MCM6 and Lactose Intolerance

Renae Geier
INTRODUCTION TO LACTOSE INTOLERANCE
Lactose Intolerance

http://www.mrbigben.com/food/dairy.html
Lactase Breaks Down Lactose

Lactose + H₂O → Glucose + Galactose

Longitudinal expression of lactase

Troleson, 2005
Calcium Deficiency

RDA = 1000 micrograms/day

http://astronutrition.com/lactase-enzyme-9000-fccl-units.html
http://myculturedpalate.com/blog/2012/10/15/gaps-and-osteoporosis
http://www.shopping.com/Viactiv-Viactiv-Calcium-Supplement-Soft-Chews-Milk-Chocolate-100-Count-Viactiv/info
http://drliesa.com/eat-your-veggies-cruciferous-that-is/
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Worldwide prevalence of lactose intolerance in recent populations (schematic)
MCM6 Has A SNP That Enhances LCT

Gene Ontology:
- DNA Replication
- Nucleus
- ATP and DNA binding

Bochman and Schwacha, 2009  
MCM6 Has A SNP That Enhances LCT

T/T: 3x transcription of LCT

### Homology

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<thead>
<tr>
<th>Species</th>
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**Domains:**

- Nucleic Acid Binding
- P-loop, AAA+
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EXPERIMENTS
People with LI have a SNP at -13910

**Hypothesis 1**: The -13910 nucleotide affects the binding of a transcription factor, AP2, which affects lactase expression

\[ 5' - \textbf{GCC} \text{NNNGGC} - 3' \ \text{AP2 Consensus} \]

\[ 5' - \textbf{CCC} \text{CCT} \text{GGC} - 3' \]

\[ 5' - \textbf{CTC} \text{CCT} \text{GGC} - 3' \]
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Hypothesis 1: The -13910 nucleotide affects the binding of a transcription factor, AP2, which affects lactase expression
Hypothesis 2: The -13910 nucleotide affects the binding of an unknown transcription factor which affects lactase expression.

Perform a DNA Pull Down Assay + MudPIT
FUTURE STUDIES
Gastrointestinal Microbiome


http://www.wzw.tum.de/bflm/index.php?id=11&L=1

Gastrointestinal Microbiome

Compare the gastrointestinal microbiota in humans, based on diet in mice – intestinal biopsy

5' – CCC CCT GGC – 3'
5' – CTC CCT GGC – 3'

http://www.columbia.edu/cu/biology/courses/w2501/Histopictures/Smallintestine_highpower.jpg
References


