



# Nutrition in ALD

Identifying ALD Standards of Care

Brooklyn 1/19/2018

Hong Brereton MS, LND, IBCLC





# Disclaimer/Talk Outline

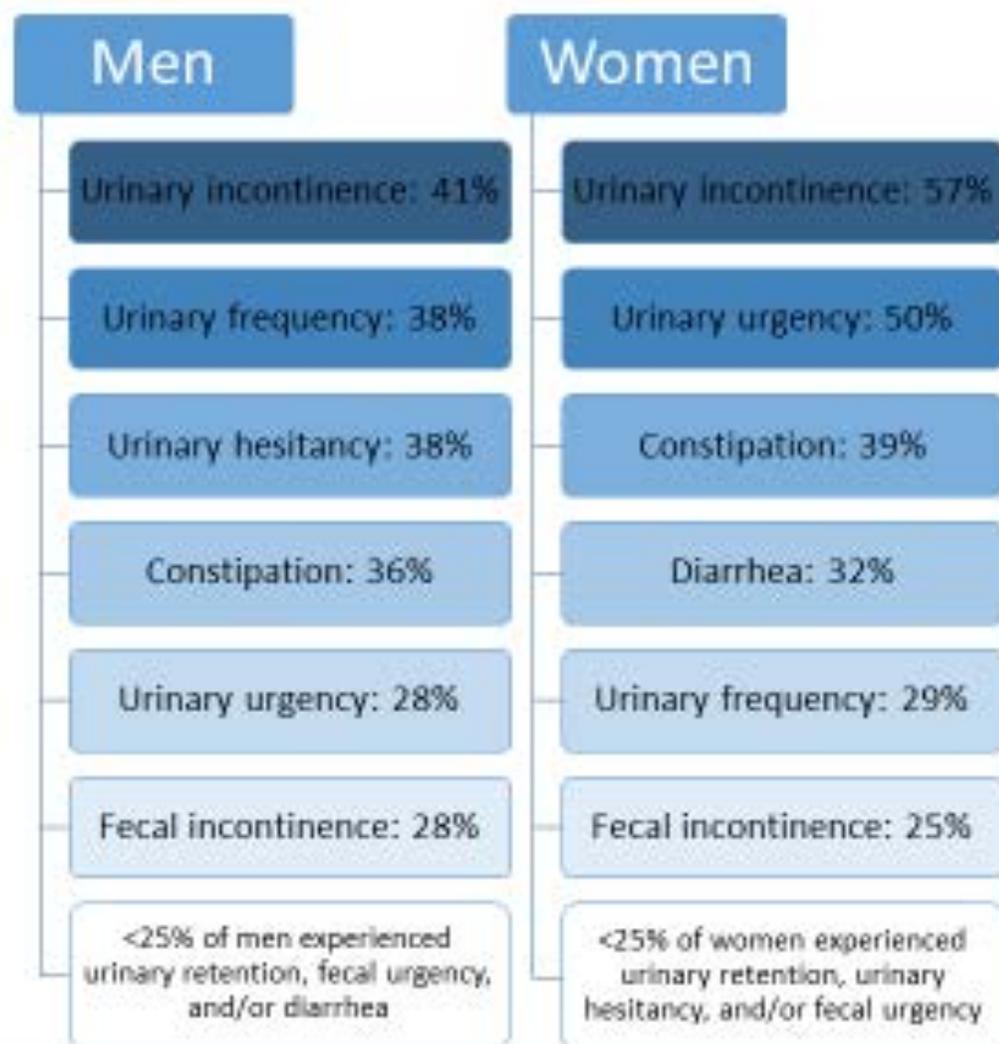
- Low fat diet and LO
- Step to look up a nutrient
- “Off label” helpful nutrition information for bowel health

