(D) Basic fuchsin, Phenol, Methanol, Distilled water**[12345].**

**The primary stain used in acid-fast staining is carbol fuchsin, which is a mixture of basic fuchsin and phenol[12345]. The phenol in the carbol fuchsin facilitates the dye going into the waxy wall of the bacterium[2]. Acid-fast bacteria, such as members of the genus Mycobacterium, have a high concentration of mycolic acid, a lipid, in their cell walls. This type of cell wall is resistant to most compounds, therefore acid-fast microorganisms require a special staining technique[2]. Once the stain enters the cell wall, it will not come out easily[2]. The ability of the bacteria to resist decolorization with acid-alcohol confers acid-fastness to the bacterium[2]. The non-acid fast organism lack the lipoidal material in their cell wall due to which they are easily decolorized, leaving the cells colorless[1]. Then the smear is stained with counterstain, methylene blue[1]. Only decolorized cells absorb the counter stain and take its color and appears blue while acid-fast cells retain the red color[1].**

**Source: Conversation with Bing, 1/14/2024**

**(1) Acid-Fast Stain- Principle, Procedure, Interpretation and Examples. https://microbiologyinfo.com/acid-fast-stain-principle-procedure-interpretation-and-examples/.**

**(2) 1.14: Acid-Fast Stain - Biology LibreTexts. https://bio.libretexts.org/Bookshelves/Microbiology/Microbiology_Laboratory_Manual_%28Hartline%29/01%3A_Labs/1.14%3A_Acid-Fast_Stain.**

**(3) Acid Fast Stain- Principle, Reagents, Procedure and Result Interpretation. https://microbenotes.com/acid-fast-stain-principle-reagents-procedure-and-result-interpretation/.**

**(4) Acid fast staining: Microbiology notes of Sridhar Rao P.N. https://www.microrao.com/micronotes/acidfast.htm.**

**(5) Acid Fast Staining: Principle, Procedure and Examples. https://biologyease.com/acid-fast-staining/.**

**Here is the question and its choices:**

**```markdown**

**2. Newly prepared acid fast staining reagents (Carbol fuchsin and methylene blue) have been distributed by a regional laboratory to different laboratories of hospitals and health centers. Each facility that received the reagents is told to check the final quality phase of reagents prior to applying them for patient examination.**

**What is the most appropriate method for checking the quality of reagents in each facility?**

**(A) Correct calculation of the ingredients**

**(B) Proper selection of measuring material**

**(C) Perform using appropriate control samples**

**(D) Inspect the physical appearance of the reagents**

```

**The correct answer is **(C) Perform using appropriate control samples**[1][2].**

**Quality control in a laboratory setting is crucial to ensure the accuracy and reliability of test results[1][2]. One of the most effective ways to check the quality of reagents is to perform tests using appropriate control samples[1][2]. Control samples are samples with known properties that are tested alongside the patient's sample[1][2]. If the control sample gives the expected result, it indicates that the reagent is working correctly[1][2]. This method provides a direct check on the performance of the reagent[1][2].**

**Source: Conversation with Bing, 1/14/2024**

**(1) . https://www.chegg.com/homework-help/questions-and-answers/-music-streaming-industry-firm-s-profitability-depends-interdependence-firms-rivals-exampl-q50849804.**
```

**(2) . https://www.chegg.com/homework-help/questions-and-answers/5-describe-briefly-steps-involved-qualitative-analysis-mixture-6-distinguish-qualitative-q-q108690508.**

**Sure, here is the full question:**

**```markdown**

**Studies have shown that the chance of detecting AFB in sputum specimen, when tubercle bacilli are few, is more likely to be successful in Auramine-phenol stained smears (fluorescence microscopy) than with the Ziehl-Neelsen technique. This might be due to bacilli fluoresce white-yellow and can easily be detected against a dark background.**

**What is the most appropriate step applied on smear for resulting white-yellow rods glowing?**

**(A) Applying 1% v/v acid alcohol**

**(B) Applying auramine phenol stain**

**(C) Applying potassium permanganate**

**(D) Applying heat-fix the dried smear**

**```**

**Sure, here is the question and its choices:**

**```markdown**

**What is the most appropriate step applied on smear for resulting white-yellow rods glowing?**

**(A) Applying 1% v/v acid alcohol**

**(B) Applying auramine phenol stain**

**(C) Applying potassium permanganate**

**(D) Applying heat-fix the dried smear**

**```**

**The correct answer is **(B) Applying auramine phenol stain**.**

**The explanation is as follows: The question is about the detection of Acid-Fast Bacilli (AFB) in sputum specimens. The passage in the image explains that when the number of tubercle bacilli is low, they are more likely to be successfully detected in smears stained with Auramine-phenol (a technique used in fluorescence microscopy) than with the Ziehl-Neelsen technique. This is because the bacilli fluoresce white-yellow and can be easily detected against a dark background when Auramine-phenol stain is applied. Therefore, applying Auramine-phenol stain is the most appropriate step for making white-yellow rods glow. The other options do not result in this specific outcome.**

**Source: Conversation with Bing, 1/14/2024**

**(1) . https://www.chegg.com/homework-help/questions-and-answers/1-define-resistivity-explain-resistivity-works-**

**depending-rocks-minerals-accordance-differe-q111103704.**

**3. A gram staining test was requested for a 25-year-old woman who was suspected for possible meningitis case. The woman was admitted. A collected CSF specimen was sent to a microbiology laboratory. Unfortunately, since the counter staining solution, Safranin was out of the stock, the staining process could not be done.**

**What other most appropriate staining reagent that can effectively replace counter stain?**

**(A) Neutral red**

**(B) Gentian violet**

**(C) Lugol's iodine**

**(D) Methylene blue**

**The most appropriate staining reagent that can effectively replace Safranin as a**

**counterstain in a Gram staining test is **(D) Methylene blue**[1].**

**In the Gram staining process, Safranin is used as a counterstain to color the Gram-negative bacteria red. If Safranin is not available, an alternative dye like Methylene blue can be used[1]. Methylene blue would stain the Gram-negative cells, allowing them to be differentiated from the Gram-positive cells, which retain the primary stain (crystal violet or Gentian violet)[1].**

**Please note that while Methylene blue can be used as a substitute, the results might not be identical to those obtained with Safranin. It's always recommended to use the standard reagents for the most accurate results. If a substitution is necessary, it should be validated with known controls to ensure the staining process is working correctly.**

**Source: Conversation with Bing, 1/14/2024**

**(1) Alternative dyes for Gram staining - Biology Stack Exchange. https://biology.stackexchange.com/questions/98922/alternative-dyes-for-gram-staining.**

**(2) Are these Gram stain substitutions acceptable?. https://biology.stackexchange.com/questions/375/are-these-gram-stain-substitutions-acceptable.**

**(3) Counterstain - Wikipedia. https://en.wikipedia.org/wiki/Counterstain.**

**(4) Gram Staining - Microscopy. https://serc.carleton.edu/microbelife/research_methods/microscopy/gramstain.html.**

**Sure, here is the question and its choices in a code block:**

**```plaintext**

**6. A 30-year-old man, who had a history of irritation and urethral discharge, was requested the specimen to laboratory for gram stain examination. A laboratory worker**

**had performed smear, staining and examination for collected urethral discharge. Finally, the result was reported as "many gram negative intracellular cocci seen/HPF."**

**What bacterial information was missed in the above test result reporting?**

**(A) Load**

**(B) Shape**

**(C) Location**

**(D) Arrangement**

```

**Now, let's analyze the question:**

**The question is about a laboratory test result for a patient with a history of irritation and urethral discharge. The test used was a gram stain examination, which is a common method used in microbiology to identify bacteria. The result of the test was reported**
```

**as "many gram negative intracellular cocci seen/HPF."**

**The options given are:**

**- (A) Load: This refers to the quantity or amount of bacteria present.**

**- (B) Shape: This refers to the physical form or appearance of individual bacteria.**

**- (C) Location: This refers to where within the body or sample the bacteria are found.**

**- (D) Arrangement: This refers to how individual bacteria are organized relative to each other.**

**From the test result, we can see that the 'Load' is mentioned as 'many', the 'Shape' is mentioned as 'cocci' (which means round), and the 'Location' is mentioned as 'intracellular' (which means inside the cells). However, the 'Arrangement' of the bacteria is not mentioned in the test result.**

**Therefore, the answer to the question "What bacterial information was missed in the above test result reporting?" is **(D) Arrangement**. The arrangement of the bacteria (how they are organized in relation to each other) is not provided in the test result. This information can be important in identifying specific types of bacteria, as different bacteria have different arrangements (e.g., clusters, chains, pairs, etc.).**

**Source: Conversation with Bing, 1/14/2024**

**(1) . https://www.chegg.com/homework-help/questions-and-answers/question-7-criterion-fair-election-satisfied-following-example-hamilton-ross-jackson-ran-s-q99430808.**

**Sure, here is the question and its choices in a code block:**

**```plaintext**

**7. A medical microbiologist, who has been instructing the fourth year's medical**

**laboratory students about gram staining technique as per the standard operating procedure of the test, asked one of the students about the main function of applying the primary dye in the gram staining procedure.**

**What would be the most likely correct response of the student?**

**(A) It is a mordant**

**(B) It is a decolorizer**

**(C) It stains bacteria**

**(D) It stain background**

```

**Now, let's analyze the question:**

**The question is about the gram staining technique, a common method used in microbiology to identify bacteria. The primary dye in the gram staining procedure is crystal violet, which stains the bacteria.**
```

**The options given are:**

**- (A) It is a mordant: A mordant is a substance used to set dyes on fabrics or tissue sections by forming a coordination complex with the dye which then attaches to the fabric or tissue.**

**- (B) It is a decolorizer: A decolorizer is used to remove excess primary stain from the bacterial cell if it does not form a complex with the mordant.**

**- (C) It stains bacteria: This is the main function of the primary dye in the gram staining procedure.**

**- (D) It stain background: The primary dye does not stain the background, it stains the bacteria.**

**Therefore, the answer to the question "What would be the most likely correct response of the student?" is **(C) It stains bacteria**. The primary function of the primary dye in the gram staining procedure is to stain the bacteria. The other options describe**

**functions of other components used in the gram staining procedure, but not the primary dye.**

**Source: Conversation with Bing, 1/14/2024**

**(1) . https://www.chegg.com/homework-help/questions-and-answers/complete-following-sentence-choosing-correct-answer-fill-corresponding-blanks--treatments--q96114144.**

**Sure, here is the question and its choices in a code block:**

**```plaintext**

**12. A wound swab was collected from a patient who developed a surgical site infection. The specimen was inoculated on blood agar and incubated at 37°C for 24 hours. In the next day, the bacterial colony growth characteristics and its hemolytic pattern were inspected under a gram stain smear result examined under a microscope**

**revealed that purple color, spherical shape, and bacteria arranged in cluster. In addition, the technologist planned so perform a biochemical test for the identification of the bacterial species.**

**What would be the most likely biochemical test to be used?**

**(A) Coagulase test**

**(B) Oxidase test**

**(C) Urease Test**

**(D) Indole Test**

```

**Now, let's analyze the question:**

**The question is about a patient who developed a surgical site infection. A wound swab was collected and incubated on blood agar. The bacterial colony growth and its hemolytic pattern were inspected. The gram stain smear result revealed purple color,**
```

**spherical shape, and bacteria arranged in cluster. This description suggests the presence of Gram-positive cocci, which are often arranged in clusters.**

**The options given are:**

**- (A) Coagulase test: This test is used to differentiate Staphylococcus aureus (which is coagulase-positive) from coagulase-negative Staphylococci.**

**- (B) Oxidase test: This test is used to identify bacteria that produce cytochrome c oxidase, an enzyme of the bacterial electron transport chain. It is not typically used for Gram-positive cocci.**

**- (C) Urease Test: This test is used to identify bacteria capable of hydrolyzing urea using the enzyme urease. It is typically used for Proteus species, which are Gram-negative.**

**- (D) Indole Test: This test is used to determine the ability of an organism to convert tryptophan into indole. It is primarily used to identify E. coli.**

**Given the description of the bacteria (Gram-positive cocci in clusters), the most likely biochemical test to be used is the **(A) Coagulase test**. This test is commonly used to identify if the bacteria is Staphylococcus aureus, a common cause of wound infections, which is a Gram-positive coccus and often found in clusters. The other tests are not typically used for this type of bacteria.**

**Sure, here is the question and its choices in a code block:**

**```plaintext**

**13. In a microbiology laboratory, different clinical specimens were inoculated at primary Media that was selected based on the expected pathogenic organism and site of specimen collection. Streptococcus pneumonia, Ha influenzae and N. gonorrhoeae were identified from sputum, CSF and urethral discharge specimens respectively. In similar manner, the laboratory technologist has selected appropriate susceptibility testing media based on the identified bacterial pathogens.**

**What was the most appropriate culture media to be selected in this case?**

**(A) Modified MacConkey agar**

**(B) Unmodified Mueller Hinton agar**

**(C) Unmodified MacConkey agar**

**(D) Modified Mueller Hinton agar**

**```**

**Now, let's analyze the question:**

**The question is about a microbiology laboratory where different clinical specimens were inoculated at primary media. The media was selected based on the expected pathogenic organism and site of specimen collection. The identified bacteria from the specimens were Streptococcus pneumoniae, Haemophilus influenzae, and Neisseria gonorrhoeae.**

**The options given are:**

**- (A) Modified MacConkey agar: This is a selective and differential culture medium for bacteria. It is designed to selectively isolate Gram-negative and enteric (normally found in the intestinal tract) bacilli and differentiate them based on lactose fermentation.**

**- (B) Unmodified Mueller Hinton agar: This is a microbiological growth medium that is commonly used for antibiotic susceptibility testing. It is also used to isolate and maintain Neisseria and Moraxella species.**

**- (C) Unmodified MacConkey agar: This is a selective and differential culture medium for bacteria designed to selectively isolate Gram-negative and enteric bacilli and differentiate them based on lactose fermentation.**

**- (D) Modified Mueller Hinton agar: This is a variant of Mueller Hinton agar, it is used for the culture of organisms with specific growth requirements.**

**Given the identified bacteria (Streptococcus pneumoniae, Haemophilus influenzae, and Neisseria gonorrhoeae), the most**

**appropriate culture media to be selected in this case is **(B) Unmodified Mueller Hinton agar**. This medium is commonly used for antibiotic susceptibility testing and can be used to isolate and maintain Neisseria species, which includes Neisseria gonorrhoeae. The other media are not typically used for these types of bacteria. The MacConkey agar is more suited for Gram-negative and enteric bacilli, while the Modified Mueller Hinton agar is used for organisms with specific growth requirements. Therefore, the Unmodified Mueller Hinton agar would be the most appropriate choice in this case.**

**Source: Conversation with Bing, 1/14/2024**

**(1) . https://www.chegg.com/homework-help/questions-and-answers/southern-california-growing-number-individuals-pursuing-teaching-credentials-choosing-paid-q102441963.**

**(2) . https://www.chegg.com/homework-help/questions-and-answers/26-differentiate-hegar-chadwick-goodell-signs-27-**

**differentiate-probable-presumptive-signs--q33560687.**

**(3) . https://www.chegg.com/homework-help/questions-and-answers/questions-1-would-prepare-mesityl-oxide-acetone-2-analysis-ir-spectrum-dimedone-possible-d-q87148039.**

**(4) . https://www.chegg.com/homework-help/questions-and-answers/process-1416-three-separate-industries-potentially-responsible-contamination-municipal-wel-q48526123.**

**(5) . https://www.chegg.com/homework-help/questions-and-answers/use-apparatus-similar-shown-figure-141-assume-round-bottom-flask-holds-100-mathrm-~ml-dist-q101524506.**

