From Farm to Table to the Gut: Fermented Dairy

Indiana Academy of Nutrition and Dietetics 2019 Annual Meeting
April 11, 2019

NDC
NATIONAL DAIRY COUNCIL™

#DairyNourishesLife

Today's Presenters

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@RunningRDN

#DairyNourishesLife

Learning Objectives

1. Distinguish between fermented foods and probiotics
2. Discuss the growing body of scientific evidence supporting consumption of fermented dairy foods within healthy dietary patterns and:
    a. Reduced risk of type 2 diabetes (T2DM)
    b. Reduced risk of cardiovascular disease (CVD)
    c. Emerging evidence on yogurt's role in reducing inflammation
3. Describe the benefits of dairy food / fermented dairy matrix
4. Provide practical examples for building healthy and appealing eating patterns, which incorporate fermented dairy foods

Fermented Foods:

What is old is new again

https://commons.wikimedia.org/wiki/File:Egyptian-woman-painting_Beer.jpg

Americas

Hawaii
Poi

Mexico
Pozol

Colombia
Guarapo

Peru
Champus

Asia

Korea
Kimchi

Japan
Natto

Tibet
Jun

India
Lassi

Africa

Ethiopia
Injera

Ethiopia
Ayib

South Africa
Incwancwa

Nigeria
Iru

Europe

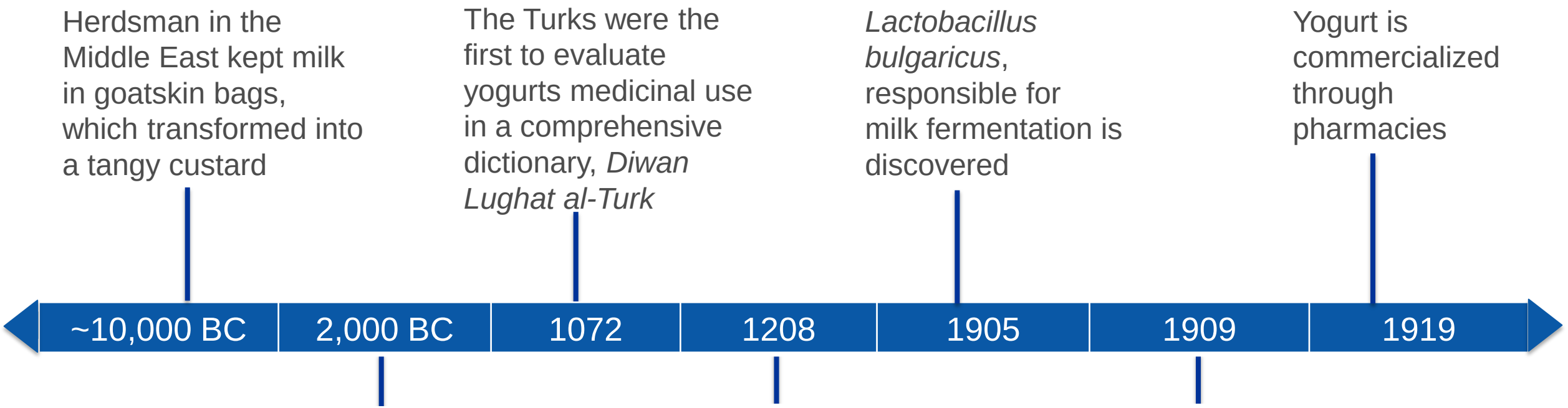
Germany
Sauerkraut

Eastern Europe
Smetana

Iceland
Skyr

Central Europe
Kefir

The History of Yogurt



Fermented Foods: Topping the Trends Lists

Source: Pollack Today's Dietitian. What's Trending in Nutrition. 2019

https://www.lpollockpr.com/trends/
https://www.todaysdietitian.com/news/122018_news.shtml

International Scientific Association for Probiotics and Prebiotics

What are fermented foods?

A fermented food or beverage is a type of food made by extensive microbial growth. These foods are nothing new. They've been around for thousands of years. To understand how fermented foods are made, let's look at yogurt.

Yogurt is a fermented food made from milk. During yogurt fermentations, lactic acid-producing bacteria grow on the sugars and other nutrients in milk. As they multiply, the bacteria produce compounds that change the flavor, texture, and nutrients in the milk to give us what we know as yogurt.

The value of fermented foods

- Source of live, active microbes
- Improve food taste, texture, and food digestibility
- Increase concentrations of vitamins and bioactive compounds in foods
- Remove/ reduce toxic or anti-nutrients in raw foods
- Increase food safety and shelf-life

Fermented Food or Probiotic?

Fermented Foods

- ✓ Made with microorganisms
- ✓ May or may not contain live active cultures at a level to confer a health benefit
- ✓ Most cheeses are fermented foods

The voluntary Live & Active Culture seal indicates a significant amount of the good bacteria remain alive after the fermentation process is complete.

Probiotics

- ✓ Should meet FAO definition: “Probiotics are *live microorganisms* that, when administered in *adequate amounts* confer *a health benefit*”
- ✓ Yogurts can be considered probiotic for people with lactose intolerance because traditional cultures, *Lactobacillus bulgaricus* and *Streptococcus thermophilus*, have been well studied for their ability to help with lactose digestion

Hill C, et al. *Nat Rev Gastroenterolog Hepatolo*. 2014;11:506-514.

Fermented Foods and Gut Health

- The human digestive tract contains approximately 100 trillion bacterial cells = gut microbiota[1]
- An imbalance between “good” bacteria and “bad” bacteria = dysbiosis[2]
- Factors influencing the gut microbiota composition[2]
  - Vaginal birth vs. Cesarean
  - Breast vs. formula feeding infants
  - Diet and intake of fiber
  - Antibiotic use
  - Hygiene levels
  - Genetic background
- Some diseases are characterized by microbial colonization patterns that differ from healthy controls[3]
- Fermented foods *may* contain living cultures that can add beneficial bacteria to the digestive tract[3]
- Eating fermented foods helps maintain a balance between good and bad bacteria

  → contributing to a healthier microbiota[3]

1. Turnbaugh PJ, et al. *Nature.* 2007;449:804–810.
2. Gagliardi A, et al. *Int J Environ Res Public Health*. 2018;15:1679-.
3. Ko CR and Hutkins R. *Nutrition Reviews*. 2018;76(S1):4-15.

