

# DAIRY

## NOURISHES LIFE

Helping people thrive at every age

### WEBINAR SERIES

Reminders for today's webinar:

- Please test your computer by using the link provided in the chat window to ensure that you can hear the speakers via streaming audio
- We recommend downloading and/or updating to the latest version of **Google Chrome** or **Firefox** to minimize the chance of system issues during the live webinar
- Continuing education certificates and handouts will be emailed within 24 hours

#DairyNourishesLife

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**Dairy DYK:**  
Your Top Questions Answered

December 12, 2019

**NDC**  
NATIONAL DAIRY COUNCIL  
#DairyNourishesLife

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### Webinar Reminders

**During the webinar**

- Preferred browsers for optimal viewing and audio: Google Chrome or Firefox
- Please type questions into the chat window
- Follow along with **#DairyNourishesLife**

**After the webinar**

- Continuing education certificates, handouts and a reference list will be emailed within 24 hours
- Webinar recording will be available next week on [www.nationaldairycouncil.org](http://www.nationaldairycouncil.org)

NationalDairyCouncil.org @NDCDairyCouncil #DairyNourishesLife

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**NDC**  
NATIONAL DAIRY COUNCIL™

Bringing to life the dairy community's shared vision of a healthy, happy, sustainable world, with science as our foundation

The U.S. Dairy Stewardship Commitment: <http://commitment.usdairy.com/>

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**Greatest Challenge of Our Generation:**  
**Nourishing a Growing Global Population with Limited Natural Resources**



**World Population 1950-2050**

Year	Population (Billions)
1950	2.5
1960	3.0
1970	3.7
1980	4.4
1990	5.3
2000	6.1
2010	7.0
2020	8.0
2030	9.0
2040	9.5
2050	9.5

Source: U.S. Census Bureau, International Data Base, December 2010 Release

**Food production will need to increase by 70% to feed the world by 2050**

**70% of the world population will live in cities by 2050**

**Global middle class will triple by 2030**

**52% of world population could have severe water scarcity by 2050**

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2008: FAO's Director General on How to Feed the World in 2050; Population and Development Review, 35, 827-839  
2010: OECD Development Centre Working Paper No. 20: The Emerging Middle Class in Developing Countries  
The Water Footprint Network; Water Stress to Affect 52% of World's Population by 2050

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**Dairy Nourishes Life Webinar Series**  
Achieved on NationalDairyCouncil.org. Search: "webinar"



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**Dairy Nourishes Life Webinar Series**  
Achieved on NationalDairyCouncil.org. Search: "webinar"

"Are hormones in milk causing early puberty in girls?"

"What are some potential dairy options for those with lactose intolerance?"

"Can you talk about the nutritional differences between grass-fed and non-grass fed?"

"Dairy production and the reduction of greenhouse gases: what is being done?"

"How can I be sure there are no antibiotics added to my milk?"

**Fat or Fiction:**  
The Science of What Milk Dairy Foods Really Do  
May 14, 2019

**Get Colored on Fermented Dairy Foods**  
November 11, 2019

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**Decoding the Dairy Case**

"Can you talk about the nutritional differences between grass-fed and non-grass fed?"

"Does A1 or A2 beta-casein make a difference?"

"Can you discuss organic vs conventional milk?"

"Does pasteurization effect the nutritional content of milk?"

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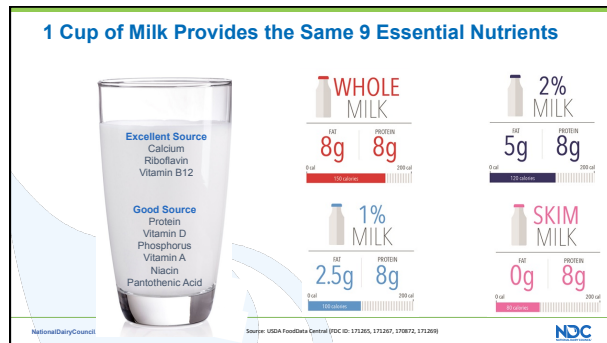
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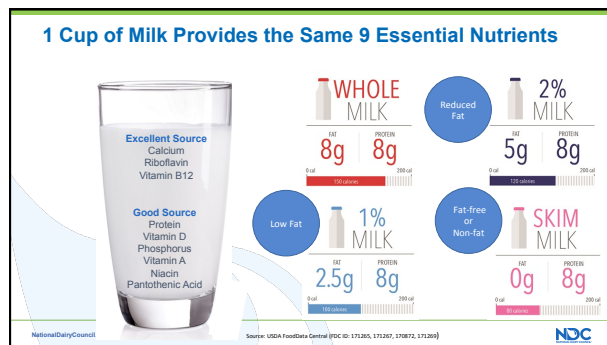
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**[HOW IT WORKS]**