# Urinary and Bowel Symptoms in AMN



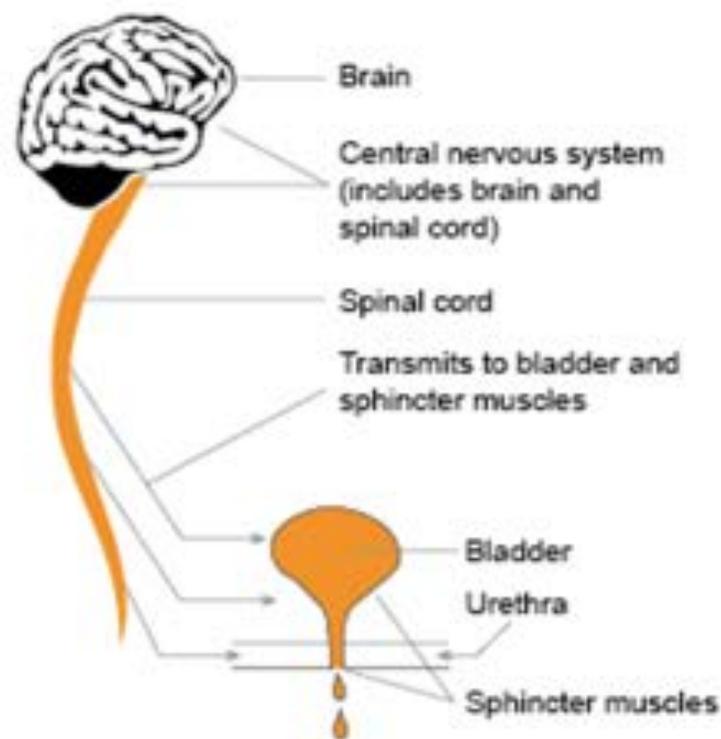
## Retrospective medical record review of 67 adult patients with an ABCD1 mutation:

- Age range 18 – 84 years
- Symptoms first appeared as early as the late teens
- Reports of urinary symptoms in 64% of men and 68% of women
- Reports of bowel symptoms in 44% of men and 64% of women





## Urinary and Bowel Symptoms in AMN: Medication Options



• **$\alpha$ -blockers:** Flomax (x2), Uroxatral (x1)

**Anti-cholinergics:** Detrol (x1)

**$\beta$ 3-agonists:** Myrbetriq (x4)

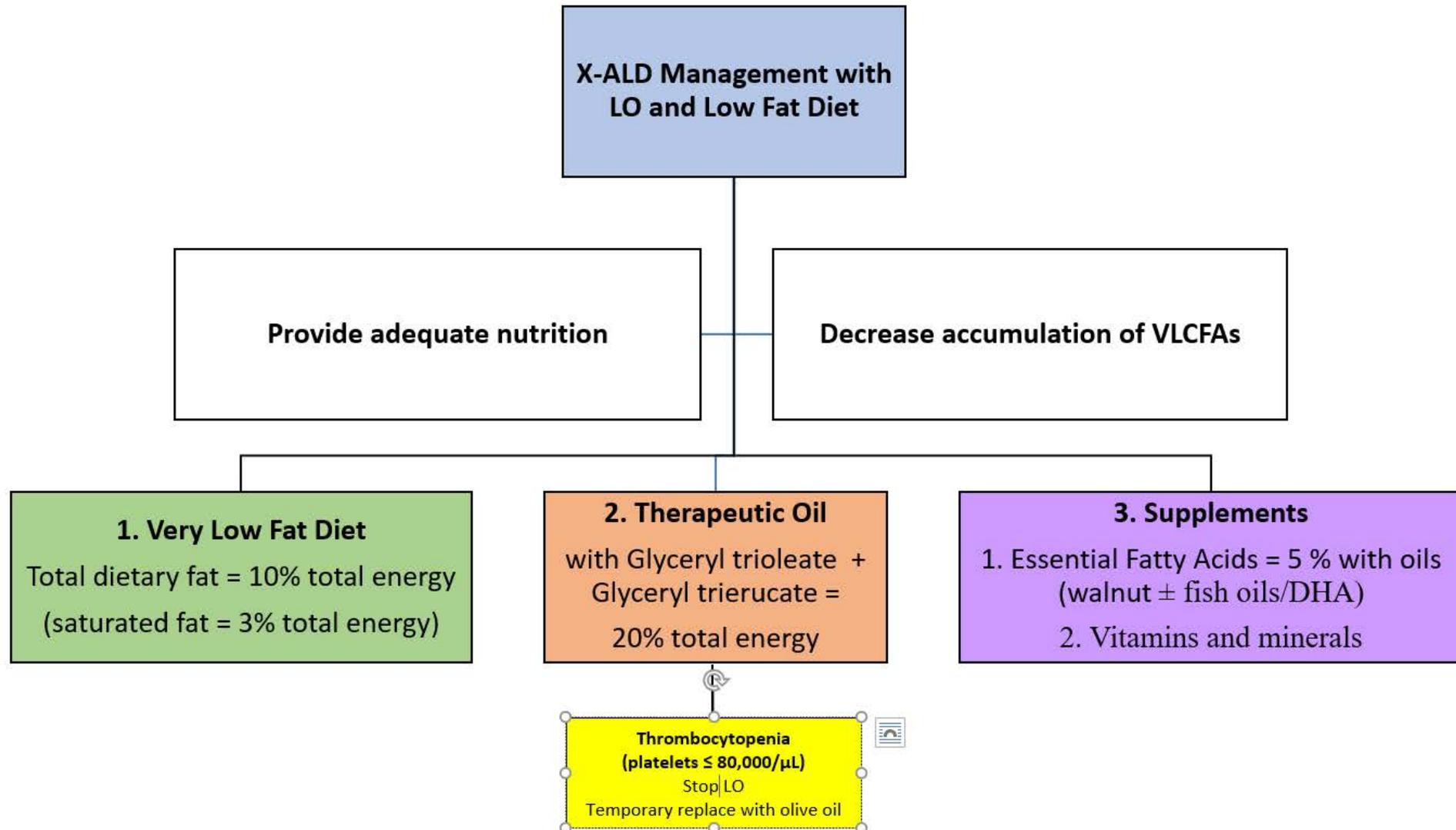
**Cholinergic agonists:** Urecholine (x1)