Dairy Foods and Health Outcomes

Cheese*:
6 essential nutrients

Protein

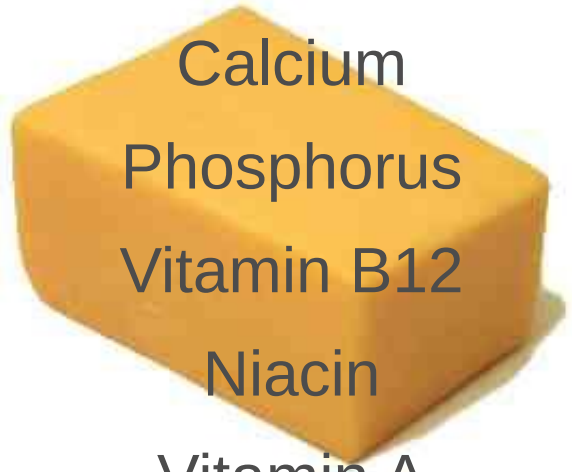
Calcium

Phosphorus

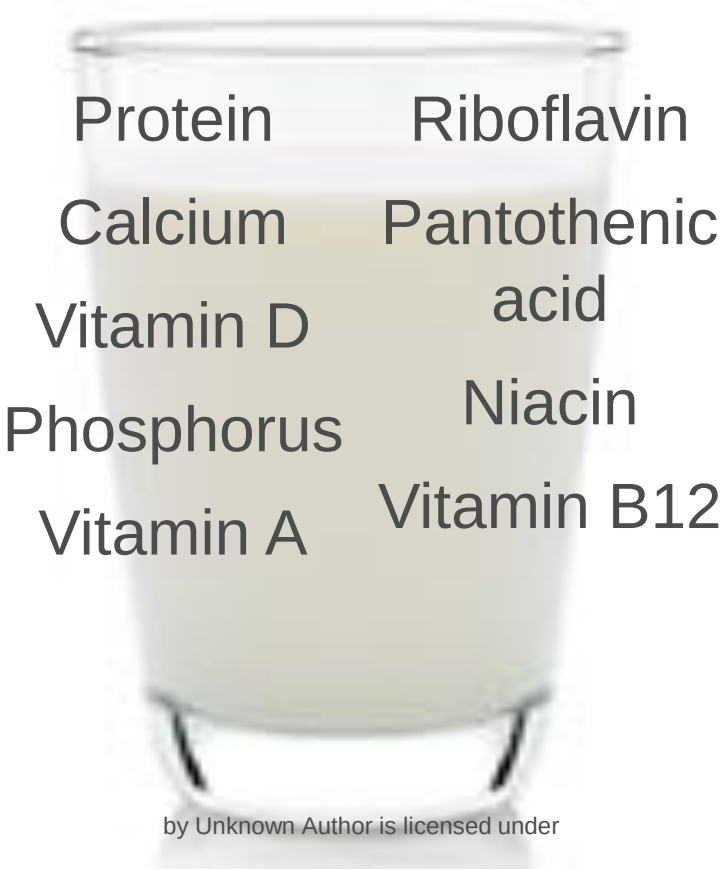
Vitamin B12

Niacin

Vitamin A



Milk:
9 essential nutrients



Protein

Calcium

Vitamin D

Phosphorus

Vitamin A

Riboflavin

Pantothenic acid

Niacin

Vitamin B12

Yogurt:
7 essential nutrients

Protein

Calcium

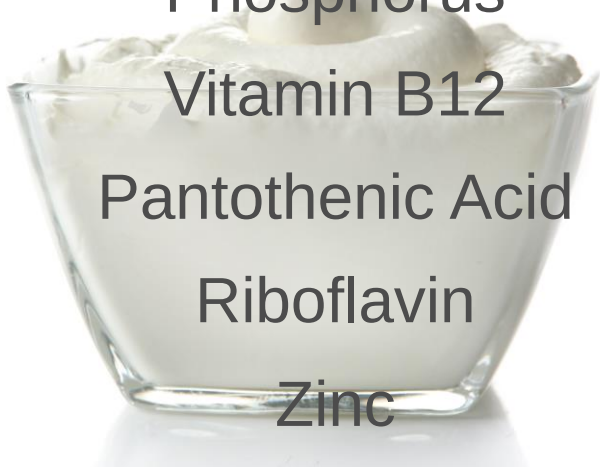
Phosphorus

Vitamin B12

Pantothenic Acid

Riboflavin

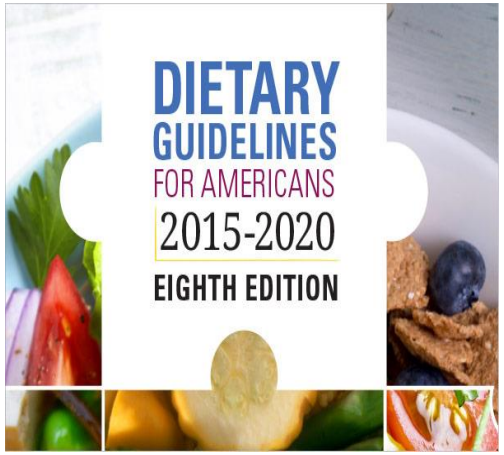
Zinc



*Nutrients based on USDA Database for Cheddar #01009

2005, 2010, 2015* Dietary Guidelines Recommend 3 Daily Servings of Dairy Foods for Those ≥9 years

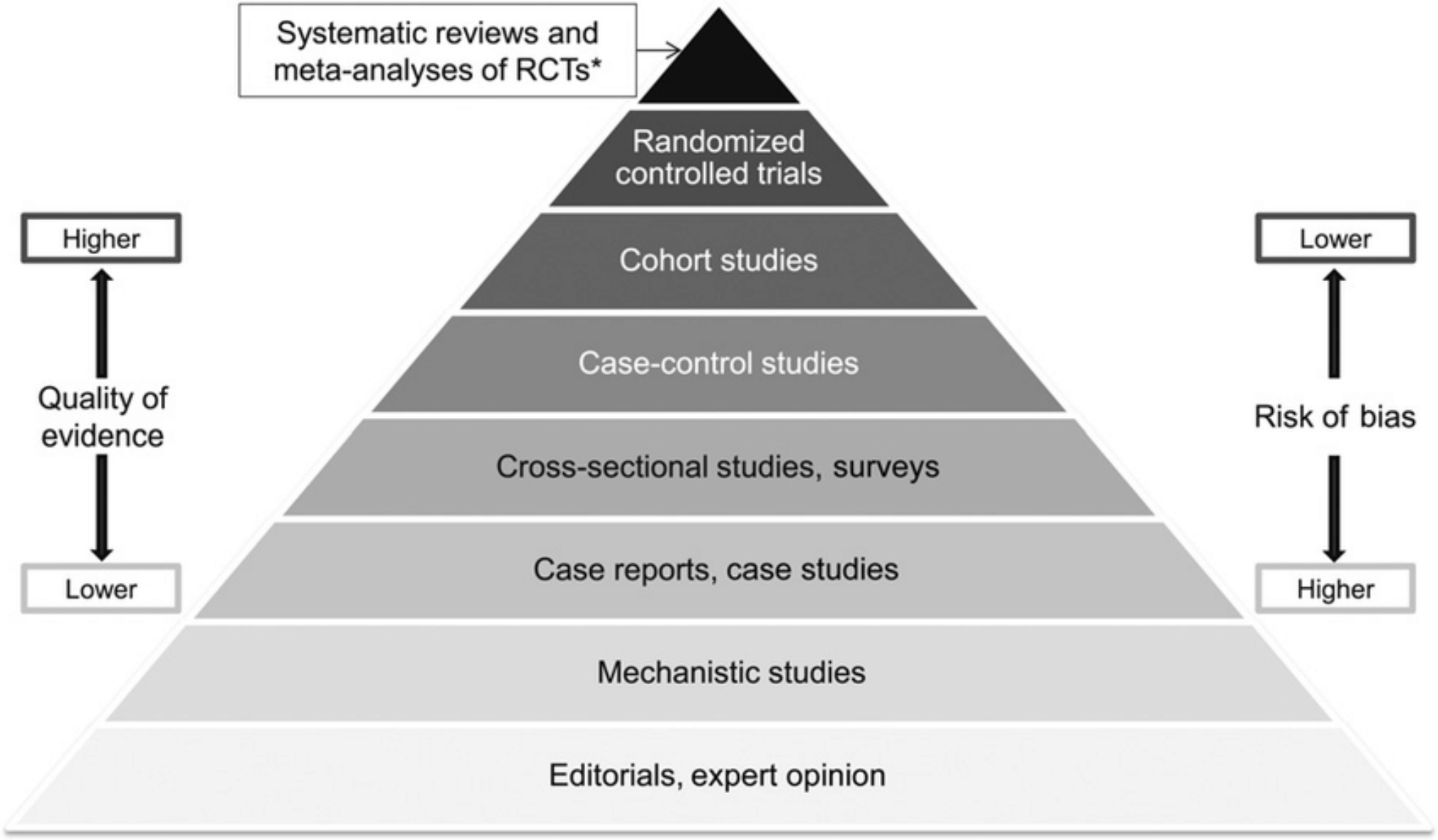
*3 servings for Americans 9 years and older in the Healthy U.S.-Style and Healthy Vegetarian Eating Patterns.



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.

Dietary Guidelines for Americans, 2015-2020

Fermented Dairy Foods and Health Outcomes



Adapted from :A Yetley, et al. Options for basing Dietary Reference Intakes (DRIs) on chronic disease endpoints: report from a joint US-/Canadian-sponsored working group. *American Journal of Clinical Nutrition*. 2016;105(1). 10.3945/ajcn.116.139097.

Fermented Dairy Foods & Type 2 Diabetes

Visit Science Summaries at ***nationaldairycouncil.org***


SCIENCE SUMMARY: Cheese & Health

NDC NATIONAL DAIRY COUNCIL

Overview

Cheese is delicious and nutritious and can start with just 3 ingredients: milk, starter culture and salt. This process can be done in so many ways that there are ~2,000 varieties of cheese. Cheese is
phosphorus and vitamin A to th
foods are important sources of
(LI), cheese can be a source of
of dairy foods are included in t
Patterns in the 2015 Dietary Gu
review concluded that eating ch
(CVD) risk (high-quality eviden
and type 2 diabetes (T2D) (mo
part of healthy eating patterns.