- Unpasteurized milk can harbor dangerous bacteria that can pose serious health risks to you and your family, according to the CDC. Pasteurization kills these bacteria!
- With the exception of milk that's marketed as raw milk, all U.S. milk is pasteurized.

## THE MILK PASTEURIZATION PROCESS

**STEP 1**

Once the farmer milks the cow, the milk is kept at a chilled temperature of 39°F.

**STEP 2**

The milk then heads to a milk plant where it is heated to 161°F.

**STEP 3**

After 15 seconds, it is quickly cooled back down to its original temperature of 39°F.

NationalDairyCouncil.org @NDCCouncil #DairyHousesLife <https://dairycouncil.org/content/2015/why-is-milk-pasteurized-4-questions-answered-that-are-nationaldairycouncil.org> NDC

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## Pasteurization vs. UHT Pasteurization

**Pasteurization**

- 161°F for 15 seconds (HTST)
- Can last anywhere from 12 to 21 days after processing if properly refrigerated

**Ultra-Pasteurization (UHT)**

- 280°F for 2 seconds
- Can last 30 to 90 days after processing and before the container is opened
- Once opened, must be refrigerated and then can last for 7-10 days

NationalDairyCouncil.org @NDCCouncil #DairyHousesLife <https://dairycouncil.org/content/2015/why-is-milk-pasteurized-4-questions-answered-that-are-nationaldairycouncil.org> NDC

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## Organic Milk

*Refers to farming method*

**Conventional Milk**

- 9 essential nutrients
- Strict regulations related to antibiotics and pesticides

**Organic Milk**

- 9 essential nutrients
- Certified USDA Organic
  - Uses only organic fertilizers and pesticides on crops
  - Provides access to pasture ≥120 days a year (any supplemental feed is certified organic)
  - Does not use antibiotics if a cow becomes sick

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## Does Organic Milk Differ from Conventional Milk?

**Factors known to affect the composition of milk<sup>1</sup>**

- Diet
- Breed of cow
- Genetic variability
- Stage of lactation
- Season/weather
- Interactions between these factors

Sources: <sup>1</sup>Schwendel et al. 2015 J Dairy Sci 98:721-746; FA composition of milk; Berbrook et al. 2013 PLOS ONE 8:e62426; FA composition of salmon; USDA Nutrient Database FDC ID: 173686

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**Total fat content organic vs. conventional<sup>1</sup>**

- Higher in organic milk (n=3 studies)
- Higher in conventional milk (n=3 studies)
- No difference (n=3 studies)

The literature reports higher Omega-3 FAs in organic milk, but not in biologically significant amounts

Sources: <sup>1</sup>Schwendel et al. 2015 J Dairy Sci 98:721-746; FA composition of milk; Berbrook et al. 2013 PLOS ONE 8:e62426; FA composition of salmon; USDA Nutrient Database FDC ID: 173686

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- Higher in organic milk (n=3 studies)
- Higher in conventional milk (n=3 studies)
- No difference (n=3 studies)

The literature reports higher omega-3 fatty acids (FA) in organic milk, but not in biologically significant amounts

**OMEGA-3 FA SALMON, CONVENTIONAL MILK, ORGANIC MILK**

Food Type	Omega-3 FA (mg per 100 kcal)
Fish	1421
Conventional	37
Organic	35

Milk — unless fortified with omega-3 FA — is not considered a major source of omega-3 FA. As such, it does not make a significant contribution toward recommended levels compared to foods like salmon.

Sources: <sup>1</sup>Schwendel et al. 2015 J Dairy Sci 98:721-746; FA composition of milk; Berbrook et al. 2013 PLOS ONE 8:e62426; FA composition of salmon; USDA Nutrient Database FDC ID: 173686

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## Grass-Fed Dairy

**No current federal regulations**

- Company can develop own certification program or go through a certifying agent
- USDA certified organic includes minimum standards for grass (forage) feeding on pasture

**Certifying companies**

- Set minimum standards for days on pasture, dry matter from pasture, prohibited feedstuffs
- Certifying companies conduct farm audits and authorize use of logos to inform consumers



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## What is A2 Beta-Casein Milk?