**Constipation Meds:** Linzess (x2), Senokot (x1), laxatives (x3), stool softeners (x2)

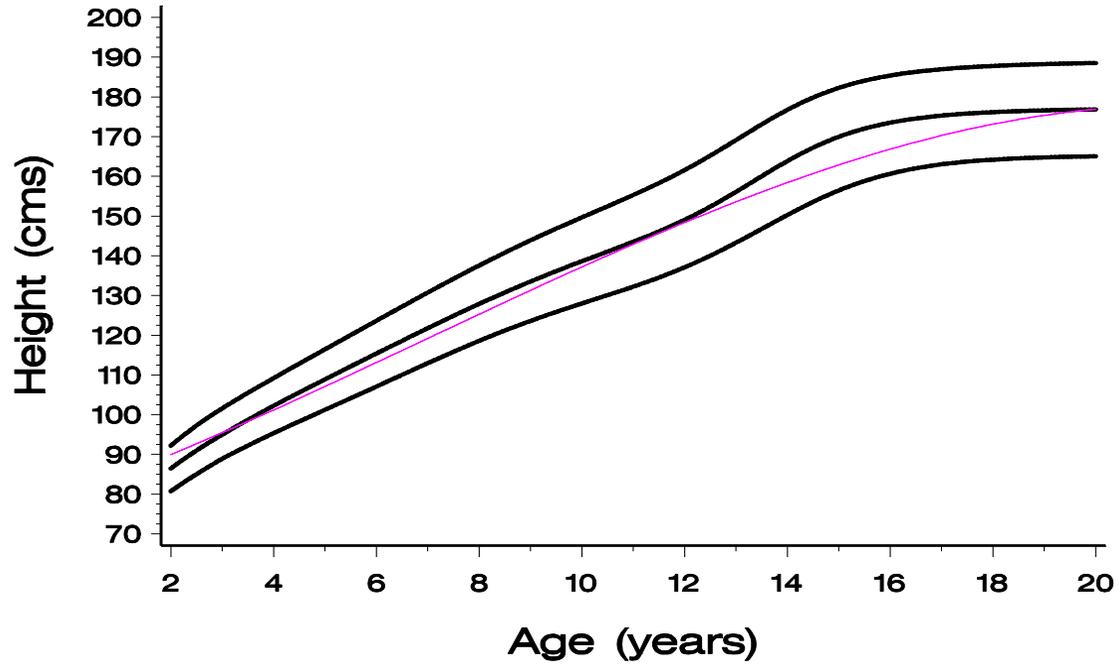
**Other Bowel Meds:** cortisone (x1), Protonix (x1), fiber supplements (x1), probiotics (x3)