Eating cheese helps Americans meet dairy food rec

Dairy foods like cheese are foundational foods in healthy eating patterns
free dairy foods, are associated with lower risk for CVD (strong evidenc
also linked to improved bone health, especially in children and adolesce

While milk should not be given to infants before 12 months, yogurt and c
introduced around 6 months, and cheese (in ½ ounce servings) can be i
developmental readiness.[2] The DGA recommends 3 daily servings[1] of lo
2½ for children 4-8 years, and 2 for children 2-3 years in the Healthy U.S
closest to meeting DGA recommendations. Girls and boys 2-5 years eat
including 0.6 servings of cheese.[3] Dairy food consumption tends to fall b
school, and this trend carries forward through adolescence and into adu
fewer than 2 servings of dairy foods daily, half of which is cheese.[4] Encc
of dairy foods like cheese to their eating pattern is a practical way to hel

Cheese is the second leading food source of c

Eating cheese helps Americans meet nutrient recor

Cheese makes important nutrient contributions to the U.S. diet.[5] Cheese
contributes other essential nutrients such as calcium, phosphorus and v
calcium, 8% of protein and 9% of vitamin D and contributes approximate
calories to the diets of Americans 2 years and older.[6] Cheese is the sec

[1] One serving refers to 1 cup-equivalent. For milk, 1 cup-equivalent equals 1 cup.

For more information, please visit: https://www.nationaldairycouncil.org/science-summary

SCIENCE SUMMARY: Type 2 Diabetes

NDC NATIONAL DAIRY COUNCIL

Overview

Dairy foods such as milk, cheese and yogurt are foundational foods in healthy eating patterns. They contribute important shortfall nutrients, including calcium, vitamin D and potassium. Low-fat and fat-free dairy foods are part of the Dietary Guidelines for Americans (DGA) recommendations, and a wide variety of nutrient-rich dairy foods are available that can help Americans meet nutrition, health and taste preferences. A growing body of research indicates that dairy food consumption is associated with multiple health benefits, including a reduced risk for type 2 diabetes (T2D). This summary reviews studies about dairy food consumption and T2D published between 2009 and 2015, building on the scientific review conducted for the 2010 DGA. This research provides further support for consuming low-fat or fat-free dairy foods as recommended in the 2015 DGA.

Healthy eating patterns can help lower risk for T2D and decrease public health costs

Type 2 diabetes affects nearly 29 million Americans 20 years and older (1), and it is estimated that one in three Americans born today will develop diabetes over his or her lifetime (2). The annual estimated cost of diagnosed diabetes in the U.S. has increased from $174 billion in 2007 to $245 billion in 2012 (3). Each year, one million people receive a new diagnosis of diabetes, and T2D accounts for 90-95% of all diagnosed cases (4). Genetic and environmental factors influence the development of T2D, and a healthy eating pattern helps contribute to overall health and the management of T2D (4). The 2015 DGA states that healthy eating patterns are associated with reduced risk for several chronic diseases, including cardiovascular disease (strong evidence) and type 2 diabetes (moderate evidence) (5). The DGA recommends three daily servings of low-fat or fat-free dairy foods for those 9 years and older, 2½ for children 4-8 years, and two for children 2-3 years, in the Healthy U.S.-Style Eating Pattern (5).

The 2015 DGA notes that moderate evidence indicates healthy eating patterns are associated with reduced risk for type 2 diabetes (5).

Accumulating evidence finds dairy food consumption is linked to lower risk for T2D

National and global health organizations recognize factors such as poor diet and physical inactivity as key contributors to the epidemics of overweight, obesity and several diet-related chronic diseases, including T2D (6, 7). The 2010 Dietary Guidelines, based on evidence published through mid-2009, stated: "Moderate evidence…indicates that intake of milk and milk products is associated with a reduced risk of cardiovascular disease and type 2 diabetes and with lower blood pressure in adults" (8). Since 2009, the body of evidence on dairy foods and type 2 diabetes has continued to grow.

Research published between 2009 and 2015 has examined links between dairy food consumption and T2D in five meta-analyses and/or systematic reviews (9-13), 13 prospective cohort studies (14-26), ten of which are about the association between dairy foods and T2D (14-23) and three of which relate to dairy fat (24-26). Results from the majority of these studies support the association between higher dairy food consumption and a reduced risk for T2D in a range of population groups. Because most of the research is observational, research is needed to understand the mechanisms underlying these observations. Overall, this research is consistent with the role of dairy foods in the healthy eating patterns recommended in the DGA.


SCIENCE SUMMARY: Yogurt & Health

NDC NATIONAL DAIRY COUNCIL

Overview

Yogurt is a nutrient-rich food that has been nourishing people for centuries. Made by culturing milk, yogurt contributes essential nutrients such as protein, calcium, phosphorus, zinc, vitamin B12, pantothenic acid (B5) and riboflavin (B2) to
led healthy eating patterns. Different yogurts help meet different people's
e and cooking needs. Yogurt varieties include low-fat, fat-free, flavored and
options, plus different styles including Greek and Icelandic. The culturing
ed to make yogurt helps break down lactose, which may make it easier for
lactose intolerance (LI) to digest yogurt. Lactose-free yogurt is also
merging evidence indicates that eating yogurt as part of a healthy diet may
ed with a lower risk for chronic diseases, long-term weight maintenance and
rkers of chronic inflammation. The Dietary Guidelines for Americans (DGA)
erican Academy of Pediatrics (AAP) recommend eating low-fat or fat-free
like yogurt every day to help meet nutrient needs.

dairy food recommendations

lthy eating patterns. Healthy eating patterns, which include low-fat and fat-
rdiovascular disease (CVD) (strong evidence) and type 2 diabetes (T2D)
ed to improved bone health, especially in children and adolescents.[1]

nonths, yogurt and cottage cheese (in ¼ to ½ cup servings) can be
e servings) can be introduced around 9 months, depending on
daily servings[1] of low-fat or fat-free dairy foods for those 9 years and older,
rs in the Healthy U.S.-Style Eating Pattern.[1] Young children come the
l boys 2-5 years eat 2.2 servings of dairy foods per day, on average.[3] Dairy
amounts by the time children go to school, and this trend carries forward
adults 19 years and older average fewer than 2 servings of dairy foods
urt on any given day.[4,5] Encouraging adults and children to add 1 more daily
m is a practical way to help meet dairy recommendations.[6]

nutrient recommendations

Low-fat yogurt is an excellent source of calcium, a nutrient of public health
o contains protein, phosphorus, zinc, vitamin B12, pantothenic acid (B5)
,500 people indicated that adults who eat at least 1 serving of yogurt per
eat yogurt.[7] This study also found that yogurt eaters have a higher
sume inadequate amounts of riboflavin (B2), vitamin B12, calcium,
yogurts contain added sugar to help reduce the natural tartness of yogurt.[7]

ale 1 cup.

nhscience-summary

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Dairy Foods are Linked to Reduced Risk of Type 2 Diabetes

The American Journal of CLINICAL NUTRITION

Dairy products and the risk of type 2 diabetes: a systematic review and dose-response meta-analysis of cohort studies[1–3]

Dagfinn Aune, Teresa Norat, Pål Romundstad,

PLOS ONE
A peer-reviewed, open access journal

Dairy Products Consumption and Risk of Type 2 Diabetes: Systematic Review and Dose-Response Meta-

1
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take Analysis
ort Studies
00 subjects

Total dairy intake
risk of type 2 dia
Beneficial associati
products, low-fat

6% reduced
erving daily
with 30g/d
t

What does 400g of dairy a day look like?
1 cup fluid milk = 245g
1 oz cheese = 28g
1, 6-oz container yogurt =170g
TOTAL = 443g or 3 servings

*For reference: 8 fl oz (1 cup) fluid milk = 245 g; 1 oz (slice) cheese = 28g; 1, 6-oz (container) yogurt = 170 g
(US Department of Agriculture (USDA), Agricultural Research Service, Nutrient Data Laboratory. USDA National Nutrient Database for Standard Reference, Legacy. Version Current: April 2018. Internet: http://www.ars.usda.gov/nutrientdata)

Aune D et al. *Am J Clin Nutr*. 2013; 98(4):1066-83.
Gao D et al. *PLoS One*. 2013; 8(9):e73965.