- Same 9 essential nutrients
- Major difference is the type of protein
- Milk's high-quality protein is in the form of casein and whey
- Beta-casein is a common form of casein and it predominantly comes in 2 forms: A1 and A2
- Milk in the United States is usually an equal mix of A1 and A2
- Certain cow breeds provide mostly milk with A2 beta-casein (called "A2 milk") with little or no A1 beta-casein



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## Does A2 Beta-Casein Milk Offer Unique Benefits?

- The current hypothesis is that A2 beta-casein milk may provide unique benefits in terms of how it is digested
- The evidence
  - There is published evidence suggesting there could be a difference in gastrointestinal tolerance in some people
  - More research is needed

Regardless – A2 beta-casein milk provides the same benefits and nutrient package as milk containing both A1 and A2 casein.



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Regardless of farming or production practices all cows' milk is nutrient-rich, safe and wholesome.

There is an option for everyone!



Excellent Source  
Calcium  
Riboflavin  
Vitamin B12

Good Source  
Protein  
Vitamin D  
Phosphorus  
Vitamin A  
Niacin  
Pantothenic Acid

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*"Types of milk/ dairy products for lactose intolerance and milk allergies?"*

*"Isn't it just more efficient to remove dairy for those that have GI discomfort?"*

*"What are some potential dairy options for those with lactose intolerance?"*

**Lactose Intolerance & Milk Allergy**

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**Abigail Copenhaver, MS, RDN, CDN**

**Disclosures:**

- Owner/founder: Farmstead Nutrition & Consulting
- Ivy Lakes Dairy & Gorham Dairy (Stanley, NY)
- Dietitian with Child Care Council
- American Dairy Association North East Spokesperson
- National Dairy Council Ambassador



**FARMSTEAD NUTRITION**




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## What's the Difference Between Lactose Intolerance and a Milk Allergy?

### Lactose Intolerance

- Sensitivity to milk sugar (lactose)
- Gastrointestinal (GI) response from an inadequate ability to digest lactose due to lack of lactase enzyme
- Rare in young children
- It is an individualized condition, meaning people may be able to enjoy milk and dairy foods once they find the management strategies that work for them

### Milk Allergy

- Reaction to milk protein (i.e., casein)
- Triggered by the immune system
- Generally impacts young children; may be outgrown by 2-3 years of age\*
- Individuals should **avoid milk and milk products** (unless allergy is outgrown)

\*Allergy and Asthma Foundation

<https://www.allergystatement.com/allergy/allergy-differences-between-lactose-intolerance-and-milk-allergy>

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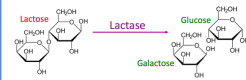
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## What is Lactose Intolerance?

"...In Lactose Intolerance, digestive symptoms are caused by lactose malabsorption a condition in which your small intestine cannot digest, or break down, all the lactose you eat or drink..."

Most people with LI can consume some amount of lactose without having symptoms. Different people can tolerate different amounts of lactose before having symptoms. LI is different from a milk allergy. A milk allergy is an immune system disorder."



<https://www.nih.gov/health-information/digestive-diseases/lactose-intolerance/digestion-factsheet>

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## Prevalence of Lactose Intolerance

# 12%

Americans self-report lactose intolerance (rare in children)

# 54%

Have not been diagnosed by a health professional

~8% of European Americans  
~10% of Hispanic Americans  
~20% of African Americans

Wolke, T. et al. (2016). Prevalence of Self-reported Lactose Intolerance in a Multiracial Sample of Adults. *Nutrition Today*, 44, 222-227. DOI:10.1016/j.nut.2015.11.004

The Hartman Group, Inc. Understanding Dairy Sensitivity. February 11, 2015.

