2025 Bi H1 Q12

Section: Metabolism and Survival

Topic: Metabolic Pathways

Question Summary:

Lactase breaks down lactose into glucose. Glucose concentration was measured in human and cow milk samples every 30 seconds for 3 minutes. You are asked which statement about the comparison is supported by the data.

Worked Solution:

Examine the glucose concentration values:

Human milk:
0.28 → 0.54 → 0.80 → 1.04 → 1.10 → 1.10

Cow milk:
0.24 → 0.46 → 0.54 → 0.58 → 0.58 → 0.58

Observations:
- At every time point, human milk shows a **higher** glucose concentration than cow milk.
- The glucose concentration in human milk increases more quickly — the slope is steeper.
- Maximum glucose concentration is reached at:
• Human milk: 1.10% at 2.5 minutes
• Cow milk: 0.58% at 2.0 minutes
So both do not peak at 2 minutes (reject D).
- Cow milk still has increasing glucose until 2.0 minutes, so lactose is still present at 1.5 minutes (reject C).
- Human milk reaches higher values earlier → faster glucose production.

Therefore, the statement supported by the data is that glucose production is faster in human milk.

Final Answer: A

Revision Tips:

- Compare **rates** by looking at how quickly values increase over time.
- A reaction reaches a maximum when the value stops increasing.
- Lactase activity questions often involve interpreting trends rather than exact values.