Consistent Evidence Demonstrates Eating Yogurt is Associated with Reduced Risk for Type 2 Diabetes

Dairy consumption and risk of type 2 diabetes: 3 cohorts of US adults and an updated meta-analysis

Mu Chen[1,2], Qi Sun[1,3], Edward Giovannucci[1,2,3], Dariush Mozaffarian[1,2,3,4], JoAnn E Manson[2,3,5], Walter C Willett[1,2,3] and Frank B Hu[1,2,3*]

14 Prospective Cohort Studies
>450,000 participants

Yogurt intake (one serving/day) associated with a 17% reduced risk for type 2 diabetes

The American Journal of CLINICAL NUTRITION

Consumption of dairy foods and diabetes incidence: a dose-response meta-analysis of observational studies[1,2]

*Lieke Gijsbers,[3] Eric L Ding,[4,5] Vasanti S Malik,[4] Janette de Goede,[3] Johanna M Geleijnse,[3] and Sabita S Soedamah-Muthu[3]**

22 Cohort Studies
>570,000 individuals

14% reduced risk per 80 g/day (~1/3-1/2 cup per day) compared to 0 g/day yogurt intake

Chen et al. *BMC Med*. 2014; 92:215.
Gijsbers et al. *Am J Clin Nutr.* 2016;103(4):1111-24.

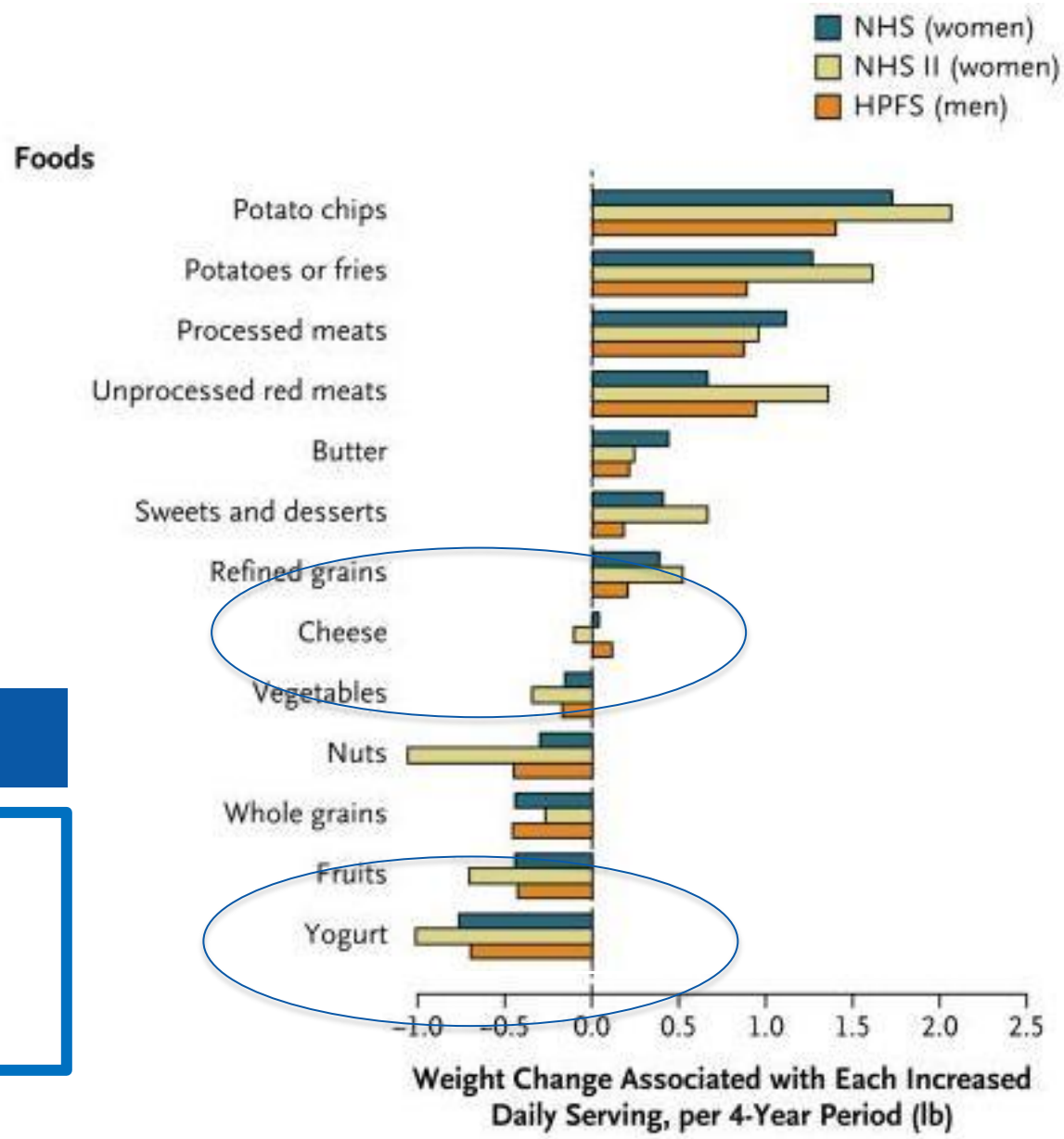
The NEW ENGLAND JOURNAL of MEDICINE

Changes in Diet and Lifestyle and Long-Term Weight Gain in Women and Men

Dariush Mozaffarian, M.D., Dr.P.H., Tao Hao, M.P.H., Eric B. Rimm, Sc.D., Walter C. Willett, M.D., Dr.P.H., and Frank B. Hu, M.D., Ph.D.

3 Cohort Studies (NHS I & II, HPFS)
>120,000 women and men

Each serving of yogurt/d was associated with -0.82 lb. weight change over a 4 year period



Mozaffarian D et al. *NEJM;* 2011. 364:2392-2404.

Fermented Dairy Foods & Cardiovascular Disease

Visit Science Summaries at
nationaldairycouncil.org


SCIENCE SUMMARY: Cheese & Health

Overview

Eating cheese helps Americans meet dairy

Eating cheese helps Americans meet nutr

SCIENCE SUMMARY: Yogurt & Health

Overview

meet dairy food recommendations

meet nutrient recommendations

SCIENCE BRIEF: Whole and Reduced-Fat Dairy Foods and CVD Risk

New science supports reassessing the role of dairy foods in healthy eating patterns

Overview

The 2015-2020 Dietary Guidelines for Americans (DGA) recommend choosing low-fat and fat-free milk, cheese or yogurt as part of healthy eating patterns. Dairy foods (such as milk, cheese, yogurt) make significant nutrient contributions to U.S. diets, including nutrients underconsumed by most Americans—calcium, vitamin D and potassium—as well as magnesium, phosphorus, zinc, vitamin A, vitamin B12, riboflavin (B2), choline, high-quality protein and saturated fat. Recommendations to reduce saturated fat consumption are intended to lower rates of cardiovascular disease (CVD), including coronary heart disease (CHD or heart attack) and cerebrovascular disease (stroke). In recent years, however, emerging research has found that saturated fat consumption may not be directly linked to CVD risk, indicating saturated fat on its own may be a poor metric for identifying healthy foods or diets. In addition, observational and trial evidence has found that dairy food consumption—regardless of fat content—is not associated with higher risk for CVD. The growing evidence base supports reassessing the role of whole and reduced-fat dairy foods in healthy eating patterns to inform future nutrition guidance regarding CVD and other cardiometabolic diseases.

Healthy eating patterns are linked to lower risk for CVD

Eating patterns are defined as "quantities, proportions, variety or combination of different foods, drinks, and nutrients in diets, and the frequency with which they are habitually consumed."[1] The 2015-2020 DGA relied heavily on evidence linking eating patterns and health outcomes and notes that "dietary components of an eating pattern can have interactive, synergistic, and potentially cumulative relationships, such that the eating pattern may be more predictive of overall health status and disease risk than individual foods or nutrients."[2]

The DGA found that "strong evidence shows that healthy eating patterns and regular physical activity are associated with a reduced risk of CVD," which was the strongest grade for any chronic disease or health condition reviewed.[3] Healthy eating patterns were defined, in general, as including low-fat or fat-free dairy foods (such as milk, cheese or yogurt), vegetables from all subgroups, fruits (mostly whole), grains (half of them whole), a variety of protein foods and oils. The DGA recommends specific eating patterns to exemplify the general recommendations, including the Healthy U.S.-Style Pattern, which is unchanged from 2010, and the Healthy Vegetarian and Healthy Mediterranean-Style Patterns.