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## National Medical Association & National Hispanic Medical Association: Consensus Statement on Lactose Intolerance

### N M A C O N S E N S U S S T A T E M E N T

Lactose Intolerance and Health Disparities  
Among African Americans and Hispanic  
Americans: An Updated Consensus Statement

Robert A. Bailey, MD, MPH, Colorado State Univ., CO, USA; Jayashree K. Sathya, MD, MSc, University of Maryland, MD, USA; Yoon-Sik Kim, MD, MPH, University of Maryland, MD, USA; Sharon Denise Alston-O'Neil, MD

"Milk and milk product intake is associated with better diet quality and has been associated with a reduced risk of chronic diseases or conditions including hypertension, cardiovascular disease, metabolic syndrome, Type 2 Diabetes and osteoporosis."

"Research indicates that those who consider themselves lactose intolerant may compromise dairy intake, which may leave them short on essential nutrient intake and more susceptible to some of the chronic diseases mentioned above."

"Public health authorities agree that for those with lactose intolerance, dairy food intake is not only possible, but also encouraged."

Robert A. Bailey, et al. Lactose intolerance and health disparities among African Americans and Hispanic Americans: an updated consensus statement. J Natl Med Assoc. 2013;305(2):112-121

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### Milk: 9 essential nutrients

Protein  
Calcium  
Vitamin D  
Phosphorus  
Vitamin A  
Riboflavin  
Pantothenic acid  
Niacin  
Vitamin B12

### People with Real or Perceived Lactose Intolerance May Not Need to Miss Out!

- Many people who are self-diagnosed or clinically diagnosed with lactose intolerance may avoid dairy
- Ideally, everyone would get a clinical diagnosis to ensure nothing else is causing their GI distress
- The good news is that avoidance may not be necessary once people learn which management strategies work for them

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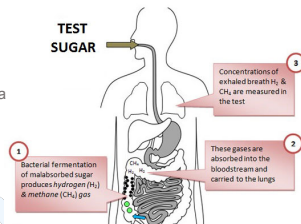
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## Diagnosing Lactose Intolerance

Doctor/Immunologist:

- Measuring glucose levels in your blood post lactose consumption
- Hydrogen breath test
- Stool acid test (result from bacteria in large intestines breaking down lactose)



Citation: <https://pubmed.ncbi.nlm.nih.gov/24101010/> Lactose intolerance and health disparities among African Americans and Hispanic Americans: an updated consensus statement

Citation: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3810101/> Lactose intolerance and health disparities among African Americans and Hispanic Americans: an updated consensus statement

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Tips to Manage Lactose Intolerance

Dairy Food	Serving Size	Lactose Grams	Helpful Hints
Cow's Milk	8 oz	12g	Try small amounts of milk in smoothies, on cereal or with meals. Having milk with solid foods help slow digestion which can mean better tolerance
Lactose-free cow's milk	8 oz	0g	Lactose-free cow's milk is real milk – just without the lactose
Yogurt	6-8 oz	12-16g	Yogurt's live and active cultures help digest lactose, which can make it easier to tolerate
Greek Yogurt	6-8oz	6-8g	There is less lactose in Greek yogurt because the straining process removes some of the lactose
Natural Cheese	1.5 oz	<1g	Due to the steps in cheese making and natural aging, natural cheese contains minimal amounts of lactose
American Cheese	2 oz	1.25g	American cheese, which is made from natural cheese, does not contain much lactose
Cottage Cheese	½ c	3g	Smaller amounts of cottage cheese do not contain much lactose
Ricotta Cheese	½ c	<1-6g	Ricotta cheese – a soft, natural cheese can contain minimal amounts of lactose
Ice Cream	½ c	14g	There are lactose-free cow's ice cream's available
Cream	1 Tbsp	<1g	Cream for coffee has minimal lactose

<https://www.nationaldairyboard.org/content/2018/lactose-intolerant-look-dairy-try-these-12-tips>

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Solutions for People with Lactose Intolerance

Test and tailor to find for what works for them


TRY IT

Opt for lactose-free cow's milk products




SIP IT

Start small and introduce dairy slowly




STIR IT

Mix milk with other foods to help slow lactose digestion




SLICE IT

Choose natural cheeses (e.g. Cheddar, Swiss)




SHRED IT

Add natural cheeses to foods (e.g. Parmesan)



SPOON IT

Yogurt's live and active cultures help digest lactose



Helpful Reminders

- Lactose intolerance is an individualized condition
- NIH Consensus found most people who have trouble digesting lactose can tolerate ~12grams at one time (that's as much as a cup of milk)
  - Start slowly with regular milk in cereal or a small amount at meals and build tolerance level back up
- Lactose-free milk is real cow's milk. It provides the same 9 nutrients, just without the lactose
- Most hard, natural cheese contain minimal lactose
- Yogurt's live and active cultures help digest lactose (and Greek and Icelandic yogurt have less lactose due to the straining process)
- Butter and cream have trace to no lactose

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"What about the antibiotics in milk?"