# Low Fat, Low Saturated Fat Diet and Lorenzo's Oil

## Males 2 to 13 years

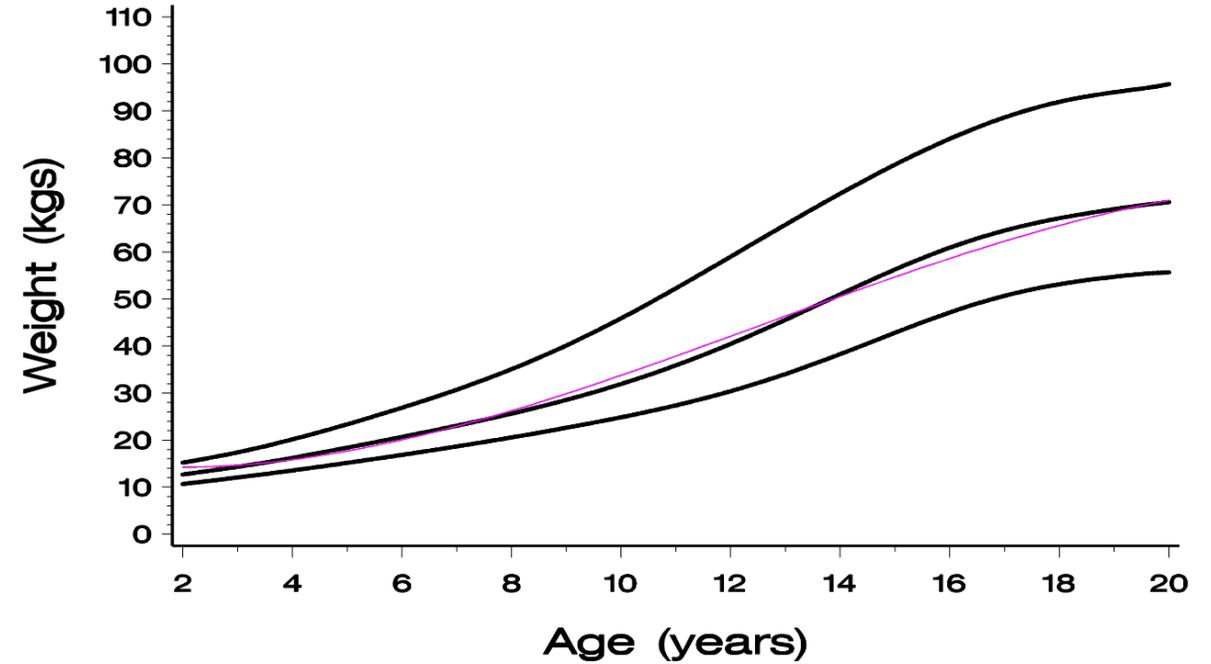


### ALD Study: Regression of Height on Age



Black lines represent median, 5th and 95th percentile CDC growth chart data for boys

### ALD Study: Regression of Weight on Age



Black lines represent median, 5th and 95th percentiles CDC growth chart data for boys

**n=130 & 501 visits**



# Nutrition Work Template

Aim 30-35% calories to come from all fats and oils:

\_ Calculate LO dose at 20% total calories

- $TC \times 0.2 = LO \text{ calories}$
- $LO \text{ cal} \div 8 = LO \text{ ml /day}$

\_ Calculate walnut oil dose at 5% total calories

- $TC \times 0.05 = WO \text{ calories}$
- $WO \text{ cal} \div 8 = WO \text{ ml /day}$

\_ Calculate dietary fats:

- $(TC \times 0.1) \div 9 = \underline{\hspace{2cm}}$  g of total fat/day
- 1/3 for saturated fats

## Limit Saturated Fats

- **Animal sources and tropical oils:**

- \_ Beef fat: 37% S-FAs

- \_ Butter: 61% S-FAs

- **Plant sources:**

- \_ Coconut: 90% S-FAs

- \_ Palm: 48% S-FAs

- \_ Peanut: 16% S-FAs but high C26:0

## Have Good Fats

- **Plant sources:**

- \_ Make Olive oil the main food oil:

- \*12-14 % S-FAs

- \*10.5 % poly unsaturated FAs

- \*73% mono-unsaturated Fas

- \_ Other oils: 10 to 16% S-FAs

- \_ Avocado

## Fatty Acid Composition of Fats and Oils

### Percent of Total Fatty Acids

Kind of Fat or Oil	Saturated	Monounsaturated	Polyunsaturated
Safflower oil	9	13	78
Sunflower oil	11	20	69
Corn oil	13	25	62
Olive oil	14	77	9
Soybean oil	15	24	61
Peanut oil	18	48	34
Sockeye salmon oil	20	55	25
Cottonseed oil	27	19	54
Lard	41	47	12
Palm oil	51	39	10
Beef tallow	52	44	4
Butterfat	66	30	4
Palm kernel oil	86	12	2
Coconut oil	92	6	2

# USDA Nutrient Database

- Step 1: <https://ndb.nal.usda.gov/ndl>
- Step 2: select “**Nutrient List**”