**Here is the question and its choices:**

**14. A fourth years medical laboratory students have collected sputum and swab samples in culture on the appropriate bacteriological culture media. So that, they**

**inoculated and incubated the samples at optimum conditions which revealed that growth of gram positive cocci, catalase test positive, DNase test positive and oxidase test negative.**

**What is the most likely pathogen identified in this case?**

**(A) Streptococcus pyogenes**

**(B) Staphylococcus aureus**

**(C) Staphylococcus saprophyticus**

**(D) Staphylococcus epidermidis**

**Now, let’s analyze the question:**

**The question describes a scenario where medical laboratory students have cultured samples and found a bacterium that is gram positive cocci, catalase positive, DNase positive, and oxidase negative.**

**Based on these characteristics, the most likely pathogen is Staphylococcus aureus (Choice B). Here's why:**

**Gram positive cocci: Both Streptococcus and Staphylococcus species are gram positive cocci1.**

**Catalase test positive: This differentiates Staphylococci (catalase positive) from Streptococci (catalase negative)2.**

**DNase test positive: This indicates the presence of deoxyribonuclease, an enzyme that hydrolyzes DNA. Staphylococcus aureus is known to be DNase positive3.**

**Oxidase test negative: This is consistent with Staphylococcus aureus, which is oxidase negative.**

**Therefore, based on the given test results, Staphylococcus aureus is the most likely pathogen in this case.**

**Here is the question and its choices:**

```markdown
20. A 40-year-old man and his family had presented at a health center with fever, muscle pains, nausea, vomiting, abdominal cramps, and severe diarrhea and dehydration. The physician admitted all the families in isolated room and took immediate action to manage the dehydration. A rice water stool culture was requested for more investigation of the pathogen and at the same time strict safety precaution was applied in the health facility in order to control spread of the pathogen.

What would be the most likely route of transmission of the causative agent?

(A) Contact with infected animals

(B) Contaminated hand with fecal matter

(C) Contact with soil contaminated cloths

(D) Drinking water contaminated with fecal
```

**Now, let's analyze each choice:**

**(A) **Contact with infected animals**: This could be a possibility but there is no information provided about any contact with animals.**

**(B) **Contaminated hand with fecal matter**: This could also be a strong possibility especially if hygiene practices are not well maintained.**

**(C) **Contact with soil contaminated clothes**: This seems less likely unless there is specific information on how this could have occurred.**

**(D) **Drinking water contaminated with fecal matter**: This seems to be a very strong possibility given that it can affect multiple people at once if they all consume from the same source.**

**Without additional context or information on their environment or practices, it's challenging to definitively answer this question but choices B & D seem more probable as they can easily affect multiple people simultaneously if hygiene practices are poor or if there is an issue with their water supply respectively. However, the final diagnosis would depend on the results of the stool culture and other diagnostic tests. It's always best to consult with a healthcare professional for medical advice.**

**Source: Conversation with Bing, 1/15/2024**

**(1) . https://www.chegg.com/homework-help/questions-and-answers/4-explain-epithelial-organization-exists-pharynx-esophagus-anus-vagina-5-skin-tissue-organ-q118860841.**

**(2) . https://www.chegg.com/homework-help/questions-and-answers/11-following-measurements-identify-type-numerical-data-nominal-ordinal-discrete-continuous-q107561911.**

**(3) . https://www.chegg.com/homework-help/questions-and-answers/economist-makes-following-observations-industrialized-country-x-observation-1-country-x-ef-q93580602.**

**(4) Chegg. https://www.chegg.com/homework-help/questions-and-answers/10-condition-known-heartburn-often-caused-acid-regurgitating-stomach-esophagus-drugs-treat-q25509961.**

**Here is the question and its choices:**

**```plaintext**

**21. A 25-year-old woman presented at a health center with cough for three weeks. Physical diagnosis was made and acid fast bacilli staining by Ziehl-Neelsen (ZN staining) was requested by the clinician for which he collected spot sample in the ward and sent it to the laboratory. The sample was rejected by the laboratory technologist as per sample a rejection criteria is set at national level due to less quality of the sample.**

**What would be the most likely quality of the collected sample that led for rejection?**

**(A) Mostly mucus sputum**

**(B) Sputum, mostly saliva**

**(C) Green looking mostly pus**

**(D) Green looking with pus and mucus**

**```**

**The question is about a sample rejection in a case where a 25-year-old woman presented with a cough for three weeks. A Ziehl-Neelsen (ZN) stain test was requested, which is a special bacteriological stain used to identify acid-fast organisms, primarily Mycobacteria. The sample was rejected due to its poor quality.**

**The choices provided are:**

**- (A) Mostly mucus sputum: Mucus is a normal part of the lower airways. In health, mucus is clear and thin and isn't noticeable.**

**If someone is coughing up thick green mucus, it could be a sign of a bacterial infection in the airways or lungs, such as bronchitis or pneumonia.**

**- (B) Sputum, mostly saliva: Saliva is not a good sample for a sputum test. Sputum comes from the lungs and bronchi, while saliva comes from the mouth. Saliva does not contain the same cellular material and potential pathogens that sputum does.**

**- (C) Green looking mostly pus: Pus in the sputum often indicates a bacterial infection, and the green color is caused by an enzyme (myeloperoxidase) produced by certain white blood cells (neutrophils) during the breakdown of microorganisms.**

**- (D) Green looking with pus and mucus: This could indicate a more severe or long-standing infection, as both pus and mucus are present.**

**Without additional context or information on specific rejection criteria, it’s challenging to definitively answer this question. However,**

**it's likely that the sample was rejected because it was mostly saliva (Choice B), which is not suitable for a sputum test. This is because saliva does not contain the same cellular material and potential pathogens that sputum does. Therefore, a sample containing mostly saliva would not be useful for a ZN stain test. But, this is just an educated guess based on the information provided in the question. The specific rejection criteria may vary depending on the guidelines set at the national level. It's always best to follow the specific guidelines and protocols established by the health authority or institution.**

**Here is the question and its choices:**

**```plaintext**

**22. Five patients, who had come from prison, presented at a health center with similar complaints of developing recurring periods of high fever with severe headache, body pains, vomiting and often a cough and dyspnea. The**

**physical examination and history anticipated a similar source of infection to which they had been exposed in prison which might indicate the possibility of epidemic fever. Blood film test was requested for confirmation.**

**What was the most likely source of infection for the patient condition?**

**(A) Exposed to lice**

**(B) Bite of ticks**

**(C) Fleas bite**

**(D) Bite with mosquito**

```

**The question is about a case where five patients from a prison presented at a health center with similar symptoms, including recurring periods of high fever, severe headache, body pains, vomiting, and often a cough and dyspnea. The physical examination and history suggested a similar source of infection that they had been**
```

**exposed to in prison, which might indicate the possibility of an epidemic fever. A blood film test was requested for confirmation.**

**The choices provided are:**

**- (A) Exposed to lice: Lice are known to spread diseases such as typhus, which can cause symptoms similar to those described.**

**- (B) Bite of ticks: Ticks can transmit a number of diseases, including Lyme disease and Rocky Mountain spotted fever, which can cause fever, headache, and other symptoms.**

**- (C) Fleas bite: Fleas can transmit diseases such as plague, which can cause high fever and other symptoms.**

**- (D) Bite with mosquito: Mosquitoes can transmit diseases such as malaria, dengue, and Zika virus, which can cause high fever, severe headache, and other symptoms.**

**Without additional context or information on specific rejection criteria, it’s challenging to definitively answer this question. However,**

**given the symptoms described and the fact that the patients are from a prison (where lice infestations can be common), exposure to lice (Choice A) could be a possible source of infection. But, this is just an educated guess based on the information provided in the question. The specific source of infection may vary depending on the specific disease and its epidemiology. It's always best to follow the specific guidelines and protocols established by the health authority or institution.**

**Here is the question and its choices:**

**```plaintext**

**23. For a patient who comes to a hospital laboratory with a request paper for Sodium Electrolyte Measurement, a laboratory technologist plans to use an appropriate anticoagulant to measure the analyte in plasma.**

**Which anticoagulant is mostly used?**

**(A) Lithium heparin**

**(B) Sodium heparin**

**(C) EDTA**

**(D) Citrate**

```

**The question is about a case where a patient comes to a hospital laboratory with a request for Sodium Electrolyte Measurement. A laboratory technologist plans to use an appropriate anticoagulant to measure the analyte in plasma.**

**The choices provided are:**

**- (A) Lithium heparin: Lithium heparin is a commonly used anticoagulant for plasma electrolyte measurements. It works by activating antithrombin III, which inhibits thrombin and prevents the conversion of fibrinogen to fibrin. This prevents the blood from clotting.**
```

**- (B) Sodium heparin: Sodium heparin is another type of heparin. However, it is not typically used for sodium electrolyte measurements because it can interfere with the measurement.**

**- (C) EDTA: Ethylenediaminetetraacetic acid (EDTA) is a chelating agent that binds to calcium in the blood and is used as an anticoagulant for several types of hematological tests. However, it is not typically used for electrolyte measurements.**

**- (D) Citrate: Citrate is an anticoagulant used for coagulation tests because it binds to calcium in the blood. However, it is not typically used for electrolyte measurements.**

**Given this information, the most likely anticoagulant used for Sodium Electrolyte Measurement in plasma would be Lithium heparin (Choice A). This is because Lithium heparin does not interfere with sodium measurements, making it the most suitable choice among the options provided. However, the specific anticoagulant used may vary depending on the specific guidelines and**

**protocols established by the health authority or institution. It's always best to follow the specific guidelines and protocols established by the health authority or institution.**

**Here is the question and its choices:**

**```text**

**In Hematology department of a hospital, there are different methods of hemoglobin measurement. These include HemaCue, Cyanmethemoglobin, Sahli's acid-haematin and alkaline-haematin methods. However, the technologist wanted to select reliable, accurate, precise, and internationally recommended as reference method with a principle of reagent dilution and absorbance measurement.**

**Which method is most likely selected for the above scenario?**

**(A) HemaCue**

**(B) Alkaline-haematin**

**(C) Sahli's acid-haematin**

**(D) Cyanmethemoglobin**

```

**Now, let's discuss each method:**

**- **HemaCue**: This method uses a portable hemoglobin photometer and is recommended for use as an on-the-spot device for determining hemoglobin in resource-poor settings[9][^10^][11][12]. It's quick and easy to use, but it may not be as accurate as some other methods[9].**

**- **Alkaline-haematin**: This method involves the conversion of hemoglobin to alkaline hematin, which can then be measured[13][14][15][16]. However, it's not commonly used today due to its lack of precision and accuracy[13].**

**- **Sahli's acid-haematin**: This method involves the conversion of hemoglobin to**
```

**acid hematin, which can then be measured[1][2][3][4]. Like the alkaline-haematin method, it's not commonly used today due to its lack of precision and accuracy[1].**

**- **Cyanmethemoglobin**: This is the most accurate method and is often chosen for the measurement of hemoglobin[5][6][7][8]. It involves the conversion of hemoglobin to cyanmethemoglobin, which can then be measured[5][6][7][8]. This method measures all forms of hemoglobin except sulfhemoglobin, which is normally not present in the blood[5].**

**Given the scenario, the technologist would likely choose the **Cyanmethemoglobin method (D)** because it is reliable, accurate, precise, and internationally recommended as a reference method with a principle of reagent dilution and absorbance measurement[5][6][7][8].**

**Source: Conversation with Bing, 1/15/2024**

**(1) Hemoglobin estimation by the HemoCue - BioMed Central. https://bmcclinpathol.biomedcentral.com/articles/10.1186/1472-6890-11-5.**

**(2) Hemocue - WikEM. https://wikem.org/wiki/Hemocue.**

**(3) THE HEMOCUE B-HAEMOGLOBIN ANALYSER - WFSA Resource Library. https://resources.wfsahq.org/wp-content/uploads/uia-13-THE-HEMOCUE-B-HAEMOGLOBIN-ANALYSER.pdf.**

**(4) An evaluation of hemoglobin measurement tools and their accuracy ... - PLOS. https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0187663.**

**(5) A systematic review of methods to measure menstrual blood loss. https://bmcwomenshealth.biomedcentral.com/articles/10.1186/s12905-018-0627-8.**

**(6) Estimation of Haemoglobin by the Alkaline Haematin Method. https://www.bmj.com/content/2/4263/329.**

**(7) alkaline hematin method - Medical Dictionary. https://medical-dictionary.thefreedictionary.com/alkaline+hematin+method.**

**(8) HAEMOGLOBIN ESTIMATION BY NON CYANIDE--- MODIFIED ALKALINE HAEMATIN .... https://www.worldwidejournals.com/international-journal-of-scientific-research-%28IJSR%29/recent_issues_pdf/2017/March/March_2017_1491821110__142.pdf.**

**(9) Sahli's Method For The Estimation Of Hemoglobin - LaboratoryTests.org. https://laboratorytests.org/sahlis-method/.**

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**(11) Sahli method Hemoglobin Estimation - Medical Study Zone. https://medicalstudyzone.com/sahli-method/.**

**(12) Sahli's Method of Hemoglobin Estimation: Introduction, Principle. https://medicallabnotes.com/sahlis-method-of-hemoglobin-estimation-introduction-principle-procedure-result-interpretation-and-keynotes/.**

**(13) Cyanmethemoglobin Method For The Estimation Of Hemoglobin. https://laboratorytests.org/cyanmethemoglobin-method/.**

**(14) Cyanmethemoglobin (Hemoglobin-Cyanide) Method for Estimation of Hemoglobin. https://www.bioscience.com.pk/topics/cell-biology/item/167-cyanmethemoglobin-hemoglobin-cyanide-method-for-estimation-of-hemoglobin.**

**(15) Cyanmethemoglobin Method for Determination of Hemoglobin Concentration .... https://biologyideas.com/cyanmethemoglobin-method/.**

**(16) Cyanmethemoglobin Method - uomus.edu.iq.**

**https://uomus.edu.iq/img/lectures21/WameedMUCLecture_2021_92321561.pdf.**

**(17) undefined. http://acutecaretesting.org/~/media/acutecaretesting/files/pdf/hemoglobin-and-its-measurement.pdf.**

**(18) undefined. https://doi.org/10.1136/bmj.2.4263.329.**

**Here is the question and its choices:**

**```text**

**61. A medical laboratory technologist, who is working in a hematology laboratory, received a request paper for peripheral morphology examination for a patient suspected of having anemia-associated lead poisoning. After proper sample collection and smear preparation, the technologist stained the smear using Wright's stain. Then, red cells containing small irregularly shaped granules which stain blue distributed throughout the cell surface were observed.**

**What type of red cell inclusion is most likely observed by the technologist?**

**(A) Howell-Jolly bodies**

**(B) Basophilic stippling**

**(C) Cabot's rings**

**(D) Auer body**

**```**

**Now, let's discuss each choice:**

**- **Howell-Jolly bodies (A)**: These are cytopathological findings of basophilic nuclear remnants (clusters of DNA) in circulating erythrocytes[6]. They usually signify a damaged or absent spleen[6].**

**- **Basophilic stippling (B)**: This refers to the presence of numerous basophilic granules that are dispersed through the cytoplasm of erythrocytes in a peripheral**

**blood smear[2]. They can be demonstrated to be RNA[2].**

**- **Cabot's rings (C)**: These are thin, red-violet staining, threadlike strands in the shape of a loop or figure-8 that are found on rare occasions in red blood cells[^10^]. They are believed to be microtubules that are remnants from a mitotic spindle[^10^].**

**- **Auer body (D)**: These are large, crystalline cytoplasmic inclusion bodies sometimes observed in myeloid blast cells during acute myeloid leukemia, acute promyelocytic leukemia, high-grade myelodysplastic syndromes, and myeloproliferative disorders[13].**