"Would've liked more information regarding antibiotic use and care for animals."

"How can I be sure there are no antibiotics added to my milk?"

Cow Care and Antibiotic Use

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### All Dairy Foods – Labeled or Not – Are Required by the FDA to be Free of Antibiotics

- Cow care is the top priority for farmers
- Antibiotic use is highly regulated and overseen by veterinarian
- FDA prohibits antibiotics in milk
- Numerous checkpoints in place as milk moves from farm to dairy case
- Any milk that tests positive is rejected and does not enter the food supply

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### Antibiotic Use on Farms

- Cow health is the number one goal
- Illness is both stressful for the cow and the farmer
- Antibiotics are expensive
  - Treatment, time, labor, non-saleable milk, other resources
- Farmers are required to work with vet on antibiotic Standard Operating Procedures (SOPs)
  - SOPs are required by FDA, milk cooperative and F.A.R.M. Program
  - Label use
  - Protocol
  - With-holds and testing
  - Treated cow management

NSICRP: <https://www.nrcsl.edu/animal-health-diagnostics/programs/nsicrp/>  
 FARM Program: <https://www.farmprogram.com/antibiotic-use-on-farms/>

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## FARM Animal Care Program

Farmers  
Assuring  
Responsible  
Management



~98% of U.S. milk comes from farms participating in the FARM Animal Care Program



FARM Program: <https://dairymilkfarms.com/dairy-farm-standards/antibiotic-stewardship/FARM>

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## Milk Regulations



- Dairy Farm
  - Inspection by milk cooperative and unannounced inspection by FDA
  - All milk that has antibiotics is discarded
  - Tested for milk quality
- Processing Plant
  - Permit is required
  - Inspections are required
  - Regulations for labeling
  - Standard of Identity, United States Code of Federal Regulations



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"What research has NDC found out about the results of having hormones in milk and other dairy products?"

"Use of growth hormones in dairy (always gets asked by patients trying to consume organic food)."

"Are hormones in milk causing early puberty in girls?"

## Hormones, Dairy Farming and Human Health

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## Hormones

- Organic substances in plants, animals and humans that function to regulate physiological activities
- They exist naturally in humans, animals and plants
  - Therefore they are found in the food we eat
  - Cows and milk are no exception
- 2 main classes of hormones
  - Steroid
    - Cholesterol derivatives
  - Protein

NationalDairyCouncil.org @NDC DairyCouncil #DairyInOurLives

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### Digestion of protein

Protein → Peptides → Amino acid

### IGF-1 is just an amino acid chain

H—Leu—Glu—Met—Tyr—Lys—Ala—Pro—Leu—Lys—Pro—

Ala—Lys—Ser—Ala—OH

### How our body processes them

- Protein Hormones are broken down in the gastrointestinal tract
- Example:
  - IGF-1 is a protein derivative hormone
  - Insulin is a peptide hormone
  - In order to impact blood sugar, it is injected
  - Not consumed by mouth, pepsin breaks down proteins in the stomach

