

Regulation of the Lactase Gene



About This Worksheet

This worksheet complements the Click and Learn "Regulation of the Lactase Gene" developed in conjunction with the 2011 HHMI Holiday Lectures on Science "Bones, Stones, and Genes: The Origin of Modern Humans."

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Key Concepts

- Eukaryotic gene expression is regulated at the levels of transcription, RNA processing, translation, and post-translation.
- Proteins called transcription factors bind to DNA and control transcription. Different types of transcription factors can increase or decrease transcription.
- Mutations in DNA regions that control gene expression can alter the way genes are expressed.
- Infants have high lactase levels so that they can digest their mothers' milk, but lactase gene expression is turned off after weaning.
- Lactase persistence is the trait that allows adults to continue to digest milk. It results from a mutation in an enhancer region of the lactase gene.

Instructions

1. Go to BioInteractive.org.
2. In the menu bar under the masthead, mouse over Topics → Evolution → Interactive.
3. Scroll down the page and click on "Regulation of the Lactase Gene."
4. Proceed through the slides, watch the embedded video clips, and answer the following questions in the space provided.

Questions

1. What is the difference between lactose tolerance and lactose intolerance? Be specific.

2. Why is lactose tolerance also called lactase persistence?

3. In which cells or tissues is lactase produced and what is its role?

4. What normally happens to the levels of lactase produced throughout a person's lifetime?

5. In general, why is it important for a cell to regulate protein production?

Regulation Of The Lactase Gene Hhmi Answers

Jesper Thorvald Troelsen



Regulation Of The Lactase Gene Hhmi Answers:

Lactase gene expression Edmond Henri Herman Maria Rings,1994 **Lactose Intolerance** Dennis Savaiano,2014-10-01 Lactose Intolerance: Pathophysiology, Diagnosis, and Management Dr. Spineanu Eugenia,2025-02-19 Lactose Intolerance Pathophysiology Diagnosis and Management offers a comprehensive exploration of lactose intolerance from a medical and biochemical perspective This treatise delves into the underlying pathophysiological mechanisms including enzyme deficiencies and genetic variations that contribute to lactose intolerance It provides an in depth analysis of diagnostic approaches including hydrogen breath tests lactose tolerance tests and stool acidity tests The text also examines various management strategies from dietary modifications and lactase supplements to alternative therapies and long term care plans Tailored for healthcare professionals researchers and individuals seeking a thorough understanding of lactose intolerance this resource integrates the latest research and clinical practices With a focus on optimizing diagnosis and treatment Lactose Intolerance Pathophysiology Diagnosis and Management serves as an essential guide to managing this common digestive disorder effectively *The Origins of Lactase Persistence and Ongoing Convergent Evolution* Beth A. Keller,2011 As a primary factor in human evolution natural selection is an important component of genetic research Studies of lactase persistence suggest that positive selection has played a powerful role in the adaptation to a lifelong consumption of fresh milk Using multiple research studies of lactase persistence and suspected corresponding single nucleotide genetic polymorphisms this study combines data sources to determine whether evidence exists for natural selection of a specific cytosine to thymine genetic mutation located 13 910 base pairs T 13910 upstream from the lactase gene This polymorphism has potential to be a causal element for lactase persistence and data suggest that natural selection has played a role in the rising frequency and distribution of this allele if only in some regions European and neighboring regions appear to have the highest frequencies with little or no frequency in Asia Africa and Indonesia however the presence of lactase persistence in those areas suggests convergent evolution may be occurring on a phenotypic level To examine this possibility several other identified polymorphisms in the same region as the T 13910 will be included in this study Molecular and Population Genetic Analyses of Variation Within and Surrounding the Human Lactase Gene Edward John Hollox,2000 **Molecular and Population Genetic Analysis of Variation Within and Surrounding the Human Lactase Gene** ,2000 *Revealing the Mechanisms Behind Adult-type Hypolactasia Through Studies of the Regulation of the Lactase Phlorizin Hydrolase Gene* Jesper Thorvald Troelsen,2008

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