Dairy foods are an important source of a unique package of nutrients to the diets of Americans. The DGA recommends 3 daily servings of low-fat or fat-free dairy foods for those 9 years and older, 2½ for children 4-8 years and 2 for children 2-3 years in the Healthy U.S.-Style Eating Pattern.[3] At current average consumption (fewer than 2 servings per day), milk, cheese and yogurt contribute 54% of calcium, 56% of vitamin D, 14% of potassium, 18% of protein, 29% of vitamin A, 27% of vitamin B12, 25% of riboflavin (B2), 12% of magnesium and 17% of zinc to the U.S. diet, but only 11% of total calories.[3] Modeling studies find that when dairy foods are removed from healthy eating patterns, calcium, magnesium, iron, vitamin A and riboflavin (B2) drop below 100% of dietary goals, and vitamin D, potassium and choline drop even lower.[1] The nutrients in dairy foods are difficult to replace with other foods in a healthy eating pattern, including calcium-equivalent foods.[1,4]

1

For more information, please visit: http://www.nationaldairycouncil.org/evidence-summary

©2018 NATIONAL DAIRY COUNCIL: Whole and Reduced-Fat Dairy Foods and CVD Risk

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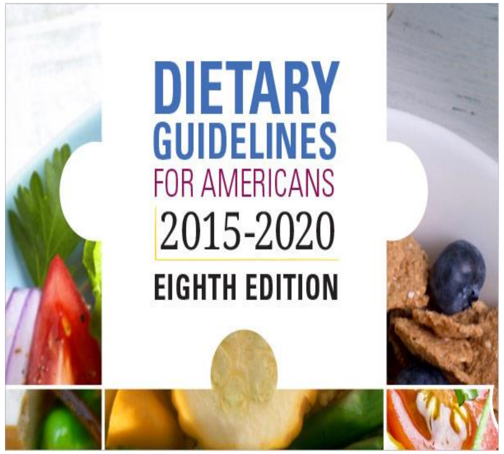
2005, 2010, 2015* Dietary Guidelines Recommend 3 Daily Servings of Dairy Foods for Those ≥9 years

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



The 2015 DGA states th
pa
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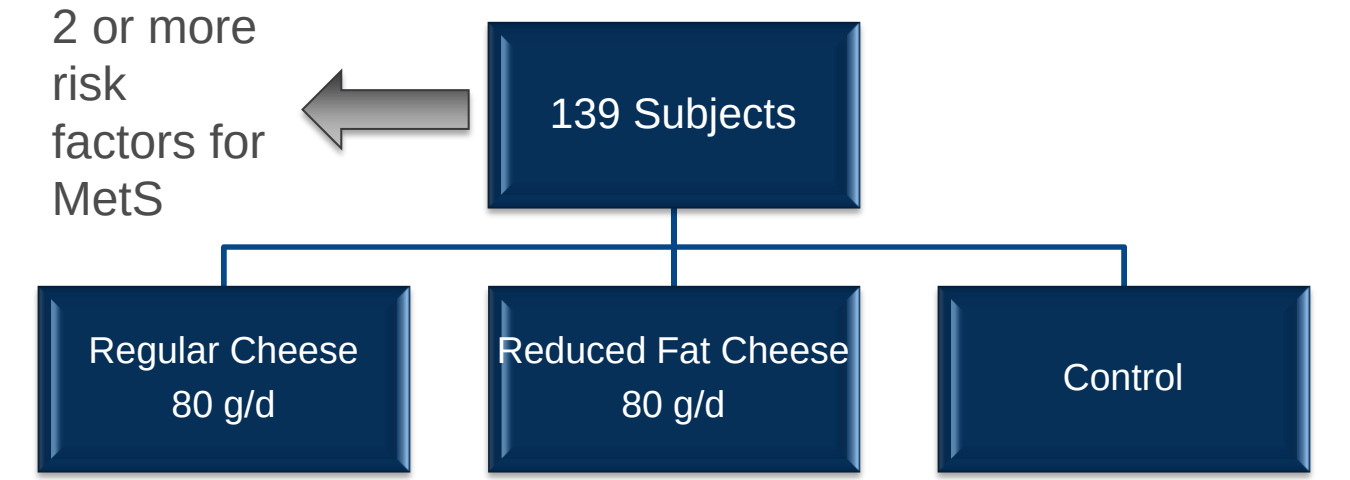
evide
evi has also linked
dairy ake to improved bone health,
especially in children and adolescents.

At least 10 systemic reviews/ meta-analyses & 13 cohort studies published between 2009-2017 suggest dairy food consumption – *regardless of fat content* – is not linked with higher risk for CVD, CHD or stroke

Dietary Guidelines for Americans, 2015-2020

Source: NDC Science Brief on Whole and Reduced-Fat Dairy Foods and Cardiovascular Disease

Cheese Consumption does not Impact Cholesterol Levels



1 oz cheese = 28g; 80g cheese = ~3 oz

The American Journal of CLINICAL NUTRITION

High intake of regular-fat cheese compared with reduced-fat cheese does not affect LDL cholesterol or risk markers of the metabolic syndrome: a randomized controlled trial[1,2]

Farinaz Raziani, Tine Tholstrup, Marlene D Kristensen,[3] Matilde L Svanegaard, Christian Ritz, Arne Astrup, and Anne Raben*

Randomized Controlled Trial
139 subjects

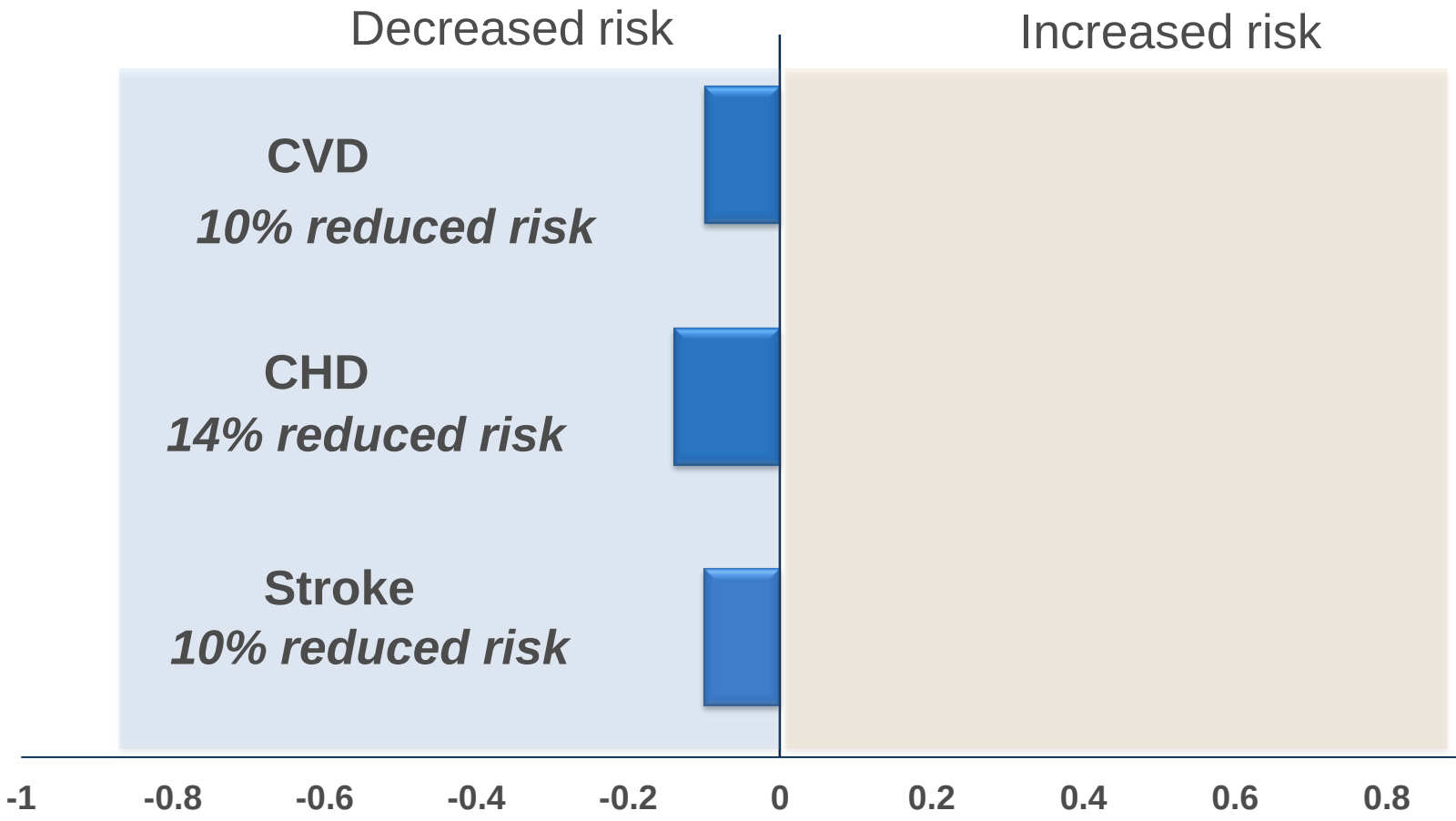
Results: No differences in total, LDL and HDL cholesterol

<u>Conclusion</u>: "A high daily intake of regular-fat cheese for 12 weeks did not alter LDL cholesterol or metabolic syndrome risk factors."