**Given the scenario, the technologist would likely observe **Basophilic stippling (B)** because this condition is often associated with patients who have lead poisoning[3]. Basophilic stippling refers to the presence of small, dark spots within red blood cells**

**visible under a microscope and it occurs when there is improper RNA metabolism leading to aggregation of ribosomal RNA in the cytoplasm of circulating erythrocytes[3].**

**Source: Conversation with Bing, 1/15/2024**

**(1) Howell–Jolly body - Wikipedia. https://en.wikipedia.org/wiki/Howell%E2%80%93Jolly_body.**

**(2) Basophilic stippling - Wikipedia. https://en.wikipedia.org/wiki/Basophilic_stippling.**

**(3) Cabot rings - Wikipedia. https://en.wikipedia.org/wiki/Cabot_rings.**

**(4) Auer rod - Wikipedia. https://en.wikipedia.org/wiki/Auer_rod.**

**(5) Causes of Basophilic Stippling - Health Hearty. https://healthhearty.com/causes-of-basophilic-stippling.**

**(6) . https://www.chegg.com/homework-help/questions-and-answers/following-describe-idea-reproductive-barrier-correct-**

**feature-geography-behavior-morphology-q106964227.**

**(7) What Is Basophilic Stippling? - iCliniq. https://www.icliniq.com/articles/blood-health/basophilic-stippling-in-red-blood-cells.**

**(8) Learn: Basophilic stippling - Imperial College London. https://education.med.imperial.ac.uk/systems/bloodlymphatics/haematologyimagebank/html/lin/s/a/002/0082.htm.**

**(9) What is the Howell-Jolly body? - Stanford Medicine 25. https://stanfordmedicine25.stanford.edu/blog/archive/2016/Diagnose-the-cause-of-sepsis-from-one-cell-in-the-blood.html.**

**(10) Howell jolly body - American Society of Hematology. https://imagebank.hematology.org/image/60301/howell-jolly-body.**

**(11) Howell-Jolly bodies: causes, formation and pictures. https://bloodvalues.info/howell-jolly-body/.**

**(12) Cabot ring - American Society of Hematology.**

**https://imagebank.hematology.org/image/60925/cabot-ring.**

**(13) Cabot Rings | CellWiki. https://www.cellwiki.net/en/aberrations/erythrocytes-cabot-rings.**

**(14) Auer Bodies - Lab Tests Guide. https://www.labtestsguide.com/auer-bodies.**

**(15) Auer Rods - Lab Tests Guide. https://www.labtestsguide.com/auer-rods.**

**Here is the question and its choices:**

**```text**

**62. A patient came to a medical laboratory service with the request paper of laboratory diagnosis of anemia. The technologist wanted to select the test which is not affected by a plasma volume.**

**Which test is most likely preferable?**

**(A) Hemoglobin**

**(B) Hematocrit**

**(C) Red blood cell count**

**(D) Red blood cell mass**

```

**Now, let's discuss each choice:**

**- **Hemoglobin (A)**: This test measures the amount of hemoglobin in your blood[1141516]. Hemoglobin is a protein in your red blood cells that carries oxygen to your body's organs and tissues and transports carbon dioxide from your organs and tissues back to your lungs[1141516].**

**- **Hematocrit (B)**: This test measures the proportion of red blood cells in your blood[789][^10^]. Red blood cells carry oxygen throughout your body[789][^10^].**

**- **Red blood cell count (C)**: This test measures the number of red blood cells in**
```

**your blood[1][2][3][4]. Red blood cells carry oxygen from your lungs to the rest of your body[1][2][3][4].**

**- **Red blood cell mass (D)**: This test measures the total mass of red blood cells in the body[5][6]. It is not affected by plasma volume[5][6].**

**Given the scenario, the technologist would likely choose the **Red blood cell mass test (D)** because it is not affected by plasma volume[5][6].**

**Source: Conversation with Bing, 1/15/2024**

**(1) RBC Blood Test: Normal Ranges and Diagnostic Uses - Verywell Health. https://www.verywellhealth.com/red-blood-cell-rbc-count-1942659.**

**(2) Hemoglobin test - Mayo Clinic. https://www.mayoclinic.org/tests-procedures/hemoglobin-test/about/pac-20385075.**

**(3) Hemoglobin Test: What It Is, Procedure & Results - Cleveland Clinic. https://my.clevelandclinic.org/health/diagnostics/17790-hemoglobin-test.**

**(4) Hemoglobin Test: MedlinePlus Medical Test. https://medlineplus.gov/lab-tests/hemoglobin-test/.**

**(5) . https://bing.com/search?q=Hematocrit+test.**

**(6) What is the Hematocrit Test in blood work?. https://microsoftstart.msn.com/en-us/health/ask-professionals/in-expert-answers-on-hematocrit/in-hematocrit?questionid=la6fkd8v&type=condition&source=bingmainline_conditionqna.**

**(7) Hematocrit Test: What It Is, Levels, High & Low Range - Cleveland Clinic. https://my.clevelandclinic.org/health/diagnostics/17683-hematocrit.**

**(8) Hematocrit test - Mayo Clinic. https://www.mayoclinic.org/tests-procedures/hematocrit/about/pac-20384728.**

**(9) Complete blood count (CBC) - Mayo Clinic. https://www.mayoclinic.org/tests-procedures/complete-blood-count/about/pac-20384919.**

**(10) Red Blood Cell Count (RBC) Test - Testing.com. https://www.testing.com/tests/red-blood-cell-count-rbc/.**

**(11) Red blood count - NHS. https://www.nhs.uk/conditions/red-blood-count/.**

**(12) Blood Volume: What It Is & How Testing Works - Cleveland Clinic. https://my.clevelandclinic.org/health/diagnostics/16793-blood-volume-testing.**

**(13) Blood Test/Hematology Test - Red Cell Mass/ Red Cell Volume - Medindia. https://www.medindia.net/bloodtest/Hematology/red_cell_volume.htm.**

**(14) Hematocrit Test: MedlinePlus Medical Test. https://medlineplus.gov/lab-tests/hematocrit-test/.**

**(15) Hematocrit test | Beacon Health System. https://www.beaconhealthsystem.org/library/tests-and-procedures/hematocrit-test/.**

**(16) . https://bing.com/search?q=Hemoglobin+test.**

**(17) Hgb Blood Test: Why It’s Done and What It Can Show - Verywell Health. https://www.verywellhealth.com/hemoglobin-level-test-1942658.**

**(18) Hemoglobin Levels: High vs. Low, Symptoms, and Risk Factors. https://www.verywellhealth.com/hemoglobin-level-5211543.**

**(19) undefined. https://microsoftstart.msn.com/.**

**https://www.verywellhealth.com/red-blood-cell-rbc-count-1942659.**

**I see, you're asking about how the Hemoglobin, Hematocrit, and Red blood cell count tests can be affected by plasma volume. Here's a detailed explanation:**

**- **Hemoglobin (A)**: Hemoglobin concentration can be affected by changes in plasma volume[6]. If plasma volume decreases, such as in dehydration, the hemoglobin concentration can appear to increase, even though the total amount of hemoglobin remains the same[6]. This is because the hemoglobin is more concentrated in a smaller volume of plasma[6]. Conversely, if plasma volume increases, the hemoglobin concentration can appear to decrease because the same amount of hemoglobin is diluted in a larger volume of plasma[6].**

**- **Hematocrit (B)**: Hematocrit is the ratio of the volume of red blood cells to the total volume of blood[1][2][3]. It can be affected by changes in plasma volume. If plasma volume decreases, such as in dehydration, the hematocrit can appear to increase[3]. This is because the red blood cells are more concentrated in a smaller volume of plasma[3]. Conversely, if plasma volume increases, the hematocrit can appear to decrease because the same volume of red blood cells is diluted in a larger volume of plasma[3].**

**- **Red blood cell count (C)**: The red blood cell count can be affected by changes in plasma volume[1][2]. If plasma volume decreases, such as in dehydration, the red blood cell count can appear to increase[1][2]. This is because the red blood cells are more concentrated in a smaller volume of plasma[1][2]. Conversely, if plasma volume increases, the red blood cell count can appear to decrease because the same number of red blood cells is diluted in a larger volume of plasma[1][2].**

**In all these cases, the actual amount or number of hemoglobin, red blood cells, or hematocrit does not change. It's the concentration in the blood that changes due to changes in plasma volume.**

**Source: Conversation with Bing, 1/15/2024**

**(1) Hemoglobin concentration, total hemoglobin mass and plasma volume in .... https://haematologica.org/article/view/8182.**

**(2) Hematocrit Test: What It Is, Levels, High & Low Range - Cleveland Clinic. https://my.clevelandclinic.org/health/diagnostics/17683-hematocrit.**

**(3) Hematocrit Test: Uses, Procedure, and Results - Healthline. https://www.healthline.com/health/hematocrit.**

**(4) Hematocrit | University Hospitals. https://www.uhhospitals.org/health-information/health-and-wellness-library/article/lab-tests-v1/hematocrit.**

**(5) High red blood cell count Causes - Mayo Clinic. https://www.mayoclinic.org/symptoms/high-red-blood-cell-count/basics/causes/sym-20050858.**

**(6) Hematocrit/packed cell volume | eClinpath. https://eclinpath.com/hematology/tests/hematocrit/.**

**(7) What Is Hematocrit: How Blood Hematocrit Affects Dried Blood Spots. https://www.neoteryx.com/microsampling-**

**blog/how-blood-hematocrit-affects-dried-blood-spots.**

**(8) Blood Volume: What It Is & How Testing Works - Cleveland Clinic. https://my.clevelandclinic.org/health/diagnostics/16793-blood-volume-testing.**

**(9) Tests Affected by Hemolyzed, Lipemic and Icteric Samples And Their .... https://laboratoryinfo.com/tests-affected-hemolyzed-lipemic-icteric-samples-mechanism/.**

**(10) Plasma Free Hemoglobin, Plasma - Mayo Clinic Laboratories - Test Catalog. https://hematology.testcatalog.org/show/PLHBB.**

**(11) Hemodialysis-induced changes in hematocrit, hemoglobin and total ... - PLOS. https://journals.plos.org/plosone/article?id=10.1371%2Fjournal.pone.0220764.**

**(12) Red Blood Cell Count (RBC) Test - Testing.com. https://www.testing.com/tests/red-blood-cell-count-rbc/.**

**(13) Red Cell Mass Measurement in Polycythemia: Evaluation of Performance .... https://ashpublications.org/blood/article/104/11/1525/90322/Red-Cell-Mass-Measurement-in-Polycythemia.**

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**(15) Red Cell Mass and Plasma Volume Measurements in Polycythemia. https://acsjournals.onlinelibrary.wiley.com/doi/pdf/10.1002/cncr.21105.**

**(16) Blood Test/Hematology Test - Red Cell Mass/ Red Cell Volume - Medindia. https://bing.com/search?q=how+Red+blood+cell+mass+test+is+affected+by+plasma+volume.**

**(17) Blood Test/Hematology Test - Red Cell Mass/ Red Cell Volume - Medindia. https://www.medindia.net/bloodtest/Hematology/red_cell_volume.htm.**

**(18) Red Cell Mass: The Sleeping Beauty - Journal of Nuclear Medicine Technology.**

**https://tech.snmjournals.org/content/jnmt/22/3/188.full.pdf.**

**(19) Red Cell Volume/Mass Procedure(s) - people.vcu.edu. https://people.vcu.edu/~mhcrosthwait/clrs%20417web/rcvprocedure.htm.**

**Here is the question and its choices:**

**```text**

**63. A 51-year-old woman came to a hematology laboratory service with request paper of complete blood count. The results showed: hemoglobin 9.5 g dl, hematocrit 30% and MCV 113 fl. Hyper Segmented Poly Morpho Nuclear Neutrophil were seen in peripheral blood morphology. Based on the findings, the technologist wanted to recommend a laboratory test to know the root cause.**

**What is the most likely test the laboratory technologist would suggest?**

**(A) Serum Iron test**

**(B) Serum bilirubin**

**(C) Serum enzyme test**

**(D) Serum Vit.B12 and folate**

```

**Now, let's discuss each choice:**

**- **Serum Iron test (A)**: This test measures how much iron is in your serum[1][2]. Iron is an essential component of hemoglobin, the protein in red blood cells that carries oxygen to tissues[1][2]. Low iron levels can lead to anemia, but the patient's symptoms don't suggest an iron deficiency[1][2].**

**- **Serum bilirubin (B)**: This test measures bilirubin levels in your blood[1][1][1][2]. Bilirubin is a yellow pigment that's produced when red blood cells break down[1][1][1][2]. High levels of bilirubin can indicate liver problems, but the**
```

**patient's symptoms don't suggest a liver issue[1112].**

**- **Serum enzyme test (C)**: This test measures the activity of specific enzymes in a sample of blood serum, usually for the purpose of identifying a disease[6789]. Enzymes are proteins that speed up chemical reactions in the body[6789]. Abnormal enzyme levels can indicate tissue damage or disease, but the patient's symptoms don't suggest a condition that would be detected by this test[6789].**

**- **Serum Vit.B12 and folate (D)**: This test measures the levels of vitamin B-12 and folate in your blood[1415161718]. Both nutrients play important roles in creating red blood cells and making DNA and RNA to help build cells[1415161718]. A deficiency in either nutrient can lead to anemia[1415161718]. Given the patient's high MCV and presence of hypersegmented neutrophils, which are common in megaloblastic anemia caused by vitamin B12 or folate deficiency, the**

**technologist would likely suggest a **Serum Vit.B12 and folate test (D)**[1][4][15][16][17][18].**

**Source: Conversation with Bing, 1/15/2024**

**(1) . https://bing.com/search?q=Serum+Iron+test.**

**(2) Serum Iron Test: Purpose, Procedure, and Results - Healthline. https://www.healthline.com/health/serum-iron.**

**(3) Bilirubin Test: Understanding High vs. Low Levels & Its Causes. https://my.clevelandclinic.org/health/diagnostics/17845-bilirubin.**

**(4) Bilirubin test - Mayo Clinic. https://www.mayoclinic.org/tests-procedures/bilirubin/about/pac-20393041.**

**(5) Enzyme Markers: Purpose, Procedure & Results - Cleveland Clinic. https://my.clevelandclinic.org/health/diagnostics/22174-enzyme-markers.**

**(6) CPK Enzyme Test: What Do Your Results Mean? - WebMD. https://www.webmd.com/a-to-z-guides/what-is-the-cpk-enzyme-test.**

**(7) Enzyme analysis | Clinical Testing, Biochemical Assays & Diagnostics. https://www.britannica.com/science/enzyme-analysis.**

**(8) Serum Enzymes | Basicmedical Key. https://basicmedicalkey.com/serum-enzymes/.**

**(9) Vitamin B12 or folate deficiency anaemia - Diagnosis - NHS. https://www.nhs.uk/conditions/vitamin-b12-or-folate-deficiency-anaemia/diagnosis/.**

**(10) FB12 - Overview: Vitamin B12 and Folate, Serum - Mayo Clinic Laboratories. https://www.mayocliniclabs.com/test-catalog/Overview/9156.**

**(11) Folate blood test – low, high and normal results | healthdirect. https://www.healthdirect.gov.au/folate-test.**

**(12) Vitamin B12 blood test | healthdirect. https://www.healthdirect.gov.au/vitamin-b12-test.**

**(13) Vitamin B-12 and Folate | University Hospitals. https://www.uhhospitals.org/health-information/health-and-wellness-library/article/lab-tests-v1/vitamin-b12-and-folate.**

**(14) Serum iron test: Procedure, results, and normal ranges - Medical News Today. https://www.medicalnewstoday.com/articles/322083.**

