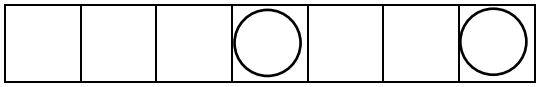
A study in scarlet

1. You've noticed a pattern among several patients: an unusual level of tiredness. Not the kind that resolves with rest, but persistent, daily exhaustion. Young individuals who were once active now avoid physical activity, report trouble concentrating, and mention falling asleep during the day despite full nights of sleep. Routine infections and diet issues are ruled out.

   This symptom is a clue. It is common, non-specific, but important.

   Unscramble the letters to identify it:

   T G F A U I E



2. To understand the symptom, you examine blood samples under a microscope. The red blood cells don't look typical. Instead of smooth, round shapes, many are irregular and crescent-like. These distorted cells could easily clog small vessels, reducing oxygen supply and explaining the previous condition.

   You've just taken the first analytical step in understanding the underlying condition.

   What facility can you use to reveal this cellular detail?

   C M I R C O S P Y O

3. To pinpoint the genetic cause behind these abnormal cells, you turn to sequence data. It's large, complex, and not human-readable without specialized tools. You rely on computational pipelines to detect known mutations in haemoglobin genes, a task beyond the previous technique alone.

   This field bridges biology and computation, and it's essential for modern diagnosis and research.

   What facility can be used for this?

   O N I T R I C I B S A M F O

4. You've traced the condition from symptom to investigation to deeper genetic insight.

   What you're looking at is a disorder where red blood cells lose their normal shape and flexibility. Instead of being soft and round, they become stiff and crescent-shaped, making it difficult for them to flow through blood vessels. This leads to poor oxygen delivery throughout the body, resulting in episodes of pain, frequent fatigue, and long-term damage to organs.

   The condition is inherited and caused by a mutation in the gene that makes haemoglobin, the protein responsible for carrying oxygen in the blood. Understanding this disorder requires careful observation, lab work, and computational analysis of the underlying genetic changes.

   The clues point to a single, well-known disease. Unjumble the circled letters in the last three clues to reach a diagnosis.