*NDC sponsored study

Raziani et al. *AJCN.* 2016; 104(4):973-81.

Meta-Analysis: Cheese Consumption is Associated with Reduced CVD Risk



EJCN
European Journal of Clinical Nutrition

Cheese consumption and risk of cardiovascular disease: a meta-analysis of prospective studies

15 Prospective Observational Studies
~340,000 participants

"This meta-analysis of prospective studies suggests a nonlinear inverse association between cheese consumption and risk of CVD."
"…the largest risk reductions observed at the consumption of approximately 40 g/d (~1.3 oz)"

Chen et al. *Eur J Nutr.* 2017; 56(8):2565-75.

Hypertension Results: Yogurt and DASH Scores

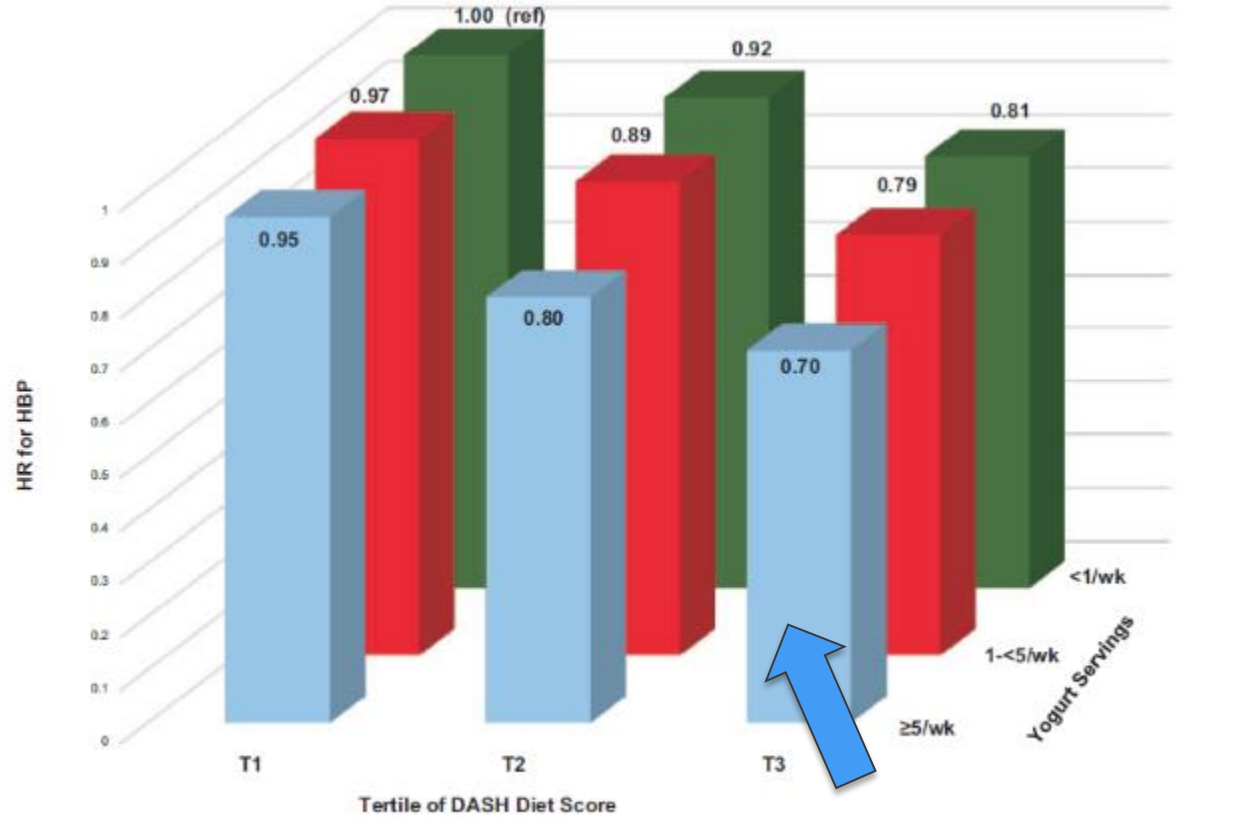


FIGURE 1 Pooled analysis of yogurt servings per week cross-classified with tertiles of a Dietary Approaches to Stop Hypertension diet score and risk of incident hypertension. Yogurt intake servings were classified into three categories of intake reflecting low, medium, and high intakes. DASH diet score were classified using tertiles of the score across the three cohorts. Analyses were adjusted for age, race, physical activity, energy intake, smoking, and family history of HBP. DASH, Dietary Approaches to Stop Hypertension; HBP, high blood pressure.

*NDC sponsored study

Journal of Hypertension

Long-term yogurt consumption and risk of incident hypertension in adults

Justin R. Buendia[a], Yanping Li[b], Frank B. Hu[b], Howard J Cabral[c], M. Loring Bradlee[a], Paula A. Quatromoni[d], Martha R. Singer[a], Gary C. Curhan[e], and Lynn L. Moore[a]

3 Cohort Studies (NHS I & II, HPFS)
~184,000 participants

"Higher total dairy intake (3 to <6 servings/day), especially in the form of yogurt (at least 5 servings/week), was associated with lower risk of incident HBP in middle-aged and older adult men and women."

Buendia JR et al. *J of Hypertension*. 2018;36(8):1671-79.

Yogurt Consumption Associated with Reduced Cardiovascular Disease Risk in Adults with Hypertension

METHODOLOGY

How many people participated?

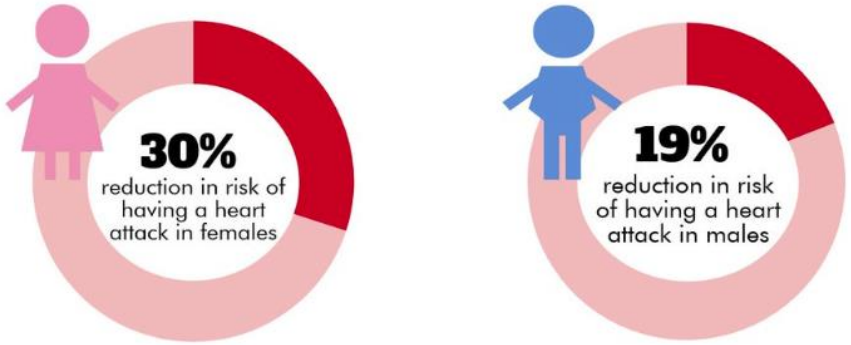
Data from more than 55,000 females in the Nurses' Health Study and 18,000 males in Health Professionals Follow-up Study was analyzed.

What did the researchers study?

The association between eating yogurt and CVD risk (myocardial infarction and stroke) among adults with high blood pressure.

RESULTS

Eating at least 2 cups of yogurt per week



*NDC spon

AJH AMERICAN JOURNAL OF HYPERTENSION

Regular Yogurt Intake and Risk of Cardiovascular Disease Among Hypertensive Adults

Justin R. Buendia,[1] Yanping Li,[2] Frank B. Hu,[2] Howard J. Cabral,[3] M. Loring Bradlee,[1] Paula A. Quatromoni,[4] Martha R. Singer,[1] Gary C. Curhan,[5] and Lynn L. Moore[1]

2 Cohort Studies (NHS & HPFS)
~74,000 participants

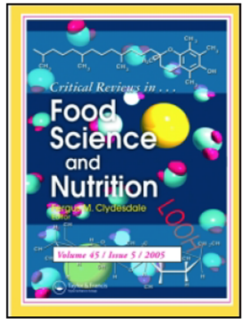
"Hypertensive men and women who consumed ≥2 servings/week of yogurt, especially in the context of a healthy diet, were at lower risk for developing CVD."