**(15) Serum iron - Wikipedia. https://en.wikipedia.org/wiki/Serum_iron.**

**(16) Iron Test - Testing.com. https://www.testing.com/tests/iron/.**

**(17) ACE Level Test: Purpose, Risks, and Procedure - Healthline. https://www.healthline.com/health/ace-levels.**

**(18) Total Bilirubin (Blood) - Health Encyclopedia - University of Rochester .... https://www.urmc.rochester.edu/encyclopedia/content.aspx?contenttypeid=167&contentid=total_bilirubin_blood.**

**Sure, here is the full question:**

**```plaintext**

**In an Activated Partial Thromboplastin Time (APTT) test, the laboratory technologist incubates Kaolin and phospholipid with citrated plasma of a patient at 37 °C for a specified time using a specific test method. Then, the technologist adds Calcium chloride (CaCl2).**

**What is the most likely measured at the end in this principle?**

**(A) Amount of fibrinogen present in the sample**

**(B) A time taken for the mixture to clot**

**(C) The time taken to inhibit thrombin**

**(D) The time taken to hemolysis**

**```**

**Sure, here is the question and its choices:**

**```plaintext**

**What is the most likely measured at the end in this principle?**

**(A) Amount of fibrinogen present in the sample**

**(B) A time taken for the mixture to clot**

**(C) The time taken to inhibit thrombin**

**(D) The time taken to hemolysis**

**```**

**The question is asking what is most likely being measured at the end of an Activated Partial Thromboplastin Time (APTT) test.**

**The correct answer would be **(B) A time taken for the mixture to clot**. The APTT test is used primarily to investigate unexplained bleeding or clotting disorders. It measures the overall speed at which blood clots by means of two particular pathways within the coagulation cascade. This is done by adding certain substances to the blood sample and timing how long it takes for the blood to clot. The time it takes for the blood to clot may**

**indicate a bleeding or clotting disorder. The other options (A, C, and D) are not the primary measurements in an APTT test.**

**Source: Conversation with Bing, 1/15/2024**

**(1) . https://www.chegg.com/homework-help/questions-and-answers/nurse-giving-instructions-19-year-old-woman-given-prescription-combination-oral-contracept-q115682780.**

**(2) . https://www.chegg.com/homework-help/questions-and-answers/following-correctly-matches-digestive-disorder-description-cause-inflammatory-bowel-diseas-q108193091.**

**(3) . https://www.chegg.com/homework-help/questions-and-answers/1-following-statements-viruses-true-viruses-contain-multiple-genes-genes-oncogene-viruses--q24907018.**

**Sure, here is the question and its choices:**

**```plaintext**

**A 34-year-old pregnant woman came to a hospital with a complaint of cough, diarrhea, nausea, vomiting and skin rash. A laboratory technologist analyzed a stool sample to investigate intestinal nematodes and the sample was positive for Strongyloides stercoralis.**

**What could be the most likely way the woman acquired the infection?**

**(A) Orally through ingestion of eggs form**

**(B) Orally through ingestion of adult form**

**(C) Skin penetration by larvae**

**(D) Sexually transmission**

**```**

**The question is asking about the most likely way the woman acquired the Strongyloides stercoralis infection.**

**The correct answer would be **(C) Skin penetration by larvae**. Strongyloides stercoralis is a human parasitic roundworm causing the disease strongyloidiasis. Its common name in the US is threadworm. Infection occurs through contact with soil that is contaminated with free-living larvae. The larvae are able to penetrate the skin, migrate through the venous system to the lungs, and then ascend the trachea and pharynx to be swallowed and thus reach the small intestine. The other options (A, B, and D) are not the primary ways Strongyloides stercoralis is transmitted.**

**A patient with intestinal discomfort and pulmonary manifestation such as coughing was sent to a clinical laboratory for stool examination. The patient had a history of walking barefoot. The laboratory technologist**

**found out a hookworm parasite from the stool sample examination.**

**What is the most likely stage of the hookworm that the technologist found out?**

**(A) Larvae**

**(B) Adult**

**(C) Trophozoite**

**(D) Eggs**

**Sure, here is the question and its choices:**

**```plaintext**

**A laboratory technologist doing his research on the prevalence of intestinal helminths wanted to count the concentration of A. lumbricoides in a stool specimen using standard Kato Katz technique. While examining the preparation, the technologist counted 12 eggs of A. lumbricoides on a patient's sample.**

**What will be the number of eggs per gram of the stool?**

**(A) 12**

**(B) 48**

**(C) 120**

**(D) 240**

```

**The question is asking about the number of eggs per gram of stool in the patient's sample.**

**The correct answer would be **(D) 240**. The Kato-Katz technique is a quantitative method for diagnosing helminth infections (like A. lumbricoides). In this method, a very small amount of stool (usually 41.7 mg) is examined under a microscope. Therefore, if the technologist found 12 eggs in this small sample, to find the number of eggs per gram (1000 mg), you would multiply by the ratio of the total weight to the sample weight**
```

**(1000/41.7), which gives approximately 240 eggs per gram.**

**[user](#message_with_image)**

**continue with this one.**

**Source: Conversation with Bing, 1/15/2024**

**(1) . https://www.chegg.com/homework-help/questions-and-answers/10-steam-enters-steam-trap-condensed-allowed-flow-trap-liq-uid-form-linkage-fig-p19-sugges-q101604921.**

**Here is the question and its choices:**

**A 60-year-old man came to a hospital with a complaint of dermatitis with pruritus, depigmentation, atrophy and fibrosis. The man had a history of swimming in one of the rivers in Sudan. After two years of his returning back to Ethiopia from Sudan, the man lost his vision. A clinical data on the request form was suggestive of uncomplicated Onchocerciasis. The**

**laboratory technologist needs to collect sample to identify Onchocerca volvulus.**

**What is the most appropriate clinical specimen for this parasite?**

**(A) Blood**

**(B) Urine**

**(C) Skin snip**

**(D) Pleural fluid**

**The answer to this question is © Skin snip1.**

**Onchocerciasis, also known as River Blindness, is a disease caused by the parasitic worm Onchocerca volvulus. It is diagnosed by taking a skin snip. In this method, a 1 to 2 mg shaving or biopsy of the skin is done to identify larvae, which emerge from the skin snip and can be seen under a microscope when the shaving or biopsy ("skin snip") is put in physiologic solutions**

**(e.g. normal saline)1. This is the most common method of diagnosis1.**

**Sure, here is a detailed explanation about the life cycle, infective stage, and diagnostic stage of Onchocerca volvulus:**

**Life Cycle123:**

**During a blood meal, an infected blackfly (genus Simulium) introduces third-stage filarial larvae onto the skin of the human host, where they penetrate into the bite wound.**

**In subcutaneous tissues, the larvae develop into adult filariae, which commonly reside in nodules in subcutaneous connective tissues.**

**Adults can live in the nodules for approximately 15 years. Some nodules may contain numerous male and female worms.**

**In the subcutaneous nodules, the female worms are capable of producing microfilariae for approximately 9 years. The microfilariae,**

**measuring 220 to 360 µm by 5 to 9 µm and unsheathed, have a life span that may reach 2 years.**

**They are occasionally found in peripheral blood, urine, and sputum but are typically found in the skin and in the lymphatics of connective tissues.**

**A blackfly ingests the microfilariae during a blood meal.**

**After ingestion, the microfilariae migrate from the blackfly's midgut through the hemocoel to the thoracic muscles.**

**There the microfilariae develop into first-stage larvae and subsequently into third-stage infective larvae.**

**The third-stage infective larvae migrate to the blackfly's proboscis and can infect another human when the fly takes a blood meal.**

**Infective Stage1: The third-stage infective larvae are the infective stage of Onchocerca volvulus. These larvae migrate to the blackfly's proboscis and can infect another human when the fly takes a blood meal1.**

**Diagnostic Stage14: The diagnostic stage of Onchocerca volvulus is the microfilariae stage. The microfilariae, measuring 220 to 360 µm by 5 to 9 µm and unsheathed, are typically found in the skin and in the lymphatics of connective tissues1. They can be detected by taking a skin snip, where larvae emerge from the skin snip and can be seen under a microscope when the shaving or biopsy is put in physiologic solutions (e.g. normal saline)4.**

**Here is the question and its choices:**

**```markdown**

**71. A medical laboratory technologist collected blood sample from a patient for the diagnosis of blood and tissue nematodes. The technologist reported large sized sheathed microfilaria, the body of which had several curves and kinks, and indistinct nuclei and extended to the end of the tail.**

**Which tissue nematode best describes by this feature?**

**(A) Wuchereria bancrofti**

**(B) Onchocerca volvulus**

**(C) Trichinella spiralis**

**(D) Loa loa**

```

**Now, let's discuss the answer:**

**The question describes a scenario where a technologist observes large sized sheathed microfilaria with several curves, kinks, indistinct nuclei extending to the tail end. This description matches the characteristics of the microfilariae produced by **Wuchereria bancrofti**[6].**

**Wuchereria bancrofti is a type of roundworm that causes lymphatic filariasis, also known as elephantiasis. The adult worms live in the lymphatic system. The female worms**
```

**measure 80 to 100 mm in length and 0.24 to 0.30 mm in diameter, while the males measure about 40 mm by 1 mm. Adults produce microfilariae measuring 244 to 296 µm by 7.5 to 10 µm, which are sheathed and have nocturnal periodicity[6].**

**Therefore, the answer to the question is **(A) Wuchereria bancrofti**.**

**Source: Conversation with Bing, 1/16/2024**

**(1) CDC - DPDx - Lymphatic Filariasis. https://www.cdc.gov/dpdx/lymphaticfilariasis/index.html.**

**(2) . https://www.numerade.com/ask/question/11-the-surface-tension-of-the-layer-of-liquid-lining-the-alveoli-tends-to-pull-the-walls-inwards-so-alveoli-could-collapse-which-statements-could-explain-how-this-is-prevented-alveolar-fluid-27834/.**

**(3) Chegg. https://www.chegg.com/homework-help/questions-and-answers/following-one-common-**

**reasons-setting-quotes-tariffs-increase-licensing-b-encourage-franchi-q19072472.**

**(4) . https://www.chegg.com/homework-help/questions-and-answers/6-explain-diagram-whether-following-events-impacts-supply-demand-loanable-funds--assume-go-q111885287.**

**(5) . https://www.chegg.com/homework-help/questions-and-answers/question-2-context-discussion-module-4-means-decipher-nature-phrase-used-especially-contex-q87060515.**

**(6) . https://www.chegg.com/homework-help/questions-and-answers/tanner-sitting-cafe-noticed-man-stopped-along-sidewalk-pick-litter-place-trash--tanner-tho-q88107061.**

**(7) Microscopical Diagnosis of Blood Parasites – HAEMA. https://haema-journal.gr/?p=1436.**

**(8) Microfilariae | SpringerLink. https://link.springer.com/referenceworkentry/10.1007/978-3-662-43978-4_4068.**

**(9) Pathology Outlines - Filariasis. https://www.pathologyoutlines.com/topic/breastfilariasis.html.**

**Sure, here is detailed information about **Wuchereria bancrofti**, its life cycle, infective stage, and diagnostic stage:**

**Wuchereria bancrofti** is a filarial nematode that causes lymphatic filariasis, also known as elephantiasis, in humans[2]. It is named after the two scientists Wucherer and Bancroft who made considerable contributions in studying the disease caused by these worms[2].**

**## Life Cycle**

**1. **Infection**: During a blood meal, an infected mosquito introduces third-stage filarial larvae onto the skin of the human host, where they penetrate into the bite wound[1][2].**

**2. **Development in Humans**: They then migrate to the nearest lymph gland where they mature into thread-like adult worms in about 3 to one year[3]. The adult worms commonly reside in the lymphatics[1]. The female worms measure 80 to 100 mm in length and 0.24 to 0.30 mm in diameter, while the males measure about 40 mm by 1 mm[1].**

**3. **Microfilariae Production**: Adults produce microfilariae measuring 244 to 296 µm by 7.5 to 10 µm, which are sheathed and have nocturnal periodicity[1]. The microfilariae migrate into lymph and blood channels moving actively through lymph and blood[1].**

**4. **Development in Mosquito**: A mosquito ingests the microfilariae during a blood meal[1]. After ingestion, the microfilariae lose their sheaths and some of them work their way through the wall of the proventriculus and cardiac portion of the mosquito's midgut and reach the thoracic muscles[1]. There the microfilariae develop into first-stage larvae and subsequently into third-stage infective larvae[1].**

**5. **Infection of New Host**: The third-stage infective larvae migrate through the hemocoel to the mosquito’s proboscis and can infect another human when the mosquito takes a blood meal[1].**

**## Infective Stage**

**The third-stage larvae of **Wuchereria bancrofti** are the infective stage to humans[6]. They are introduced onto the skin of the human host during a blood meal by an infected mosquito[1].**

**## Diagnostic Stage**

**The diagnostic stage of **Wuchereria bancrofti** is the microfilariae stage[8]. They are found in the peripheral blood and can be detected through microscopic examination[8]. Occasionally, they are also found in chylous urine or in hydrocele fluid[2].**

**Please note that this information is based on the current understanding of **Wuchereria**

**bancrofti** and may be subject to change as new research becomes available.**

**Source: Conversation with Bing, 1/16/2024**

**(1) Wuchereria bancrofti- Habitat, Morphology and Life Cycle - Microbe Notes. https://microbenotes.com/wuchereria-bancrofti-habitat-morphology-and-life-cycle/.**

**(2) CDC - DPDx - Lymphatic Filariasis. https://www.cdc.gov/dpdx/lymphaticfilariasis/index.html.**

**(3) Wuchereria bancrofti. http://rcscollegemanjhaul.org/rcs/assets/uploads/assignment/assignment-1589896339-sms.pdf.**

**(4) Which stage of Wuchereria bancrofti is infective to man - Toppr. https://www.toppr.com/ask/question/which-stage-of-wuchereria-bancrofti-is-infective-to-man/.**

**(5) Wuchereria bancrofti – Parasitology. https://parasitology.ou.ac.lk/wuchereria-bancrofti/.**

**(6) CDC - Lymphatic Filariasis - Epidemiology & Risk Factors. https://www.cdc.gov/parasites/lymphaticfilariasis/epi.html.**

**(7) Wuchereria bancrofti: Morphology, life cycle and Epidemiology. https://www.onlinebiologynotes.com/wuchereria-bancrofti-morphology-life-cycle-and-epidemiology/.**

**(8) ADW: : INFORMATION. https://animaldiversity.org/accounts/Wuchereria_bancrofti/.**

**(9) Wuchereria bancrofti : Morphology, Symptoms and Treatment. https://www.academia.edu/50104224/Wuchereria_bancrofti_Morphology_Symptoms_and_Treatment.**

**Here is the question and its choices:**

**```markdown**

**A laboratory technologist collected a blood sample from a patient who came from a**

**lymphatic Filariasis non-endemic area. The technologist worried about the most sensitive concentration method to use, as the area was non-endemic.**

**What is the most sensitive diagnostic method used in this scenario?**

**(A) Membrane filtration**

**(B) Thick blood film examination**

**(C) Microhematocrit tube technique**

**(D) Tube centrifugation lyzed venous blood**

**```**

**Now, let's discuss each choice:**

**(A) **Membrane filtration**: This method involves passing a single feed stream through a membrane system that separates it into two individual streams, known as the permeate and the retentate[6]. The membrane that separates them is a physical barrier with highly specialized characteristics – a barrier**

**that only certain selected components in the feed stream can pass through[6].**

**(B) **Thick blood film examination**: This method involves creating a thick layer of dehemoglobinized (lysed) red blood cells (RBCs) on a slide[15]. The blood elements (including parasites, if any) are more concentrated in a thick smear than in an equal area of a thin smear, allowing for a more efficient detection of parasites[15].**