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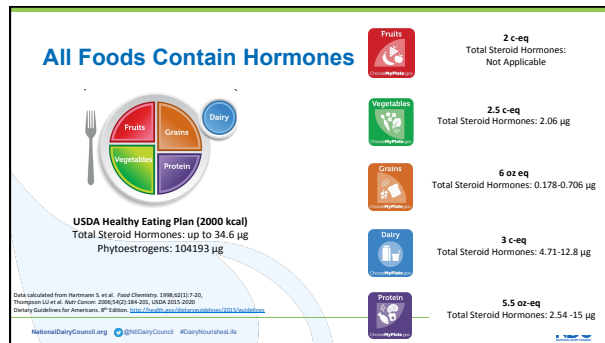
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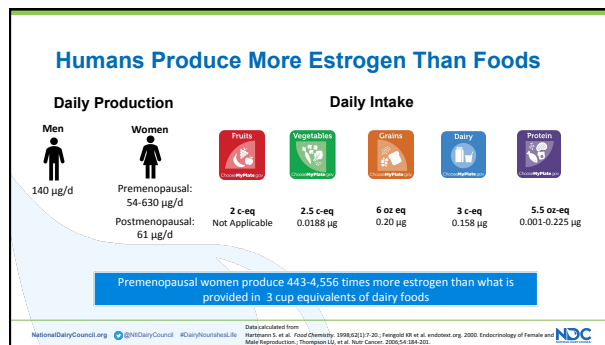
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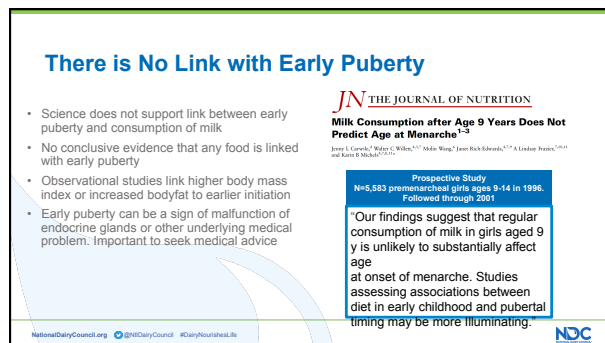
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**Bovine growth hormone is only active in cows and not recognized by the human body**

**Hormones are a Key**

Hormones deliver instructions to specific tissues by binding to receptors which acts like a lock (receptor) and key (hormone) mechanism.

Just like your key will not open someone else's lock, most hormones will only work in the animal that produced them and in the specific tissues that have the receptor.

For example, the growth hormone produced by cattle (a key) will not fit in the growth hormone receptor (the lock) in humans - so it would have no effect.

For more info check out [The Food Facts.org](http://TheFoodFacts.org)

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**FDA**

**Recombinant Bovine Somatotropin (rbST): A Safety Assessment**

Initially presented at the Joint Annual Meeting of the American Dairy Science Association\*, Canadian Society of Animal Science, and American Society of Animal Science

Montreal, Canada  
July 14, 2009

Updated on March 22, 2010

"...food products from cows treated with rbGH are safe for consumption by human."

"The FDA's review of rbGH has been scrutinized by both the Department of Health and Human Services' Office of Inspector General (OIG) and by GAO, as well as by JECFA."

<http://www.fda.gov/oc/ohrt/2010/07/14/20100714RecombinantSomatotropinSafetyAssessment2010.pdf>

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**Consumer Preference**

- Dairy companies have responded to consumer preference
- Packaging Claims
  - The farmer can pledge to not use artificial growth hormones
  - Must include statement:
    - "The Food and Drug Administration has determined there is no significant difference between milk from rBST treated cows and non-rBST-treated cows."

**THIS MILK IS FROM COWS NOT TREATED WITH rBST**

THE FOOD AND DRUG ADMINISTRATION HAS DETERMINED THERE IS NO SIGNIFICANT DIFFERENCE BETWEEN MILK FROM rBST TREATED COWS AND NON-rBST TREATED COWS

INGREDIENTS: PASTEURIZED HOMOGENIZED REDUCED FAT

Image: [https://farmmilkblog.files.wordpress.com/2009/05/05\\_rst\\_free\\_milk.png?w=570](https://farmmilkblog.files.wordpress.com/2009/05/05_rst_free_milk.png?w=570)

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**Dairy Communities Commitment to Environmental Sustainability**

- "Dairy production and the reduction of greenhouse gases- what is being done?"
- "Environmental impact of producing dairy foods"
- "...on the amounts of methane produced and energy to farm cattle - what is your response to the risk-benefit on the environment of consuming dairy?"

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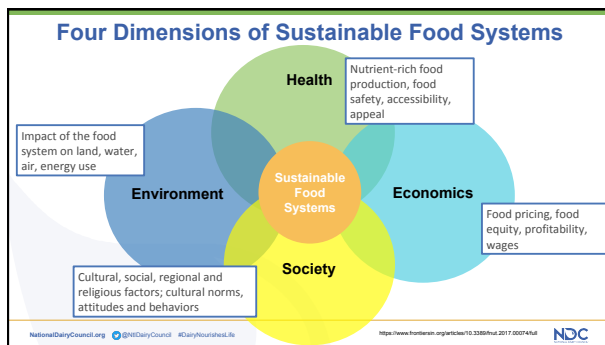
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**2005, 2010, 2015\* Dietary Guidelines recommend 3 daily servings of dairy foods for those >9 years**

**DIETARY GUIDELINES FOR AMERICANS 2015-2020**  
EVIDENCE SUMMARY

The 2015 DGA states that healthy eating patterns, including low-fat or fat-free dairy foods, are associated with **reduced risk for several chronic diseases**, including **cardiovascular disease** (strong evidence) and **type 2 diabetes** (moderate evidence). Research has also linked dairy intake to **improved bone health**, especially in children and adolescents.

