Case Study: Lactose Intolerance

Enzyme of focus: Lactase
Case Study: Lactose Intolerance

How does lactase work?

<table>
<thead>
<tr>
<th>Condition</th>
<th>Water Only</th>
<th>Sucrose Solution</th>
<th>Aspartame Solution</th>
<th>Milk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glucose Strip Results</td>
<td>Negative</td>
<td>positive</td>
<td>positive</td>
<td>positive</td>
</tr>
</tbody>
</table>

When you are done, do the following: (BE PREPARED TO SHARE!!!)

(1) Explain the results of this experiment. Then answer the question, “How does lactase work?”

(2) READ the article you and your partner was assigned. Discuss and answer the following in your notes: “How has lactose intolerance affect the human population? How have scientists exploit what we know about enzyme substrate specificity to address lactose intolerance medical issues?
Case Study: Lactose Intolerance

How does lactase work?

• Lactase breaks down lactose sugar so that the simple sugar can be digested.
• Lactose is a large disaccharide, Lactase is an enzyme that specifically breaks down lactose sugar.
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TOK: How has lactose intolerance affect the human population? How have scientists exploit what we know about enzyme substrate specificity to address lactose intolerance medical issues?

- Hypothesis: original human species started out as lactose intolerant. The gene mutated for easier digestion - So…. Human’s diet might have been originally herbivoric, must gradually became omnivores. Therefore, we no longer had to rely on plants in the winter - our diets expanded.
- 60% of most people of Asians and African decent stopped production of lactase. (maybe higher)
- A study found that of 61% patients were LI, 2% Denmark, rest in Zambia - LI increases with latitude and with rising temperatures
- Adults don’t produce enough lactase with time.
- Although 1st dairy farmers were from Europe, about 80% are LI.
- LI is genetically based, oral supply of LT gene may be available.
- Alternative method: consumption of Kefir, a set of bacteria that can help breakdown lactose.