Name:

**Case Study:**

**“The Pain Killer Killer”**

35

**Warm-up: read the Scenario and answer questions 1 & 21**

**Background:** While working at his desk, N. Ron Leigh, an executive of a multinational energy company, was stricken with what appeared to be a severe allergic reaction. His throat swelled to such an extent that he could hardly breathe. Rapid response by 911 saved his life. Both paramedics and police wondered what may have brought on such an attack. A bottle of Tylenol was found on Mr. Leigh’s desk. It was well known that he suffered from asthma bouts of sinusitis and, recently, Tension Headaches. Mr. Leigh is allergic to acetylsalicylic acid (Aspirin), but not acetaminophen (Tylenol). The caplet size was 325mg.

1. What is Mr. Leigh allergic to AND what was his allergic reaction?
2. What steps would you take to determine whether the caplets were Tylenol/acetaminophen, or something else (like Aspirin, ibuprofen/Motrin, Excedrin/Caffeine, or an illicit drug?

**Problem:** Several Tablets were taken from the Tylenol bottle and submitted to your lab for analysis. As the lab tech, you took a sample of the victim’s blood plasma. The Spectroscopy test came back negative for Tylenol, but positive for Aspirin (acetylsalicylic acid). Next, you’ll take a mass Spectroscopy test to determine the amount of acetylsalicylic acid (Aspirin) in his system.

1. **What is your job as the lab tech?** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Background** **Information:** When testing for acetylsalicylic acid (Aspirin). We can blast the blood sample with infrared light. If the sample absorbs more infrared light, that means there is a higher concentration of the drug in their system. Below is a chart that tells you the concentration of the drug based on how much the sample absorbed the infrared light.

**Concentration Table:** Known Concentrations based on infrared absorptions.

|  |  |
| --- | --- |
| **Infrared Absorption** | **Concentration of the drug**  **ppm = parts per million** |
| 0.0 | 0 ppm |
| 0.10 | 20ppm |
| 0.25 | 40ppm |
| 0.30 | 60ppm |
| 0.40 | 80ppm |
| 0.70 | 100ppm |

**Concept Question Check:**

1. If the infrared absorption reading was .25, what was the blood concentration? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What is the infrared absorption, if the person had a plasma/drug concentration of 100ppm? \_\_\_\_\_\_\_\_

**Graph:** Make a line graph based on the Concentration Table Data.

**X-axis = Concentration Y-axis = Absorption**

**Figure 1 Title:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Y-axis Title

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |

X-Axis Title: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Graph Analysis Question:**

1. What was the concentration of acetylsalicylic acid (Aspirin) in Mr. Leigh’s blood, if the plasma came back with an absorption of 0.20? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**How many tablets did he take?**

Based on your answer to graph question #1, use **Figure 2** to determine how many tablets Mr. Leigh ingested.

**Figure 2:** Aspirin Tablets Ingested



1. How many tablets did Mr. Leigh Ingest?

**Extension:** Mr. Leigh is Allergic to Aspirin. On his desk was a bottle of Tylenol. However, your tests came back negative for Tylenol, but positive for Aspirin. **What Happened?** On a separate piece of paper do the following

Come up with a plausible scenario of the crime. (10 pts)

* You need two suspects
* A motive for each suspect
* How did the person carry out the crime?
* Be as creative as possible!