\* 3 servings for Americans 9 years and older in the Healthy U.S.-Style and Healthy Vegetarian Eating Patterns.

NationalDairyCouncil.org @NDC DairyCouncil #DairyInBusinessLife Dietary Guidelines for Americans, 2015-2020 NDC

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## Dairy's Economic and Social Contributions to Sustainability

- Milk is produced in every state; most milk travels ~300 miles and 48 hours from farm to store
- The dairy community supports nearly 3 million jobs & contributes \$625 billion to the U.S. economy every year
- 95% of dairy farms in the U.S. are family owned and operated
- The livelihoods of ~1 billion people globally are connected to dairy
- 37 million dairy farms globally are led by women
- Dairy foods are accessible and affordable



NationalDairyCouncil.org @NDCDairyCouncil #DairyInOurLives

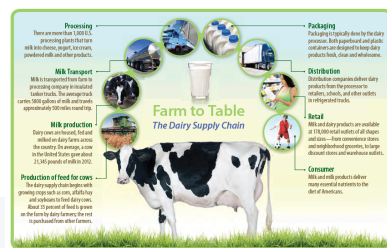
[https://www.ndc.org/page/content/uploads/2016/12/DFAO\\_Globad\\_Facts\\_1.pdf](https://www.ndc.org/page/content/uploads/2016/12/DFAO_Globad_Facts_1.pdf)  
<https://www.nationaldairy.org/sustainability-reporting/dairy-and-sustainability-framework-for-us-dairy>  
<https://www.nationaldairy.org/sustainability-reporting/dairy-and-sustainability-reporting/dairy-sustainability-report>



## Dairy and the Environment

### Dairy Life Cycle Assessment (LCA):

### Understanding Dairy From Grass to Glass



NationalDairyCouncil.org @NDCDairyCouncil #DairyInOurLives



Over the past 10 years,  
we've reduced our impact...

21%  
less land

30%  
less water

20%  
less manure

19%  
less GHG

Capper, J. Cady, R. 2019. The effects of improved performance in the U.S. dairy cattle industry on environmental impacts between 2007 and 2017. *Journal of Animal Science*, 1-14

### Conclusions

- Regardless of farming or production practices, cow's milk, including lactose free, provides the same nine essential nutrients, is safe and wholesome
- Lactose intolerance is a highly individualized condition, the good news is there are dairy based solutions that can be tailored to meet most peoples' needs
- All dairy foods are required by the FDA to be free of antibiotics
- All plants and animals produce hormones. No hormones are added to milk and there is no link with dairy consumption and early puberty.
- Because of a commitment to continuous improvement, precision feeding and breeding and resource management plans, a gallon of milk can be produced today using 19% less greenhouse gas compared to 2007.

NationalDairyCouncil.org @NDC DairyCouncil #DairyNourishesLife

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### Host of Resources on www.nationaldairycouncil.org

#### 10+ Science Summaries

#### Recipes

NationalDairyCouncil.org @NDC DairyCouncil #DairyNourishesLife

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### Dairy Nourishes NETWORK

- Quarterly updates
- Advance notice of webinars
- Recipe ideas/meal tips
- Engaging contests
- Opportunities to be highlighted on NDC's social
- In-person educational and networking events

**To join visit NationalDairyCouncil.org**  
<https://www.nationaldairycouncil.org/content/2019/national-dairy-council-join-the-dairy-nourishes-network>

NationalDairyCouncil.org @NDC DairyCouncil #DairyNourishesLife

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**Questions?**  
Please enter your questions into the chat window.



Continuing education certificates and handouts will be shared via email within 24 hours of the webinar's conclusion.

The full webinar recording will be available next week on [www.nationaldairyCouncil.org](http://www.nationaldairyCouncil.org).



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