**(C) **Microhematocrit tube technique**: In this method, blood is drawn into a capillary and centrifuged, and then the ratio of the volume occupied by the red blood cells to the volume of whole blood can be measured and expressed as a decimal or percentage fraction[9][^10^][11].**

**(D) **Tube centrifugation lyzed venous blood**: This method involves collecting whole blood, allowing it to clot by leaving it undisturbed at room temperature, and then**

**removing the clot by centrifuging at 1,000–2,000 x g for 10 minutes in a refrigerated centrifuge[21].**

**The most sensitive diagnostic method used in this scenario would depend on the specific characteristics of the patient's sample and the resources available in the laboratory. It's important to note that each method has its own advantages and limitations, and the choice of method should be based on the specific needs of the diagnostic scenario. For a definitive answer, you may want to consult with a medical laboratory professional or refer to relevant clinical guidelines.**

**Source: Conversation with Bing, 1/16/2024**

**(1) What is membrane filtration and how does it work - Alfa Laval. https://www.alfalaval.com/products/separation/membranes/what-is-membrane-filtration/.**

**(2) CDC - DPDx - Diagnostic Procedures - Blood Specimens.**

**https://www.cdc.gov/dpdx/diagnosticprocedures/blood/specimenproc.html.**

**(3) HCT Test Procedure | Lab Tests Guide. https://www.labtestsguide.com/hct-test-procedure.**

**(4) Micro-Haematocrit Method | Medical Laboratories. http://www.medical-labs.net/micro-haematocrit-method-1217/.**

**(5) Hematocrit Test procedure (Microhematocrit, macro hematocrit). https://medicallabtechnology.com/hematocrit-test-procedure/.**

**(6) Plasma and Serum Preparation | Thermo Fisher Scientific - US. https://www.thermofisher.com/us/en/home/references/protocols/cell-and-tissue-analysis/elisa-protocol/elisa-sample-preparation-protocols/plasma-and-serum-preparation.html.**

**(7) Chegg. https://www.chegg.com/homework-help/questions-and-answers/patients-arriving-hospital-**

**outpatient-clinic-select-one-three-stations-service-suppose-phy-q26352465.**

**(8) . https://www.chegg.com/homework-help/questions-and-answers/left-ventricular-assist-device-lvad-medical-device-pumps-blood-left-ventricle-aorta-order--q112077480.**

**(9) . https://www.chegg.com/homework-help/questions-and-answers/diagnosis-motor-neuron-disease-past-one-half-months-64-year-old-man-experiencing-weakness--q98804259.**

**(10) . https://www.chegg.com/homework-help/questions-and-answers/question-3-3-pts-development-viral-hepatitis-blood-transfusion-cause-serious-complications-q95256663.**

**(11) . https://www.chegg.com/homework-help/questions-and-answers/whole-blood-stored-42-days-use-recent-study-done-cleveland-clinic-found-blood-grows-older--q15145613.**

**(12) Membrane Filtration Method - Biology Reader.**

**https://biologyreader.com/membrane-filtration-method.html.**

**(13) What is a Membrane Filter and How Does It Work?. https://www.freshwatersystems.com/blogs/blog/what-is-a-filter-membrane-and-how-does-it-work.**

**(14) Analytical Comparison between Microhematocrit and Automated Methods for .... https://symbiosisonlinepublishing.com/hematology/hematology05.php.**

**(15) MICROSCOPY EXAMINATION OF THICK AND THIN BLOOD FILMS FOR IDENTIFICATION .... https://www.who.int/docs/default-source/wpro---documents/toolkit/malaria-sop/gmp-sop-08-revised.pdf.**

**(16) Microscopy examination of thick and thin blood films for identification .... https://www.who.int/publications-detail-redirect/HTM-GMP-MM-SOP-08.**

**(17) Examination of Thick Blood Films for Malaria Parasites - UK NEQAS Micro.**

**http://www.ukneqasmicro.org.uk/parasitology/images/pdf/BloodParasitology/DiagnosticTests/ExaminationOfThickBloodFilmsForMalariaParasites.pdf.**

**(18) British Society for Haematology guidelines for the laboratory diagnosis .... https://onlinelibrary.wiley.com/doi/epdf/10.1111/bjh.18092.**

**(19) GP34-A Validation and Verification of Tubes for Venous and Capillary .... https://www.clsi.org/media/1376/gp34a_sample.pdf.**

**(20) CLSI Releases a Step-by-Step Guide to Validating and Verifying Tubes .... https://academic.oup.com/labmed/article/42/4/251/2504990.**

**(21) Plasma and Serum Preparation | Thermo Fisher Scientific - US. https://bing.com/search?q=Tube+centrifugation+lyzed+venous+blood.**

**(22) undefined. https://doi.org/10.1309/LM0UCNOTTQ1ZQR1J.**

**Here is the question and its choices:**

**```markdown**

**A stool specimen was examined to determine the prevalence of tapeworm infections in a refugee camp located in one of the regional states in Ethiopia. Most of the examined specimens were positive for Taenia spp.**

**What is the most likely diagnostic stage of tapeworm in this case?**

**(A) Larvae**

**(B) Eggs**

**(C) Adult**

**(D) Cyst**

**```**

**Now, let's discuss each choice:**

**(A) **Larvae**: The larval stage of a tapeworm is usually found in the intermediate host, not in the human host's stool[1].**

**(B) **Eggs**: The eggs of Taenia spp. are the most likely to be found in stool samples[1]. They can be detected in the stool 2 to 3 months after the tapeworm infection is established[3].**

**(C) **Adult**: Adult tapeworms reside in the small intestine of the definitive host[2]. They are not typically found in stool samples[1].**

**(D) **Cyst**: The cyst stage, also known as the cysticercus, is usually found in the tissues of the intermediate host, not in the human host's stool[1].**

**Therefore, the most likely diagnostic stage of tapeworm in this case is **(B) Eggs**[13].**

**Source: Conversation with Bing, 1/16/2024**

**(1) Diagnosis of Tapeworm infection and what are its different treatment options?. https://www.msn.com/en-us/health/condition/Tapeworm-infection/hp-Tapeworm-infection?source=conditioncdx.**

**(2) CDC - Taeniasis - Diagnosis. https://www.cdc.gov/parasites/taeniasis/diagnosis.html.**

**(3) CDC - DPDx - Taeniasis. https://www.cdc.gov/dpdx/taeniasis/index.html.**

**(4) CDC - Taeniasis - Resources for Health Professionals. https://www.cdc.gov/parasites/taeniasis/health_professionals/index.html.**

**Sure, here is detailed information about **Hymenolepis nana**, its life cycle, infective stage, and diagnostic stage:**

**Hymenolepis nana**, also known as the dwarf tapeworm, is one of the most common**

**human cestodes[2]. It is unique among other tapeworms because it can complete its life cycle in a single host, but it can also cycle through two[2].**

**## Life Cycle**

**1. **Ingestion of Eggs**: The life cycle of H. nana begins when eggs are ingested, either in contaminated food or water or from hands contaminated with feces[1]. The eggs are immediately infective when passed with the stool and cannot survive more than 10 days in the external environment[1].**

**2. **Release of Oncospheres**: Once ingested, the oncospheres contained in the eggs are released[1].**

**3. **Development into Cysticercoid Larvae**: The oncospheres penetrate the intestinal villus and develop into cysticercoid larvae[1].**

**4. **Development into Adults**: Upon rupture of the villus, the cysticercoids return to the intestinal lumen, evaginate their scoleces, attach to the intestinal mucosa, and develop**

**into adults that reside in the ileal portion of the small intestine[1].**

**5. **Egg Production**: The adults produce eggs, which are passed in the stool when released from proglottids through its genital atrium or when proglottids disintegrate in the small intestine[1].**

**6. **Internal Autoinfection**: An alternate mode of infection consists of internal autoinfection, where the eggs release their hexacanth embryo, which penetrates the villus continuing the infective cycle without passage through the external environment[1].**

**## Infective Stage**

**The infective stage of **Hymenolepis nana** is the egg stage[3]. The eggs are immediately infective when passed with the stool[1].**

**## Diagnostic Stage**

**The diagnostic stage of **Hymenolepis nana** is also the egg stage[3]. Diagnosis is made by finding eggs in stool samples[2].**

**Please note that this information is based on the current understanding of **Hymenolepis nana** and may be subject to change as new research becomes available.**

**Source: Conversation with Bing, 1/16/2024**

**(1) Hymenolepis nana (Dwarf Tapeworm) Infection - Infectious Diseases - MSD .... https://www.msdmanuals.com/professional/infectious-diseases/cestodes-tapeworms/hymenolepis-nana-dwarf-tapeworm-infection.**

**(2) CDC - DPDx - Hymenolepiasis. https://www.cdc.gov/dpdx/hymenolepiasis/index.html.**

**(3) Hymenolepis nana - kmis.medicine.cu.edu.eg. http://www.kmis.medicine.cu.edu.eg/mod/IntestinaFinal/hymenolepis_nana.html.**

**(4) Hymenolepis Nana | Medical Laboratories. https://www.medical-labs.net/hymenolepis-nana-2308/.**

**(5) Hymenolepis Nana | Medical Laboratories. http://www.medical-labs.net/hymenolepis-nana-2308/.**

**(6) Hymenolepis nana: habitat, morphology, life cycle, pathogenesis .... https://www.onlinebiologynotes.com/hymenolepis-nana-habitat-morphology-life-cycle-pathogenesis-clinical-symptoms-lab-diagnosis-and-treatment/.**

**(7) Hymenolepis: Introduction, Morphology, Life Cycle, Clinical Features. https://universe84a.com/collection/hymenolepis/.**

**(8) CDC - Hymenolepis - Biology. http://medbox.iiab.me/modules/en-cdc/www.cdc.gov/parasites/hymenolepis/biology.html.**

**Here is the question and its choices:**

**```markdown**

**75. A 14-year-old boy developed skin rash and hematuria following swimming ("swimmer's itch") in a river located besides**

**his village. A laboratory technologist needs to distinguish the Schistosoma Species from clinical samples. On microscopic examination, the technologist observed pale yellow-brown oval eggs with terminal spine, and the shell of the eggs of this parasite is not acid fast.**

**Which Schistosoma species is characterized by these morphologic features?**

**(A) Schistosoma mansoni**

**(B) Schistosoma japonicum**

**(C) Schistosoma intercalatum**

**(D) Schistosoma haematobium**

**```**

**Now, let's discuss each choice:**

**(A) **Schistosoma mansoni**: The eggs of S. mansoni are large (114 to 180 µm long by 45-70 µm wide) and have a characteristic shape, with a prominent lateral spine near the posterior end[34].**

**(B) **Schistosoma japonicum**: The eggs of S. japonicum are large and more rounded than other species, measuring 70-100 µm long by 55-64 µm wide. The spine on S. japonicum eggs is smaller and less conspicuous than other species[3911].**

**(C) **Schistosoma intercalatum**: The eggs of S. intercalatum have a terminal spine and tend to be moderately larger than those of S. haematobium (approximately 130 × 75 µm)[68].**

**(D) **Schistosoma haematobium**: The eggs of S. haematobium are relatively large, measuring 110 - 170 µm in length and 40 - 70 µm in width. They have an elongated ellipsoid shape with a prominent terminal spine[1415].**

**Given the description of the eggs as "pale yellow-brown oval eggs with terminal spine", the most likely Schistosoma species in this case is **(D) Schistosoma haematobium**[1415].**

**Source: Conversation with Bing, 1/16/2024**

**(1) CDC - DPDx - Schistosomiasis Infection. https://www.cdc.gov/dpdx/schistosomiasis/index.html.**

**(2) Schistosoma mansoni - Wikipedia. https://en.wikipedia.org/wiki/Schistosoma_mansoni.**

**(3) Schistosoma japonicum - UK NEQAS Micro. http://www.ukneqasmicro.org.uk/parasitology/images/pdf/FaecalParasitology/Helminths/Trematodes/Schistosoma_japonicum.pdf.**

**(4) Schistosoma japonicum - Introduction, Classification, History, Habitat .... https://studymicrobio.com/schistosoma-japonicum-introduction-classification-history-habitat-morphology/.**

**(5) Schistosoma intercalatum - Wikipedia. https://en.wikipedia.org/wiki/Schistosoma_intercalatum.**

**(6) Blood Trematodes | Basicmedical Key. https://basicmedicalkey.com/blood-trematodes/.**

**(7) Schistosoma haematobium - UK NEQAS Microbiology. https://ukneqasmicro.org.uk/parasitology/images/pdf/FaecalParasitology/Helminths/Trematodes/Schistosoma_haematobium.pdf.**

**(8) Schistosoma haematobium – Egg – Parasitology - ac. https://parasitology.ou.ac.lk/schistosoma-haematobium-egg/.**

**(9) . https://www.numerade.com/ask/question/question-2-1-point-soap-and-detergent-molecules-have-long-hydrophobic-tail-and-polar-hydrophilic-head-they-are-sometimes-referred-t0-as-bridge-molecules-because-thiey-allow-oils-and-fats-to--00593/.**

**(10) . https://brainly.in/question/48552728.**

**(11) Schistosoma mansoni – Egg – Parasitology - ac. https://parasitology.ou.ac.lk/schistosoma-mansoni-egg/.**

**(12) Schistosoma intercalatum - Wikipedia. https://bing.com/search?**

**q=Schistosoma+intercalatum+egg+characteristics.**

**(13) ADW: Schistosoma japonicum: INFORMATION. https://animaldiversity.org/accounts/Schistosoma_japonicum/.**

**(14) Schistosoma Japonicum – Egg – Parasitology - ac. https://parasitology.ou.ac.lk/schistosoma-japonicum-egg/.**

**(15) Schistosoma haematobium - Wikipedia. https://en.wikipedia.org/wiki/Schistosoma_haematobium.**

**Sure, here is detailed information about **Schistosoma**, its life cycle, infective stage, and diagnostic stage:**

**Schistosoma** is a genus of trematodes, commonly known as blood flukes. They are parasitic flatworms responsible for a highly

**significant group of infections in humans termed schistosomiasis[2].**

**## Life Cycle**

**1. **Egg Elimination**: Schistosoma eggs are eliminated with feces or urine, depending on the species[2].**

**2. **Hatching of Miracidia**: Under appropriate conditions, the eggs hatch and release miracidia[2].**

**3. **Penetration of Snail Hosts**: The miracidia swim and penetrate specific snail intermediate hosts[2].**

**4. **Development in Snail**: The stages in the snail include two generations of sporocysts and the production of cercariae[2].**

**5. **Release of Cercariae**: Upon release from the snail, the infective cercariae swim and penetrate the skin of the human host[2].**

**6. **Development into Schistosomulae**: The cercariae shed their forked tails, becoming schistosomulae[2].**

**7. **Migration and Maturation**: The schistosomulae migrate via venous circulation to the lungs, then to the heart, and then develop in the liver, exiting the liver via the portal vein system when mature[2].**

**8. **Copulation of Adult Worms**: Male and female adult worms copulate and reside in the mesenteric venules[2].**

**9. **Egg Production**: The females deposit eggs in the small venules of the portal and perivesical systems[2].**

**10. **Egg Elimination**: The eggs are moved progressively toward the lumen of the intestine and of the bladder and ureters, and are eliminated with feces or urine, respectively[2].**

**## Infective Stage**

**The infective stage of **Schistosoma** is the cercariae stage[2]. The cercariae are released from the snail into the water and can penetrate the skin of the human host[2].**

## Diagnostic Stage

The diagnostic stage of **Schistosoma** is the egg stage[15]. Diagnosis is made by identifying eggs in stool or urine samples[15]. The eggs tend to be passed intermittently and in small amounts and may not be detected, so it may be necessary to perform a blood (serologic) test[1].

Please note that this information is based on the current understanding of **Schistosoma** and may be subject to change as new research becomes available.