*First, Second, Third Nutrients*

*All Foods or Abridged List*

*Can select food groups*

*Sort by nutrient content (highest to low) or food name (A,B,C....)*

*Amount by “Household” measurements or 100 grams*

**\*First Nutrient:**

Select a nutrient

**Second Nutrient:**

Select a nutrient

**Third Nutrient:**

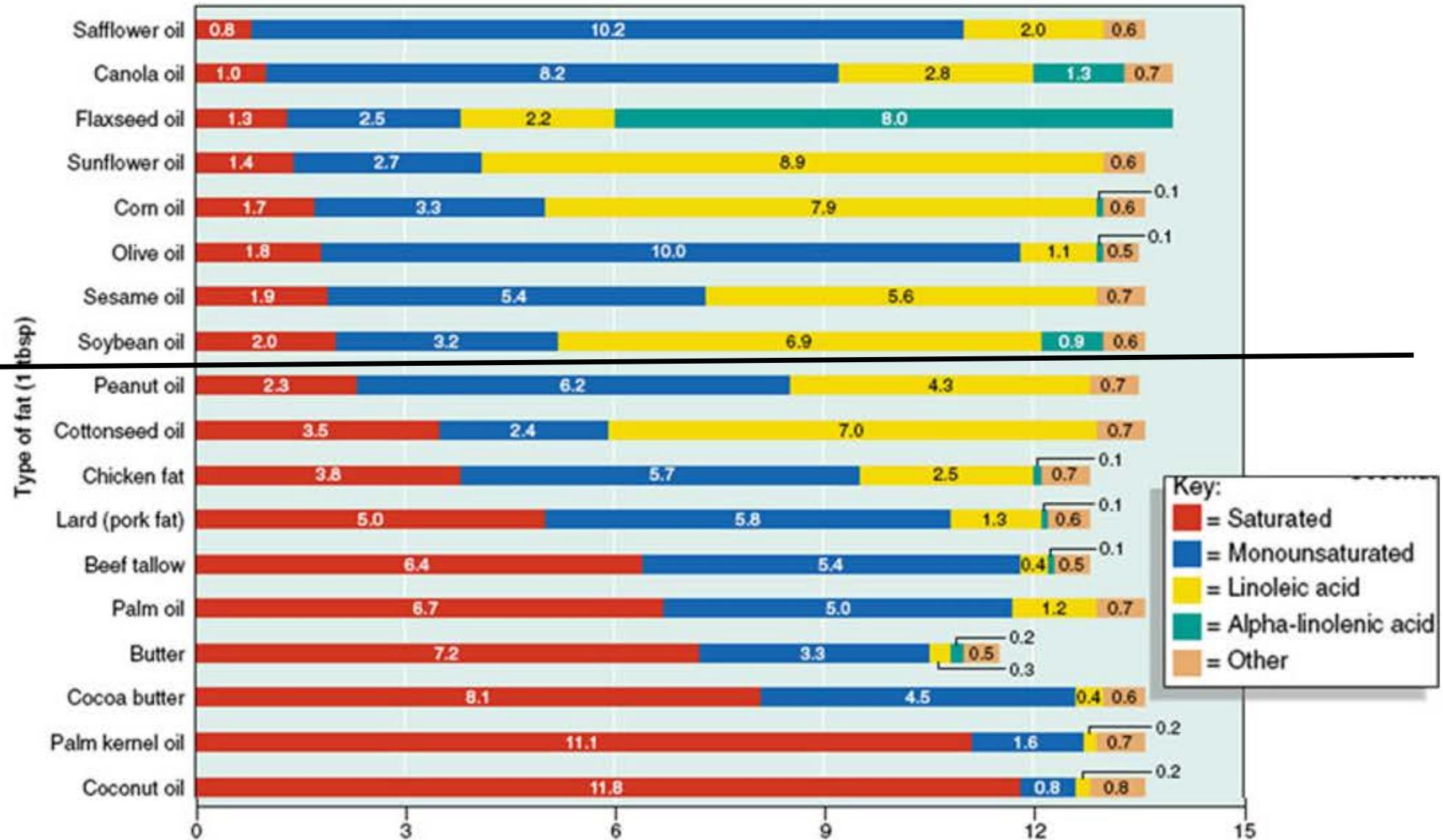
Select a nutrient

**Food Subset:** ?

All Foods

**Food Groups:** *Select food groups (10 maximum)*

## A COMPARISON OF SATURATED AND UNSATURATED FATTY ACIDS IN DIETARY FATS AND OILS



Fat g /tablespoon

[https://www.uccs.edu/Documents/danderso/fats\\_oils.pdf](https://www.uccs.edu/Documents/danderso/fats_oils.pdf)