Buendia JR et al. *Am J Hypertension*. 2018; 31(5): 557 – 65.
Infographic adapted from Bell Institute:
https://twitter.com/bellinstitute/status/968546334163767296

Fermented Dairy Foods & Inflammation

Inflammation

- ✓ Eating dairy foods does not seem to be linked to increased inflammation
- ✓ In some cases eating dairy foods has been linked to reduced indicators of systemic inflammation



Critical Reviews in Food Science and Nutrition

Dairy products and inflammation: A review of the clinical evidence

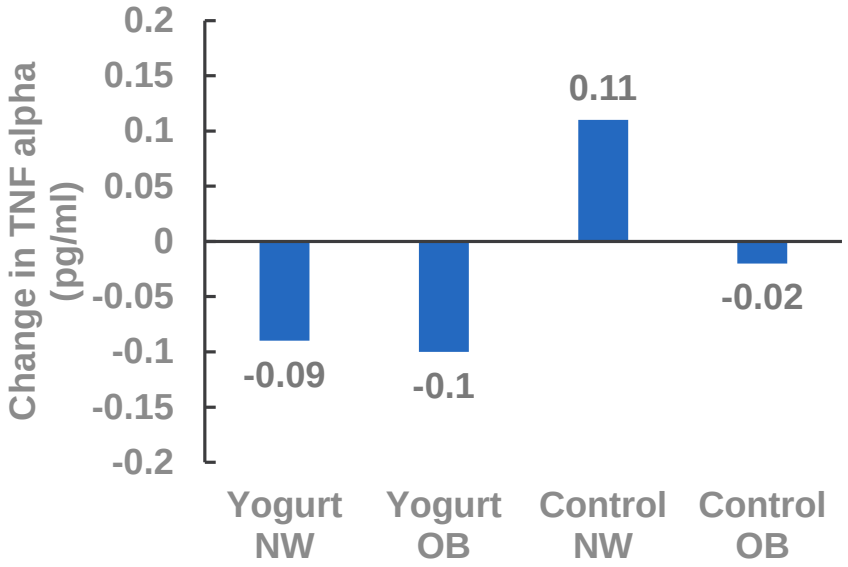
Alessandra Bordoni, Francesca Danesi, Dominique Dardevet, Didier Dupont, Aida S. Fernandez, Doreen Gille, Claudia Nunes dos Santos, Paula Pinto, Roberta Re, Didier Rémond, Danit R. Shahar & Guy Vergères

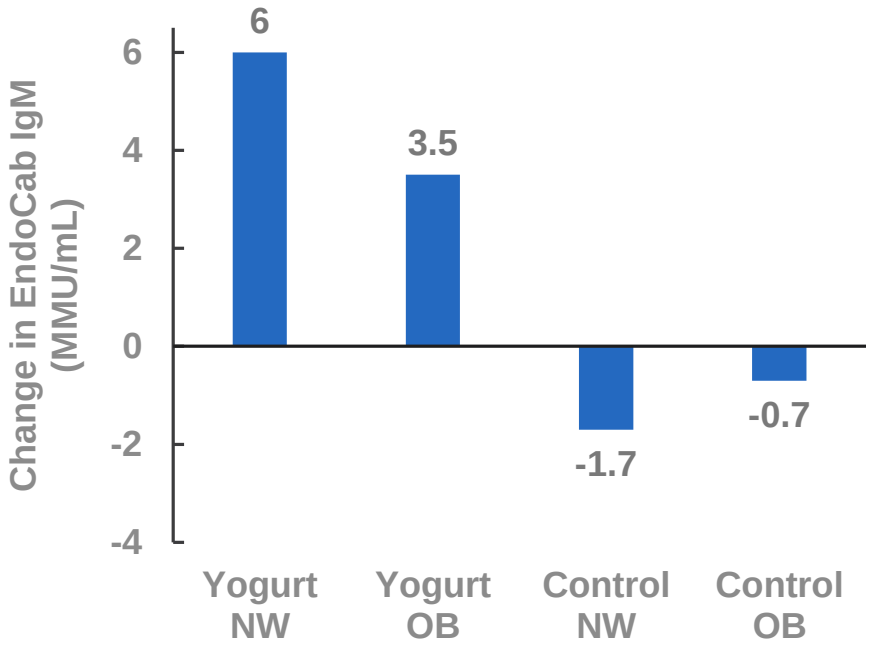
Systematic Review of 52 Clinical Trials

Eating Yogurt Linked to Reduced Inflammation and Improved Markers of Gut Integrity

BJN BRITISH JOURNAL OF NUTRITION

Low-fat yogurt consumption reduces biomarkers of chronic inflammation and inhibits markers of endotoxin exposure in healthy premenopausal women: a randomised controlled trial





Randomized Controlled Trial
128 premenopausal women

12 ounces (1.5 servings) of low-fat yogurt/day x 9 weeks = reduced biomarkers of chronic inflammation and improved markers for gut integrity - compared with a non-dairy control food

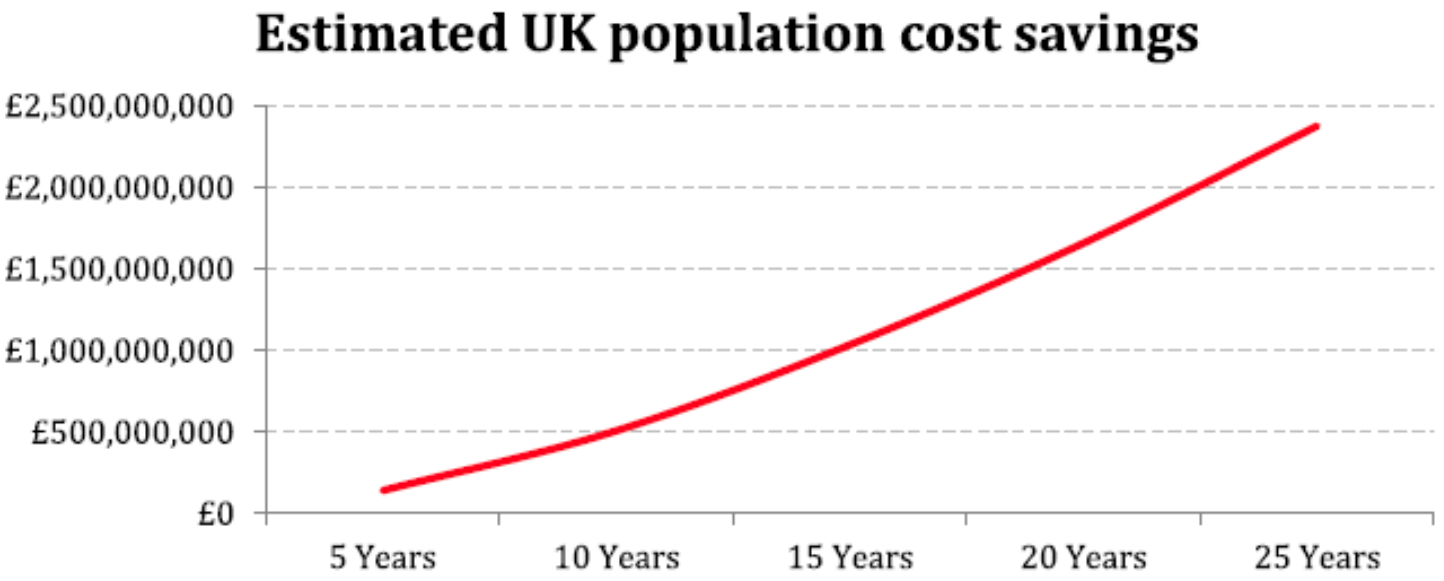
NW = normal weight
OB = obese

Yogurt = Yoplait Low-fat
Control = ZenSoy SoyPudding

*NDC sponsored study

Pei R et al. *Br J of Nutrition*. 2017; 118:1043-51.

Economic Model Predicts Increased Yogurt Consumption Could Reduce Health Care Costs



BMC Nutrition

RESEARCH ARTICLE Open Access

An economic model for the use of yoghurt in type 2 diabetes risk reduction in the UK