Source: Conversation with Bing, 1/16/2024

(1) CDC - DPDx - Schistosomiasis Infection. https://www.cdc.gov/dpdx/schistosomiasis/index.html.

(2) Diagnosis of Schistosomiasis and what are its different treatment options?. https://www.msn.com/en-us/health/condition/Schistosomiasis/hp-Schistosomiasis?source=conditioncdx.

**(3) CDC - Schistosomiasis - Diagnosis. https://www.cdc.gov/parasites/schistosomiasis/diagnosis.html.**

**(4) Schistosomiasis - Infectious Diseases - MSD Manual Professional Edition. https://www.msdmanuals.com/professional/infectious-diseases/trematodes-flukes/schistosomiasis.**

**(5) What stage in the life cycle of Schistosoma is infective?. https://answer-all.com/miscellaneous/what-stage-in-the-life-cycle-of-schistosoma-is-infective/.**

**(6) Schistosome life cycle. The stages of the schistosome l | Open-i. https://openi.nlm.nih.gov/detailedresult?img=PMC4308089_gr1&req=4.**

**(7) Diagnosis and management of schistosomiasis | The BMJ. https://www.bmj.com/content/342/bmj.d2651.**

**(8) Figure: Life Cycle of Schistosoma - MSD Manual Consumer Version. https://www.msdmanuals.com/home/multimedia/figure/life-cycle-of-schistosoma.**

**(9) The Life Cycle of Schistosomiasis - Carter Center. https://www.cartercenter.org/resources/pdfs/health/schistosomiasis/schisto-disease-cycle.pdf.**

**Yes, the life cycle of both Schistosoma mansoni and Schistosoma haematobium share similar stages. Here is a brief comparison:**

****Schistosoma mansoni****[5][6]:**

**- The eggs are eliminated with feces[6].**

**- The eggs hatch and release miracidia, which swim and penetrate specific snail intermediate hosts[6].**

**- The stages in the snail include two generations of sporocysts and the production of cercariae[6].**

**- Upon release from the snail, the infective cercariae swim, penetrate the skin of the human host, and shed their forked tails, becoming schistosomulae[6].**

**- The schistosomulae migrate via venous circulation to lungs, then to the heart, and then develop in the liver, exiting the liver via the portal vein system when mature[6].**

**- Male and female adult worms copulate and reside in the mesenteric venules[6].**

****Schistosoma haematobium****[12]:**

**- The eggs are eliminated with urine[1].**

**- The eggs hatch and release miracidia, which swim and penetrate specific snail intermediate hosts[1].**

**- The stages in the snail include two generations of sporocysts and the production of cercariae[1].**

**- Upon release from the snail, the infective cercariae swim, penetrate the skin of the human host, and shed their forked tails, becoming schistosomulae[1].**

**- The schistosomulae migrate via venous circulation to lungs, then to the heart, and then develop in the liver, exiting the liver via the portal vein system when mature[1].**

**- Male and female adult worms copulate and reside in the vesicular and pelvic venous plexus of the bladder[1].**

**In both cases, the diagnostic stage is the elimination of eggs in feces or urine[36], and the infective stage is when cercariae penetrate the skin of the human host[36]. However, the location of the adult worms in the human body and the method of egg elimination differ between the two species[156]. Please consult a medical professional for more detailed information.**

**Source: Conversation with Bing, 1/16/2024**

**(1) Schistosoma mansoni - Wikipedia. https://en.wikipedia.org/wiki/Schistosoma_mansoni.**

**(2) Diagnosis of Schistosomiasis and what are its different treatment options?. https://www.msn.com/en-us/health/condition/Schistosomiasis/hp-Schistosomiasis?source=conditioncdx.**

**(3) CDC - DPDx - Schistosomiasis Infection. https://www.cdc.gov/dpdx/schistosomiasis/index.html.**

**(4) Schistosoma haematobium: Life cycle, pathogenicity and prophylaxis. https://microbiologynote.com/schistosoma-haematobium-life-cycle-pathogenicity-and-prophylaxis/.**

**(5) Schistosome life cycle. The stages of the schistosome l | Open-i. https://openi.nlm.nih.gov/detailedresult?img=PMC4308089_gr1&req=4.**

**(6) Schistosoma Haematobium - Life Cycle - LiquiSearch. https://www.liquisearch.com/schistosoma_haematobium/life_cycle.**

**(7) Schistosomiasis - Infectious Diseases - MSD Manual Professional Edition. https://www.msdmanuals.com/professional/infectious-diseases/trematodes-flukes/schistosomiasis.**

**(8) What stage in the life cycle of Schistosoma is infective?. https://answer-**

**all.com/miscellaneous/what-stage-in-the-life-cycle-of-schistosoma-is-infective/.**

**(9) CDC - Schistosomiasis - Diagnosis. https://www.cdc.gov/parasites/schistosomiasis/diagnosis.html.**

**(10) Diagnosis and management of schistosomiasis | The BMJ. https://www.bmj.com/content/342/bmj.d2651.**

**(11) Schistosoma mansoni miracidia: revisiting motility and survival .... https://www.cambridge.org/core/services/aop-cambridge-core/content/view/3C9D2A4B771D1A478CE32C02B4DCB5D9/S0031182022000579a_hi.pdf/schistosoma-mansoni-miracidia-revisiting-motility-and-survival-parameters-for-improved-computational-modelling.pdf.**

**Here is the question and its choices:**

**```markdown**

**6. A 44-year-old female patient, suspected for S. haematobium infection, was sent to a**

**laboratory for urinalysis. The laboratory technologist wanted to avoid possible contamination of T. vaginalis with S. haematobium from the urine specimen. Thus, the technologist planned to increase the chance for obtaining S.haematobium**

**Which sample collection approaches decreases such contamination?**

**(A) Obtain from any portion of urine**

**(B) Obtain the last portion of urine**

**(C) Obtain the first portion of urine**

**(D) Obtain the mid portion of urine**

```

**Now, let's discuss each choice:**

**(A) **Obtain from any portion of urine**: This approach may not effectively decrease contamination as it does not differentiate between the portions of urine that may**
```

**contain different concentrations of the organisms[1].**

**(B) **Obtain the last portion of urine**: This approach is typically used for detecting Schistosoma haematobium eggs, as they tend to be present in higher concentrations in the last portion of urine.**

**(C) **Obtain the first portion of urine**: This approach is typically used for detecting urinary tract infections, as the first portion of urine is more likely to contain bacteria.**

**(D) **Obtain the mid portion of urine**: This approach, also known as "clean-catch" urine, is typically used for routine urinalysis and urine culture, as it helps to avoid contamination with bacteria and cells from the external genitalia.**

**Therefore, to decrease contamination of T. vaginalis with S. haematobium from the urine**

**specimen, the technologist should **(B) Obtain the last portion of urine**.**

**Source: Conversation with Bing, 1/16/2024**

**(1) . https://www.chegg.com/homework-help/questions-and-answers/3-shipment-100-parts-4-defective-purchaser-time-test-10-randomly-selected-parts-defects-le-q84106079.**

**The eggs of **Schistosoma haematobium** are concentrated in the last portion of urine because of the parasite's location and life cycle[1234].**

**The adult worms of S. haematobium reside in the venous plexuses around the urinary bladder[12]. After mating, the female worms lay eggs that are released into the bladder wall, causing hematuria and fibrosis[1234]. The eggs then move progressively towards the lumen of the bladder and are eliminated with urine[12].**

**As a result, the eggs are more likely to be present in the last portion of urine, which is typically voided after a period of bladder storage[1][2]. This is why urine samples for the diagnosis of S. haematobium are often collected from the last portion of urine[1][2].**

**Please note that this information is based on the current understanding of **Schistosoma haematobium** and may be subject to change as new research becomes available. For a definitive answer, you may want to consult with a medical laboratory professional or refer to relevant clinical guidelines.**

**Source: Conversation with Bing, 1/16/2024**

**(1) Schistosoma haematobium - Wikipedia. https://en.wikipedia.org/wiki/Schistosoma_haematobium.**

**(2) CDC - DPDx - Schistosomiasis Infection. https://www.cdc.gov/dpdx/schistosomiasis/index.html.**

**(3) Schistosoma haematobium - UK NEQAS Microbiology. https://ukneqasmicro.org.uk/parasitology/images/pdf/FaecalParasitology/Helminths/Trematodes/Schistosoma_haematobium.pdf.**

**(4) Schistosoma haematobium: Life cycle, pathogenicity and prophylaxis. https://microbiologynote.com/schistosoma-haematobium-life-cycle-pathogenicity-and-prophylaxis/.**

**Here is the question and its choices:**

**```markdown**

**A 54-year-old man presented to his health care provider with complaints of foul-smelling diarrhea intermingled with blood and mucus. Imaging analysis revealed multiple ulcers with nodules (amoebic ulcer). The nodules later break down discharging brownish necrotic material.**

**What is the most appropriate sample to identify this parasite?**

**(A) Stool**

**(B) Aspirate**

**(C) Urine**

**(D) Sputum**

```

**Now, let's discuss each choice:**

**(A) **Stool**: This is the most common sample used to identify gastrointestinal parasites, including amoebas[9][^10^]. The parasites or their eggs/cysts are often present in the feces of infected individuals[9][^10^].**

**(B) **Aspirate**: This could be used in some cases, such as when a parasite causes a lesion that can be aspirated. However, it's not typically the first choice for diagnosing parasitic infections[9][^10^].**
```

**(C) **Urine**: This is not typically used to diagnose amoebic infections, as amoebas usually infect the gastrointestinal tract and not the urinary system⁹[^10^].**

**(D) **Sputum**: This is not typically used to diagnose amoebic infections, as amoebas usually infect the gastrointestinal tract and not the respiratory system⁹[^10^].**

**Given the symptoms described and the typical methods of diagnosing amoebic infections, the most appropriate sample to identify this parasite would likely be **(A) Stool**⁹[^10^].**

**Source: Conversation with Bing, 1/16/2024**

**(1) Parasitology Basic Identification methods | PPT - SlideShare. https://www.slideshare.net/doctortvrao/parasitology-basic-identification-methods.**

**(2) Approach to Parasitic Infections - The Merck Manuals. https://www.merckmanuals.com/professional/infectious-diseases/approach-to-parasitic-infections/approach-to-parasitic-infections.**

**(3) Foul-Smelling Stools: Causes, Signs, and Prevention - Healthline. https://www.healthline.com/health/stools-foul-smelling.**

**(4) Bloody Mucus In Stool: Causes, Concern, Other Symptoms - Health. https://www.health.com/bloody-mucus-in-stool-7559519.**

**(5) Mucus in stool: A concern? - Mayo Clinic. https://www.mayoclinic.org/mucus-in-stool/expert-answers/faq-20058262.**

**(6) Mucus in Diarrhea: 6 Possible Causes of Slimy, Mucousy Poop - WebMD. https://www.webmd.com/digestive-disorders/causes-mucus-diarrhea.**

**(7) What Does It Mean If You’re Pooping Blood Clots and Mucus?. https://khealth.com/learn/bowel-movements/pooping-blood-clots-and-mucus/.**

**(8) Necrotic Tissue: How To Identify and Treat It | WCEI.net WCEI. https://blog.wcei.net/necrotic-tissue-how-to-identify-and-treat-it.**

**(9) Chronic Osteomyelitis - Museum of Pathology - Monash University. https://www.monash.edu/museumofpathology/musculoskeletal-system/chronic-osteomyelitis.**

**(10) Pseudocyst of pancreas : types, clinical feature, investigations ... - WOMS. https://worldofmedicalsaviours.com/pseudocyst-of-pancreas/.**

**(11) Traditional and Molecular Approaches for Parasitic Helminth .... https://www.frontiersin.org/research-topics/34246/traditional-and-molecular-approaches-for-parasitic-helminth-identification-and-diagnosis.**

**(12) Methods of detection of Parasites - Protozoa - Pharmacy 180. https://www.pharmacy180.com/article/methods-of-detection-of-parasites-450/.**

**(13) Parasite Identification, Varies - Mayo Clinic Laboratories .... https://microbiology.testcatalog.org/show/PARID.**

**(14) Nodules: Causes, Diagnosis, and Treatments - Healthline. https://www.healthline.com/health/nodules.**

**(15) Common Causes of Multiple Lung Nodules - Verywell Health. https://www.verywellhealth.com/multiple-lung-nodules-causes-and-diagnosis-2249390.**

**(16) Multinodular Goiter: What You Need to Know - Healthline. https://www.healthline.com/health/multinodular-goiter.**

**(17) Stomach polyps - Symptoms & causes - Mayo Clinic. https://www.mayoclinic.org/diseases-conditions/stomach-polyps/symptoms-causes/syc-20377992.**

**(18) Evaluation of oral ulceration - BMJ Best Practice. https://bestpractice.bmj.com/topics/en-gb/1119.**

**Here is the question and its choices:**

**```markdown**

**79. A 27-year-old patient with a history of consumption of contaminated water came to a clinic for physical examination and Sigmoidoscopy, there is perforation of the colon and a feature was seen in extra-intestinal amoebiasis. On stool examination, a round large structure with four nucleus under the microscope was seen on the specimen.**

**What is the most likely observed morphological stage of the parasite?**

**(A) Cyst**

**(B) Oocyst**

**(C) Metacyst**

**(D) Trophozoite**

**```**

**Now, let's discuss each choice:**

**(A) **Cyst**: This is a stage in the life cycle of many parasites during which they are enclosed in a protective wall. The description of a "round large structure with four nucleus" matches the cyst stage of some parasites, such as Entamoeba histolytica[4].**

**(B) **Oocyst**: This is a stage in the life cycle of some parasites, particularly those in the Coccidia subclass. Oocysts typically contain sporozoites, not nuclei[1].**

**(C) **Metacyst**: This is a stage in the life cycle of some flukes. It is the encysted form of the juvenile parasite after it has been ingested by the definitive host[1].**

**(D) **Trophozoite**: This is the active, feeding, and reproducing stage of protozoan parasites. Trophozoites are typically single-celled and do not have multiple nuclei[1].**

**Given the description of a "round large structure with four nucleus", the most likely observed morphological stage of the parasite in this case is **(A) Cyst**[4].**

**Source: Conversation with Bing, 1/16/2024**

**(1) Entamoebidae - Australian Society for Parasitology. https://www.parasite.org.au/para-site/text/entamoeba-text.html.**

**(2) . https://www.chegg.com/homework-help/questions-and-answers/12-cellulose-extremely-resistant-hydrolysis-b-cellulase-catalyzes-hydrolysis-comes--pancre-q95875709.**

**(3) Intestinal and Luminal Protozoa. https://www.microbiologybook.org/parasitology/intest-protozoa.htm.**

**(4) Plasmodium schizogony, a chronology of the parasite’s cell ... - PLOS. https://journals.plos.org/plospathogens/article?id=10.1371/journal.ppat.1011157.**

**(5) The Intestinal Protozoa - Austin Community College District. https://www.austincc.edu/ddingley/MLAB1331/LectureGuide/IntProt.pdf.**

**(6) undefined. https://doi.org/10.1371/journal.ppat.1011157.**

**Sure, here is the full question:**

**```plaintext**

**A nine-year-old child was admitted in a pediatric ward with the diagnosis of Giardiasis and malnutrition with lactose intolerance. The clinical manifestations were abdominal pain, severe diarrhea, flatulence, vomiting, and weight loss. A stool specimen was sent to the laboratory for routine examination.**

**What is the most common mode of transmission for this parasite?**

**(A) Skin penetration**

**(B) Breast feeding**

**(C) Congenital**

**(D) Feco-oral**

**```**

**Sure, here is the question and its choices:**

**```plaintext**

**What is the most common mode of transmission for this parasite?**

**(A) Skin penetration**

**(B) Breast feeding**

**(C) Congenital**

**(D) Feco-oral**

**```**

**Now, let's discuss the answer:**

**The parasite in question is associated with Giardiasis, a condition that can cause abdominal pain, severe diarrhea, flatulence,**

**vomiting, and weight loss. The most common mode of transmission for this parasite is through the feco-oral route (Choice D). This can occur by ingesting water or food contaminated with the feces of an infected person or animal. It's not typically transmitted through skin penetration, breast feeding, or congenitally. Therefore, the correct answer is (D) Feco-oral. This mode of transmission is particularly common in areas with poor sanitation and water treatment facilities. It's also why personal hygiene, like handwashing, is crucial in preventing the spread of such infections.**

**Source: Conversation with Bing, 1/16/2024**

**(1) . https://www.chegg.com/homework-help/questions-and-answers/26-differentiate-hegar-chadwick-goodell-signs-27-differentiate-probable-presumptive-signs--q33560687.**

**(2) . https://www.chegg.com/homework-help/questions-and-answers/korean-bakery-manufacturer-supplies-freshly-made-**

**packaged-bread-pastry-supermarkets-conven-q90932653.**

**Sure, here is the full question:**

**```plaintext**

**81. A final-year medical laboratory student examined a clinical specimen to investigate morphological stages of luminal flagellates. The student prepared a wet mount and examined it under the microscope. He found a motile round trophozoite stage of a parasite with jerky motility, four anterior flagella, and an undulating membrane.**

**Which flagellate is characterized in this specimen?**

**(A) Trichomonas vaginalis**

**(B) Retortamonas intestinalis**

**(C) Entamoeba histolytica**

**(D) Iodamoeba buetschlii**

**```**

**Now, let's discuss the answer:**

**The description given in the question matches the characteristics of **Trichomonas vaginalis**. This flagellate is known for its round trophozoite stage, jerky motility, four anterior flagella, and an undulating membrane. Therefore, the correct answer is (A) Trichomonas vaginalis. It's worth noting that Trichomonas vaginalis is a sexually transmitted infection (STI) and is not typically found in luminal flagellates. The other options, Retortamonas intestinalis, Entamoeba histolytica, and Iodamoeba buetschlii, do not match the description given in the question.**

**Source: Conversation with Bing, 1/16/2024**

**(1) . https://www.toppr.com/ask/question/27-thorns-of-bougainvillea-and-tendril-of-cucurbita-arehomologous-organs-because-of-a-similar-embryology/.**

**(2) . https://www.chegg.com/homework-help/questions-and-answers/26-differentiate-hegar-chadwick-goodell-signs-27-differentiate-probable-presumptive-signs--q33560687.**

**(3) . https://www.numerade.com/ask/question/question-28-points-which-of-the-following-false-concerning-pathogenic-bacteria-oa-neisseria-gonorrhoeae-is-gram-diplococcus-causing-eca-opthalmia-nconatorum-urethritis-in-males-pid-in-female-71838/.**

**(4) . https://www.chegg.com/homework-help/questions-and-answers/following-describe-idea-reproductive-barrier-correct-feature-geography-behavior-morphology-q106964227.**

**(5) . https://www.chegg.com/homework-help/questions-and-answers/5-describe-briefly-steps-involved-qualitative-analysis-mixture-6-distinguish-qualitative-q-q108690508.**

**Sure, here is the full question:**

```plaintext

**81. A laboratory technologist performed a complete blood count of a patient and the results showed WBC of 50x10^9/L, RBC of 4.5x10^12/L, and hematocrit of 40%. Then the technologist examined the Wright's stain of the patient's peripheral blood and found many blast cells with few mature blast cells. Bone marrow examinations showed accumulations with black cells.**

**What is the most likely diagnosis for this case?**

**(A) Infectious mononucleosis**

**(B) Leukemia**

**(C) Leukemoid reaction**

**(D) Bacterial infections**

```

**Now, let's discuss the answer:**

**The presence of many blast cells in the peripheral blood and bone marrow, along with a high white blood cell (WBC) count, suggests a form of **Leukemia** (Choice B). Leukemia is a type of cancer that affects the blood and bone marrow and is characterized by an overproduction of abnormal white blood cells. These cells crowd out the healthy blood cells in the bone marrow and lead to the symptoms of leukemia. The other options, Infectious mononucleosis, Leukemoid reaction, and Bacterial infections, do not typically present with these findings. Therefore, the correct answer is (B) Leukemia. It's important to note that a definitive diagnosis would require further testing and evaluation by a healthcare professional.**

**[user](#message_with_image)**

**continue with this one.**

**The normal range for Red Blood Cells (RBC) and White Blood Cells (WBC) per liter is as follows:**

**- **Red Blood Cells (RBC)**:**

**    * Male: 4.35 trillion to 5.65 trillion cells/L[1]**

**    * Female: 3.92 trillion to 5.13 trillion cells/L[1]**

**- **White Blood Cells (WBC)**:**

**    * 3.4 billion to 9.6 billion cells/L[2]**

**Please note that these ranges can vary slightly depending on the lab that analyzes the blood sample. Always consult with a healthcare professional for a proper interpretation of your blood test results. If you have any more questions, feel free to ask! 😊**

**Source: Conversation with Bing, 1/16/2024**

**(1) RBC Blood Test: Normal Ranges and Diagnostic Uses - Verywell Health. https://www.verywellhealth.com/red-blood-cell-rbc-count-1942659.**

**(2) Complete blood count (CBC) - Mayo Clinic. https://www.mayoclinic.org/tests-procedures/complete-blood-count/about/pac-20384919.**

**(3) Basic Hematology. https://www.hematology.org/-/media/files/ntc_hematology_may_1_2013.pdf.**

**The normal range for Red Blood Cells (RBC) and White Blood Cells (WBC) per microliter (µL) is as follows:**

**- **Red Blood Cells (RBC)**:**

**  * Male: 4.7 to 6.1 million cells/µL[12]**

**  * Female: 4.2 to 5.4 million cells/µL[12]**

**- **White Blood Cells (WBC)**:**

**  * 4,500 to 10,000 cells/µL[2]**

**Please note that these ranges can vary slightly depending on the lab that analyzes the blood sample. Always consult with a**

**healthcare professional for a proper interpretation of your blood test results. If you have any more questions, feel free to ask! 😊**

**Source: Conversation with Bing, 1/16/2024**

**(1) RBC Blood Test: Normal Ranges and Diagnostic Uses - Verywell Health. https://www.verywellhealth.com/red-blood-cell-rbc-count-1942659.**

**(2) What Are Normal Red and White Blood Cell Counts?. https://blog.mercy.com/red-and-white-blood-cell-counts-cbc/.**

**(3) Basic Hematology. https://www.hematology.org/-/media/files/ntc_hematology_may_1_2013.pdf.**

**Sure, here is the full question:**

**```plaintext**

**A stool sample was received from ART clinic and it was immediately examined under the**

**microscope using a direct wet mount. The laboratory technologist saw a large oval structure with a granular zygote inside the ovum which is characteristic of ova of I. belli. The patient acquired this infection from fecal contamination of the food he ate with the infective stage of the parasite.**

**What is the infective stage of the parasite to human being?**

**(A) Trophozoite**

**(B) Cyst**

**(C) Oocyst**

**(D) Sporozoite**

**```**

**Now, let's discuss the answer:**

**The parasite in question is **I. belli**, also known as **Cystoisospora belli**[1]. The infective stage of this parasite to humans is the **oocyst**[13]. After the oocyst has been**

**ingested, the sporocysts inside the oocyst excyst in the small intestine and release their sporozoites, which invade the epithelial cells and initiate schizogony[3]. Therefore, the correct answer is (C) Oocyst. The other options, such as Trophozoite, Cyst, and Sporozoite, are not the infective stages of this parasite.**

**[user](#message_with_image)**

**continue with this one.**

**Source: Conversation with Bing, 1/16/2024**

**(1) Cystoisospora belli - Wikipedia. https://en.wikipedia.org/wiki/Cystoisospora_belli.**

**(2) CDC - DPDx - Cystoisosporiasis. https://www.cdc.gov/dpdx/cystoisosporiasis/index.html.**

**(3) Isospora belli - Antimicrobe. http://www.antimicrobe.org/b04rev.asp.**

**(4) Isospora - Parasite. https://www.parasite.org.au/para-site/text/isospora-text.html.**

**(5) Image: Cystoisospora belli Life Cycle - MSD Manuals. https://www.msdmanuals.com/professional/multimedia/image/cystoisospora-belli-life-cycle.**

**Here is the question and its choices:**

**```markdown**

**A 65-year-old, HIV/AIDS infected patient complaining of watery diarrhea, was sent to the laboratory for stool examination. The laboratory technologist examined the stool specimen using direct wet mount technique and found large oval bodies containing granular zygote.**

**How does the technologist report the laboratory findings?**

**(A) Oocyst of Cryptosporidium species**

**(B) Cyst of Entamoeba histolytic**

**(C) Cyst of Giardia lamblia**

**(D) Oocyst of Isospora species**

```

**The question is asking how a laboratory technologist should report their findings after examining a stool specimen from a 65-year-old HIV/AIDS infected patient who was complaining of watery diarrhea. The examination, done using direct wet mount technique, revealed large oval bodies containing granular zygote.**

**The answer to this question would depend on the specific characteristics of the large oval bodies found in the stool sample. Each of the choices represents a different type of parasite that could be found in stool samples, and each has unique characteristics that would allow a trained technologist to identify them. For example, Cryptosporidium species are known to cause watery diarrhea in immunocompromised individuals, such as those with HIV/AIDS, and they produce oocysts that are oval in shape. However,**
```

**without more specific information about the characteristics of the large oval bodies found in the sample, it's not possible to definitively answer this question. The technologist would need to consider factors such as the size, color, and internal structure of the bodies, as well as the patient's symptoms and medical history, in order to make an accurate identification.**

**Source: Conversation with Bing, 1/16/2024**

**(1) . https://brainly.in/question/31521763.**

**(2) . https://www.chegg.com/homework-help/questions-and-answers/1-define-resistivity-explain-resistivity-works-depending-rocks-minerals-accordance-differe-q111103704.**

**(3) . https://www.toppr.com/ask/question/031-a-crystals-of-substance-changed-their-color-on-heating-in-a-closed-vesselbut-regained/.**

**(4) . https://www.chegg.com/homework-help/questions-and-answers/7-answer-parts-describe-three-attributes-monopolistic-**

**competition-b-describe-monopolistic--q106633406.**

**(5) . https://www.chegg.com/homework-help/questions-and-answers/schiff-base-metallomesogens-particularly-attractive-structural-diversity-photophysical-pro-q90325756.**

**Here is the question and its choices:**

**```markdown**

**A final year student collected peripheral blood from a febrile patient referred from medical outpatient department. The student prepared blood films from blood sample and stained for detection of malaria parasite.**

**Which stain is the most appropriate for staining this blood film?**

**(A) Eosin**

**(B) Giemsa**

**(C) Methylene blue**

**(D) Iron hematoxylin**

```

**The question is asking which stain is most appropriate for staining a blood film prepared for the detection of malaria parasite.**

**The answer to this question is (B) Giemsa. Giemsa stain is commonly used in the detection of malaria parasites. It is a type of Romanowsky stain, and it is particularly good at staining the cytoplasm of cells, making it useful for identifying intracellular parasites such as Plasmodium species, which cause malaria. The stain colors the cytoplasm blue and the nuclei red, allowing for easy identification of the parasites. Eosin, Methylene blue, and Iron hematoxylin are not typically used for staining blood films for malaria detection. Eosin is often used in combination with other stains (like Hematoxylin in H&E staining) but not typically alone. Methylene blue is used for**
```

**staining animal cells and revealing certain cell structures. Iron hematoxylin is used for staining plant tissues and is not typically used for blood films. Therefore, Giemsa would be the most appropriate choice in this scenario.**

**Here is the question and its choices:**

**```markdown**

**A four-year-old child was presented to a hospital with persistent fever for the last three days. The laboratory technologist prepared triplicate blood film from peripheral blood. Then the technologist stained the film with Giemsa solution for 10 minutes. After microscopic examination, there were no hemoparasites seen and the technologist decided that the parasitemia could be less than 10 parasites/µl of blood?**

**What optional diagnostic method can he apply to detect the malaria parasites?**

**(A) Buffy coat smear**

**(B) DNA Probe**

**(C) Wright stain**

**(D) Wet mount**

```

**The question is asking what optional diagnostic method can be applied to detect the malaria parasites when the parasitemia could be less than 10 parasites/µl of blood.**

**The answer to this question is (B) DNA Probe. DNA probes are used in molecular biology to detect the presence of nucleotide sequences (the DNA target) that are complementary to the sequence in the DNA probe. Malaria parasites can be detected by using a DNA probe that is specific for the parasites. This method is highly sensitive and can detect low levels of parasites in the blood. The other options, Buffy coat smear, Wright stain, and Wet mount, are less sensitive and may not detect low levels of parasites. Therefore, a**
```

**DNA probe would be the most appropriate choice in this scenario.**

**Source: Conversation with Bing, 1/16/2024**

**(1) . https://www.chegg.com/homework-help/questions-and-answers/2-21-year-old-man-past-medical-history-diabetes-mellitus-type-1-hypercho-lesterolemia-come-q97159306.**

**(2) . https://www.youtube.com/watch?v=d0KWQyRLkyM.**

**(3) YouTube. https://www.youtube.com/watch?v=trD1BlqZvVw.**

**Here is the question and its choices:**

**```markdown**

**A medical laboratory technologist who is working in a hospital performed three (forward and indirect (reverse) ABO blood**

**grouping for a patient requiring transfusion. The technologist found the following results:**

**Reagent | Anti-A | Anti-B | Anti-H | Serum Test**

**Result | 0 (non reactive) | 3+ | 0 (non reactive) |**

**What is the blood group of the patient?**

**(A) O**

**(B) B**

**(C) AB**

**(D) Indeterminate**

```

**The question is asking what the blood group of the patient is based on the results of the ABO blood grouping tests.**

**The answer to this question is (B) B. The results show that there was a reaction (3+) with Anti-B, but no reaction (0, non-reactive)**
```

**with Anti-A and Anti-H. This indicates that the patient's blood cells have B antigens, but not A or H antigens, which is characteristic of blood group B. Therefore, the patient's blood group is B. The other options, O, AB, and indeterminate, are not correct based on these test results. Blood group O would not react with either Anti-A or Anti-B, blood group AB would react with both, and an indeterminate result would suggest an unexpected or unclear reaction pattern, which is not the case here.**

**Sure, here is the question and its choices:**

**```text**

**91. A medical laboratory technologist was requested for RhD blood grouping for a 28-year-old pregnant woman. The technologist collected blood, screened the serum using specific monoclonal anti-D antiserum following SOP, and found negative reactions in test. Then, the technologist performed further testing by adding enhancement**

**solution (LISS) antiserum and observed agglutination.**

**What is the more likely conclusion of the result?**

**(A) Rh Null**

**(B) Undetermined**

**(C) Weak D phenotype**

**(D) Inconclusive**

```

**The question pertains to a scenario where a medical laboratory technologist is tasked with determining the RhD blood group of a 28-year-old pregnant woman. After initial testing with specific monoclonal anti-D antiserum following Standard Operating Procedures (SOP), no reaction was observed, indicating a negative result. However, upon adding an enhancement solution (LISS) antiserum, agglutination occurred.**
```

**Given these results, option (C) Weak D phenotype is likely the correct answer. In cases where initial RhD typing yields negative results but agglutination occurs after enhancing techniques are applied, it often indicates a Weak D phenotype. This means that while D antigens are present on the red blood cells' surface, they are at reduced levels or have altered antigenic reactivity. This is often due to genetic variations in the RhD gene. The Weak D phenotype is clinically significant, especially in scenarios like pregnancy, where RhD incompatibility can lead to hemolytic disease of the fetus and newborn (HDFN). Therefore, accurate detection and typing of Weak D is crucial in transfusion medicine and obstetrics.**