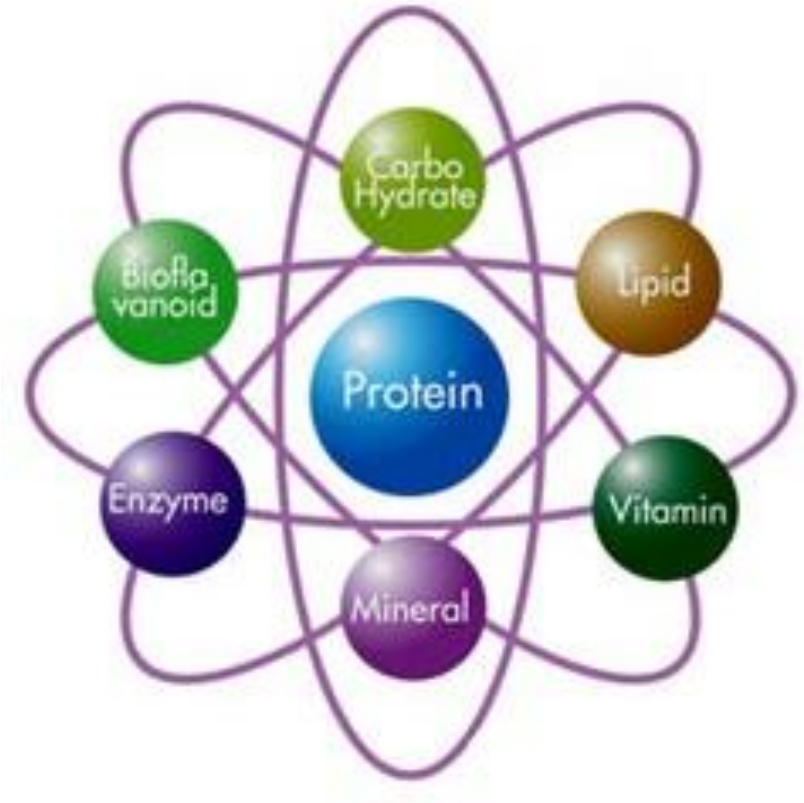
Irene Lenoir-Wijnkoop[1*], James Mahon[2], Lindsay Claxton[2], Alicia Wooding[2], Andrew Prentice[3,4] and Nick Finer[5]

Patient Simulation Model

Increasing average yogurt consumption by 100g/d could result in 388,000 fewer people developing T2D, which could save the UK £2.3bn

Dairy Foods Matrix

Dairy Foods' Matrix is Unique: Whole is Greater than the Sum of its Parts



Fermented Dairy Foods Matrix

DELIVERY OF LIVE FERMENTS TO THE GI TRACT

Microorganisms in the diet

The consumption of 'living' fermented foods potentially increases the numbers of microorganisms by up to 10 000-fold [10].

It could be equivalent to introducing new, albeit transient, bacteria into the indigenous, intestinal microbiota [1].

Practical vehicle

The delivery of microorganisms to the GI tract is supported by the food matrix, which promotes the long-term survival of microorganisms during distribution and storage [1].

The consumption of "live yogurt cultures in yogurt contributes to improve digestion of lactose in individuals with lactose maldigestion" [2].

YOGURT IN NUTRITION
INITIATIVE FOR A BALANCED DIET

For full list of references, visit: http://www.yogurtinnutrition.com/live-ferments-fermentation-of-milk-into-yogurt/

People are Asking…

Is this good for my body?

Is this good for the animals?

Is this good for the planet?

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."

In Only 70 Years, We've Reduced our Impact…

90% less land

65% less water

76% less manure

63% less GHG

The dairy community has a voluntary commitment to further reduce GHG 25% by 2020

US Dairy Stewardship Commitment

Capper J. Cady A. Bauman D. 2009. The environmental impact of dairy production; 1944 compared with 2007. Journal of Animal Science. 87:2160-2167

From Research to Resources and Recipes

Safety & Storage to Minimize Food Waste

Cheese

- Do not leave at room temperature for ≥2 hours, 1 hour if ≥90° F
- Keep refrigerator at 35-40° F
- Factor 20-30 minutes to come to room temp
  - **Soft Cheeses**: Toss after 2 hours
  - **Hard Cheeses**: Can sit out for 2 hours then wrap well; refrigerate to use again

Mold?

- **Soft Cheeses**:

  Don't eat
- **Hard Cheeses**:

  Cut ≥ 1" around and below the mold spot, re-cover the cheese in fresh wrap

What about freezing?

- Softer cheese freeze well when shredded
- Aged cheese may become crumbly
- Thaw 24-28 hours in refrigerator

https://dairygood.org/content/2016/how-long-can-cheese-sit-out
https://dairygood.org/content/2016/can-you-freeze-cheese
https://dairygood.org/content/2018/can-you-eat-moldy-cheese

Safety & Storage to Minimize Food Waste

Yogurt

- Do not leave at room temperature for ≥2 hours, 1 hour if ≥90° F
- Keep refrigerator at 35-40° F
- Stored properly, shelf-life: 7-14 days
- Store tightly covered in original container on top shelf of refrigerator
- Eating only a portion of a carton?
  - Spoon out what you intend to eat and return the carton to the refrigerator
- If separation occurs, stir the liquid (aka: whey) back into the yogurt
- What about freezing?
  - Changes texture; may lose active cultures
  - Won't significantly impact nutritional value

https://dairygood.org/content/2017/how-long-can-yogurt-sit-out
https://dairygood.org/content/2016/can-you-freeze-yogurt

Quick Tips for Adding More Fermented Dairy to Your Plate

Breakfast

- Add yogurt, kefir or buttermilk to your smoothies, granola or oatmeal
- Create a savory breakfast bowl and top with yogurt and shredded cheese

Lunch/Dinner

- Use yogurt in place of mayonnaise on your sandwiches
- Try a yogurt-based salad dressing or make your own ranch using buttermilk
- Top salads with flavorful cheeses to add depth

Snacks

- Create your own dips using buttermilk or yogurt as the base
- Create yogurt parfaits by layering yogurt with granola & fresh fruit

Bringing Science to the Table

Visit www.nationaldairycouncil.org/recipes
for inspiration on how to bring the benefits of fermented dairy foods to the table

RECIPE

9 Simple Ways to Help You Get 3 Servings of Dairy

LUNCH

Grilled Shrimp with Yogurt Cilantro Salsa

BREAKFAST

14 Tasty Twists on Overnight Oats

APPETIZER

Roasted Red Pepper Yogurt Dip

Conclusions

- Current Dietary Guidelines for American 9 years and older recommend 3 daily servings of dairy foods as part of healthy diet patterns
- Fermented dairy food consumption is on the rise and is associated with lower risk of type 2 diabetes and cardiovascular disease as part of healthy diet patterns
- Emerging evidence suggest a reduction in post-meal and chronic inflammation may be one of the mechanisms mediating these beneficial effects
- Foods are more than just the sum of their individual nutrients; the dairy foods/fermented dairy matrix is unique and needs to be considered collectively when looking to understand these health benefits

Dairy Nourishes NETWORK

Dairy Nourishes Network members will receive:

- 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

Questions?

Allison Koch, MS, RDN, CSSD
Director, Health & Wellness Partnerships
National Dairy Council

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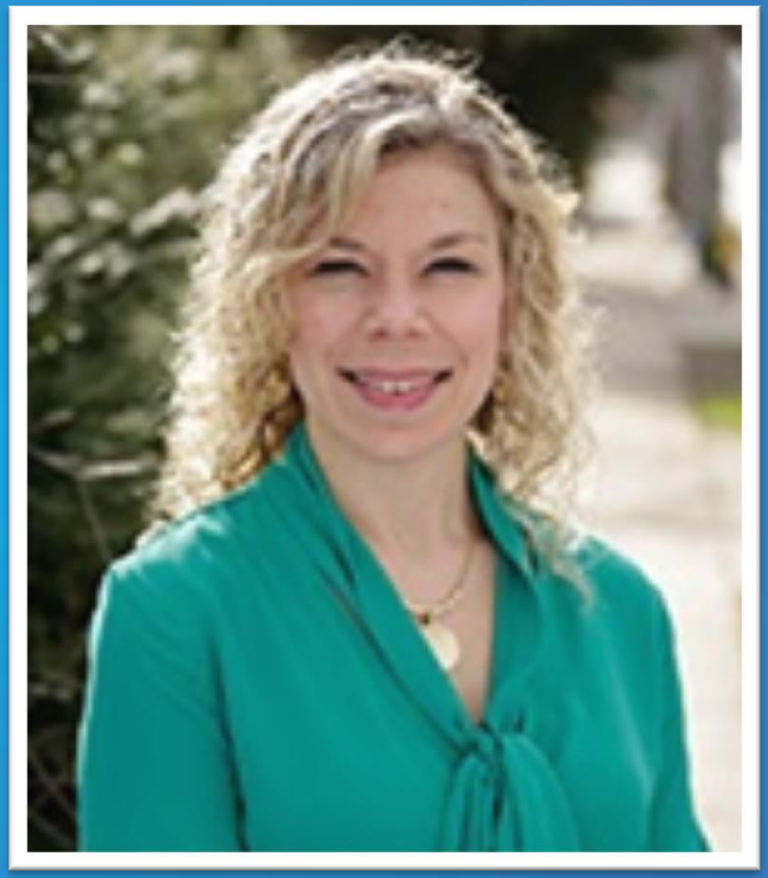
@RunningRDN



Thank You!

NationalDairyCouncil.org

@NtlDairyCouncil

#DairyNourishesLife

NATIONAL DAIRY COUNCIL™