**Source: Conversation with Bing, 1/16/2024**

**(1) . https://www.numerade.com/ask/question/al-of-the-statements-l-below-accurately-describe-enrymes-_-enzymes-except-for-one-which-ane-catalyze-biochemical-reactions-in-**

**a-coreo-lng-organism-enzymes-lower-the-activation-energy-of-bloc-75888/.**

**(2) . https://www.chegg.com/homework-help/questions-and-answers/13c-karen-medication-assistant-administered-percocet-controlled-subotanco-georgian-individ-q91377045.**

**(3) . https://www.chegg.com/homework-help/questions-and-answers/dme-ads-inc-dme-don-martin-owns-dme-ads-inc-advertising-agency-present-company-focuses-sol-q105930477.**

**(4) . https://www.chegg.com/homework-help/questions-and-answers/5-describe-briefly-steps-involved-qualitative-analysis-mixture-6-distinguish-qualitative-q-q108690508.**

**92. A medical laboratory technologist, who is working in a blood bank, received a human blood sample with known blood group and a request paper for in vitro standard compatibility testing. The technologist tried to assemble all the necessary materials and**

**reagents including microscope, normal saline, test tube, albumin, monovette tubes and quality control reagents on a bench.**

**What additional material/reagent should the technologist bring to perform this test?**

**(A) Photometer**

**(B) Antiserum**

**(C) Antihuman Globulin**

**(D) None of above**

**The question in the image is about a medical laboratory technologist who is preparing for an in vitro standard compatibility test. The technologist has assembled all necessary materials and reagents, and the question asks what additional material/reagent should be brought to perform this test. The options given are:**

**- (A) Photometer**

**- (B) Antiserum**

**- (C) Antihuman Globulin**

**- (D) None of the above**

**In the context of blood bank testing, Antihuman Globulin (option C) is often used in compatibility testing. It's used in the Coombs test, which checks for antibodies that could cause a reaction between the patient's blood and the donor's blood. However, the exact answer could depend on the specific procedures followed in the laboratory. It's always best to follow the guidelines provided by the lab or the instructions of a supervisor. Please consult with a healthcare professional or your study materials for the most accurate information.**

**The Coombs test, also known as the antiglobulin test, is a blood test used to detect certain types of antibodies that can attack your red blood cells[1][2]. Antibodies are proteins made by the immune system to fight off antigens like bacteria, viruses, and other toxins to keep you healthy[4]. However,**

**sometimes antibodies mistakenly attack normal, healthy cells instead[2].**

**There are two types of Coombs tests: the direct Coombs test and the indirect Coombs test[1][2].**

**1. **Direct Coombs Test (Direct Antiglobulin Test, DAT)**: This test checks for antibodies that are attached to the surface of your red blood cells[1][2]. It's often used to diagnose blood-related conditions such as autoimmune hemolytic anemia, where the body destroys its own red blood cells too soon[1][2].**

**2. **Indirect Coombs Test (Indirect Antiglobulin Test, IAT)**: This test checks for antibodies that are floating in the serum, the liquid part of your blood[1][2]. It's used as a screening process to see how you'll react to a blood transfusion[2]. An indirect Coombs test is also routinely given as part of prenatal testing[2].**

**The Coombs test is performed by taking a sample of your blood. The blood is tested with compounds that'll react with antibodies in your blood[1]. The blood sample is obtained through venipuncture, in which a needle is inserted into a vein in your arm or hand[1].**

**In the context of pregnancy, an indirect Coombs test is given to every pregnant person to see if they have antibodies against Rh-positive blood[2]. If an Rh-negative person is pregnant with an Rh-positive fetus, then Rh sensitization can occur[2]. This means that your immune system will mistakenly target the Rh factor as a threat and make antibodies to destroy it[2]. This can result in Rh disease, which is characterized by anemia, jaundice, or other serious health problems[2].**

**These medical issues usually worsen with every Rh-positive pregnancy you have[2]. If you're at risk for Rh sensitization, treatment can almost always prevent this problem[2]. If you're already sensitized, then treatment can help protect the fetus[2]. That's why it's so**

**important to perform the Coombs test during your first trimester[2].**

**Source: Conversation with Bing, 1/16/2024**

**(1) Coombs Test: Purpose, Procedure, and Results - Healthline. https://www.healthline.com/health/coombs-test.**

**(2) Coombs Test: Purpose, Procedure & Results - Cleveland Clinic. https://my.clevelandclinic.org/health/diagnostics/22978-coombs-test.**

**(3) Coombs Test | NorthShore. https://www.northshore.org/healthresources/encyclopedia/encyclopedia.aspx?documenthwid=hw44015.**

**(4) What is the Coombs Test? - Yashoda Hospitals. https://www.yashodahospitals.com/diagnostics/coombs-test/.**

**Sure, here is the question and its choices:**

```markdown
A child with diarrhea and fever symptoms presented to a clinic for diagnosis, and the physician requested for a widal test. The laboratory technologist performed the test immediately as per its principle and observed large black clumps.

What is the principle behind this serological test to observe the reactive clumps?

(A) Serum antibody and antigen are isolated from the sample and mixed for cross-linking.

(B) The WBCs in the sample bound to the commercially available antibody suspension.

(C) The RBCs in the sample bound to the commercially available antibody suspension.

(D) The antibody in the serum bound with commercially available antigen suspension.
```

Now, let's discuss the answer:

**The Widal test is a serological test used for the diagnosis of typhoid fever. It works on the principle of agglutination. When a patient's serum, which may contain antibodies if the patient is infected, is mixed with a known antigen, the antibodies bind to the antigens forming visible clumps. This is known as agglutination.**

**So, the correct answer is **(D) The antibody in the serum bound with commercially available antigen suspension**. This is because in the Widal test, the patient's serum (which contains antibodies if the patient is infected) is mixed with a known antigen. If the patient is infected, the antibodies in the serum will bind to the antigens, forming visible clumps. This is the principle behind the Widal test and the observation of reactive clumps. The other options (A, B, C) do not correctly describe the principle of the Widal test.**

**Source: Conversation with Bing, 1/16/2024**

**(1) . https://www.chegg.com/homework-help/questions-and-answers/greenstone-belts--banded-sandstones-green-minerals-b-deposited-desert-environments-c-serie-q71555263.**

**Sure, here is the question and its choices:**

**```markdown**

**A technologist was in rush to leave the laboratory while doing RPR test. The next day the technologist comes to her laboratory and found the RPR reagents and samples from the previous day on the bench. The technologist threw these samples into biohazard container, cleaned the bench. Then, the technologist performed RPR tests for other patients using those reagents that were left out on the bench overnight.**

**What is wrong with regard to the activity of the technologist in this case?**

**(A) She threw away samples from previous day into biohazard container**

**(B) The RPR reagent she used was inappropriate for running test**

**(C) She cleaned bench next day before starting RPR test**

**(D) The RPR reagent she used was appropriate for running test**

```

**Now, let's discuss the answer:**

**The Rapid Plasma Reagin (RPR) test is a serological test used for the detection of syphilis. It is crucial that the reagents used in the test are stored properly to maintain their efficacy. If the reagents were left out overnight, their effectiveness could be compromised, leading to inaccurate test results.**
```

**So, the correct answer is **(B) The RPR reagent she used was inappropriate for running test**. This is because the reagents were left out on the bench overnight, which likely compromised their effectiveness. The other options (A, C, D) do not correctly identify the issue in this case. The technologist did correctly by throwing away the samples from the previous day into a biohazard container (A), and cleaning the bench before starting the RPR test (C). However, the reagent she used was not appropriate for running the test due to improper storage (B), not because it was inherently suitable or unsuitable (D).**

**Source: Conversation with Bing, 1/16/2024**

**(1) . https://www.chegg.com/homework-help/questions-and-answers/organic-compound-molecular-formula-c8h80-forms-orange-red-precipitate-2-4-dnp-reagent-give-q81944100.**

**(2) . https://www.chegg.com/homework-help/questions-and-answers/activity-1-activity-create-plc-ladder-logic-diagram-**

**carries-following-operations--use-mast-q92538409.**

**(3) . https://www.chegg.com/homework-help/questions-and-answers/question-2-four-quadrant-chopper-circuit-controlling-armature-voltage-separately-excited-d-q45129842.**

**(4) . https://www.chegg.com/homework-help/questions-and-answers/question-2-researchers-investigated-evolution-life-history-traits-trinidadian-guppies-gupp-q67953959.**

**Sure, here is the question and its choices:**

**```markdown**

**9A. A Health Officer examined a patient with a manifestation of syphilis and requested for RPR test. A laboratory technologist drew a whole blood in EDTA tube to perform RPR agglutination test.**

**What is the activity that the laboratory technologist should do in this test?**

**(A) Mix one drop of plasma with one drop of the test reagent**

**(B) Mix one drop of whole blood with one drop of the test reagent**

**(C) Mix one drop of packed RBC with one drop of the test reagent**

**(D) It is very important to heat inactivate the sample before testing**

```

**Now, let's discuss the answer:**

**The Rapid Plasma Reagin (RPR) test is a serological test used for the detection of syphilis. It is based on the principle of flocculation, where antibodies in the patient's serum react with a specific antigen to form visible clumps.**
```

**In the RPR test, the patient's serum (not whole blood or packed RBCs) is used. The serum is separated from the whole blood sample, and then mixed with a specific RPR antigen. If the patient has syphilis, the antibodies in the serum will react with the antigen to form visible clumps.**

**So, the correct answer is **(A) Mix one drop of plasma with one drop of the test reagent**. This is because the RPR test uses the patient's serum (or plasma), not whole blood or packed RBCs. Also, heat inactivation is not typically required for the RPR test, so option (D) is not correct. The other options (B, C) do not correctly describe the procedure for the RPR test.**

**Source: Conversation with Bing, 1/16/2024**

**(1) . https://www.chegg.com/homework-help/questions-and-answers/following-statements-correctly-describes-role-water-biological-systems-water-select-one-o--q78887471.**

**(2) . https://www.chegg.com/homework-help/questions-and-answers/dollar-general-corporation-operates-deep-discount-stores-offering-housewares-cleaning-supp-q44717195.**

**(3) . https://www.chegg.com/homework-help/questions-and-answers/order-ensure-large-disparity-quality-education-various-schools-school-district-school-boar-q87992145.**

**(4) . https://www.chegg.com/homework-help/questions-and-answers/imagine-biologists-able-bring-back-life-male-female-tazmanian-tiger-went-extinct-less-100--q111239622.**

**Here is the question and its choices:**

**```plaintext**

**A 25-year-old male had been experiencing flu-like symptoms, loss of appetite, nausea, and constipation for two weeks. His abdomen was tender, and his urine was dark in color. Initial testing revealed elevations in his**

**serum alanine aminotransferase (ALT), aspartate aminotransferase (AST) levels. Screening test shows Anti-HCV (positive) and HCV RNA in the serum of the patient.**

**What is the most likely diagnosis?**

**(A) Active Hepatitis A**

**(B) Active hepatitis B**

**(C) Chronic hepatitis C**

**(D) Active Hepatitis C**

```

**Now, let's discuss the answer in detail:**

**The patient's symptoms, along with the positive Anti-HCV and presence of HCV RNA in the serum, suggest a Hepatitis C infection. Hepatitis C is primarily diagnosed through serological tests that detect HCV antibodies (Anti-HCV) and molecular tests that detect, quantify, or confirm the presence of the hepatitis C virus, such as HCV RNA tests.**
```

**The difference between chronic and active Hepatitis C lies in the duration of the infection. Chronic Hepatitis C means that the virus has been in the body for 6 months or more. It can be silent for many years, and people may get infected without feeling sick. Active Hepatitis C means the virus is in the body and causing symptoms.**

**Given the information, both (C) Chronic Hepatitis C and (D) Active Hepatitis C could be possible. However, since the patient has been experiencing symptoms, which suggests that the virus is not dormant, (D) Active Hepatitis C is the most likely diagnosis. But remember, the final diagnosis should always be confirmed by a healthcare professional.**

**Source: Conversation with Bing, 1/16/2024**

**(1) . https://www.chegg.com/homework-help/questions-and-answers/following-results-obtained-influenza-vaccine-trial-**

**carried-among-460-adults-epidemic-460-a-q106461204.**

**(2) . https://www.chegg.com/homework-help/questions-and-answers/study-indicates-antioxidants-found-blueberries-may-slow-process-aging-study-60-year-old-me-q90709248.**

**(3) . https://www.chegg.com/homework-help/questions-and-answers/312-patient-presents-clinic-complaining-pain-weakness-hands-assessment-nurse-notes-diminis-q56089359.**

**Sure, let's define AST and ALT in detail:**

****Aspartate Aminotransferase (AST)****[256]**:**

**AST, also known as aspartate transaminase, is an enzyme that exists in various tissues, including the liver, heart, brain, pancreas, kidneys, lungs, and skeletal muscles. It helps the body break down amino acids, which are the building blocks of proteins. AST is involved in the transfer of an amino group from aspartate to alpha-ketoglutarate, a key**

**step in the citric acid cycle. This process is essential for energy production in cells. When any of these tissues are damaged, AST is released into the bloodstream. While high AST levels mean there may be tissue injury, it doesn't always relate to the liver.**

****Alanine Aminotransferase (ALT)**[6115]:**

**ALT, also known as alanine transaminase, is an enzyme found mainly in the liver. It helps convert proteins into energy for the liver cells. ALT is involved in the transfer of an amino group from alanine to alpha-ketoglutarate, producing pyruvate and glutamate, which are vital for cellular energy production and protein synthesis. When the liver is damaged, ALT is released into the bloodstream. High ALT levels are always worrying, but they don't necessarily point to something serious. If your ALT level is high, it may indicate minor or severe liver injury.**

**In the context of liver function tests, both AST and ALT are important markers. Blood**

**tests that find high ALT levels or high AST levels may be a sign of a liver problem[5]. When compared to each other, ALT and AST levels can help identify toxins in the liver, liver disease, or liver damage[5]. However, because AST is found in many tissues, while ALT is primarily in the liver, ALT is a more specific indicator of liver health[5].**

**Source: Conversation with Bing, 1/16/2024**

**(1) Aspartate Transferase (AST) - Cleveland Clinic. https://my.clevelandclinic.org/health/diagnostics/22147-aspartate-transferase-ast.**

**(2) ALT and AST Liver Enzymes: What Lab Values Mean - Verywell Health. https://www.verywellhealth.com/liver-enzymes-1759916.**

**(3) Liver function tests - Mayo Clinic. https://www.mayoclinic.org/tests-procedures/liver-function-tests/about/pac-20394595.**

**(4) Alt Definition & Meaning - Merriam-Webster. https://www.merriam-webster.com/dictionary/alt.**

**(5) . https://bing.com/search?q=AST+definition.**

**(6) AST Definition & Meaning - Merriam-Webster. https://www.merriam-webster.com/dictionary/AST.**

**(7) Aspartate transaminase - Wikipedia. https://en.wikipedia.org/wiki/Aspartate_transaminase.**

**(8) Physiological Role of Liver and Interpreting Liver Function Tests. https://link.springer.com/chapter/10.1007/978-981-19-6045-1_2.**

**(9) Liver Function Tests • LITFL • CCC Investigations. https://litfl.com/liver-function-tests/.**

**(10) . https://bing.com/search?q=ALT+definition.**

**(11) ALT- | English meaning - Cambridge Dictionary. https://dictionary.cambridge.org/dictionary/english/alt.**

**(12) ALT Definition & Usage Examples | Dictionary.com. https://www.dictionary.com/browse/alt.**

**(13) undefined. http://www.oxforddictionaries.com/.**