**\*First Nutrient:**

Fatty acids, total saturated (g)

**Second Nutrient:**

Total lipid (fat) (g)

**Third Nutrient:**

Fiber, total dietary (g)

**Food Subset:** ?

Abridged List

**Food Groups:** *Select food groups (10 maximum)*

Select a foodgroup

**Sort by:**

Nutrient Content

**Measure by:**

Household

Go

Reset

NDB_No	Description	Weight(g)	Measure	Fatty acids, total saturated (g) Per Measure
19182	Desserts, mousse, chocolate, prepared-from-recipe	808.0	1.0 recipe yield	73.940
01053	Cream, fluid, heavy whipping	120.0	1.0 cup, whipped	27.638
01030	Cheese, muenster	132.0	1.0 cup, diced	25.229
01009	Cheese, cheddar	132.0	1.0 cup, diced	24.904
01167	Cheese, mexican, queso chihuahua	132.0	1.0 cup, diced	24.873
01040	Cheese, swiss	132.0	1.0 cup, diced	24.060
01052	Cream, fluid, light whipping	120.0	1.0 cup, whipped	23.204
01035	Cheese, provolone	132.0	1.0 cup, diced	22.543
01044	Cheese, pasteurized process, swiss	140.0	1.0 cup, diced	22.463



## Food High in Saturated Fats

- Page # 1: 25 top foods with 74-11 g/serve (cup or 1 common eaten item).
- They are: cream based dessert (mousse), heavy whipping cream, cheese, pie, coconut, fast foods, peanut, whole milk, beef fat, salami, candies with chocolate & nut, butter, fried fast foods, biscuit (Popeyes), sausage, red meats (beef, lamb..), fried chicken, pizza, tallow, chocolate chip cookies....



ALD/AMN Who are not on Therapeutic Diet

Consider “Off Label Diets”

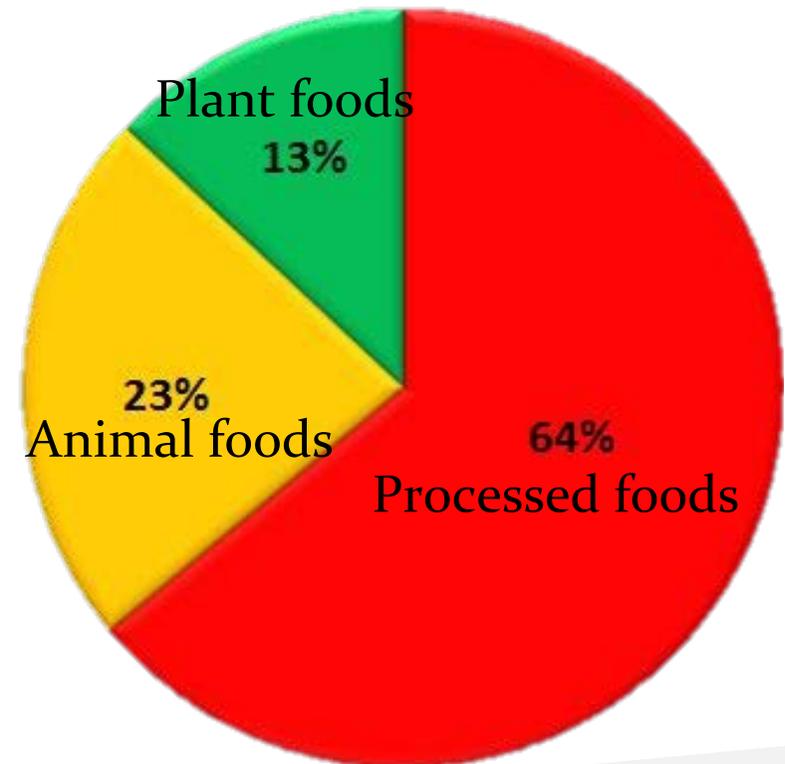
Known To Promote Low Saturated Fats

- DASH diet
- Mediterranean diet/PREMEDS
- MIND diet



# Standard American Diet (SAD!) Based on Calories Consumed per UDSA

- \_ High in **meat**, dairy, fat, **sugar**
- \_ High refined, processed foods





# Low Saturated Fat Diet Timeline

Mediterranean Diet (MedDiet)

1940-1950

Cardiovascular Disease

US MIND Diet

2015

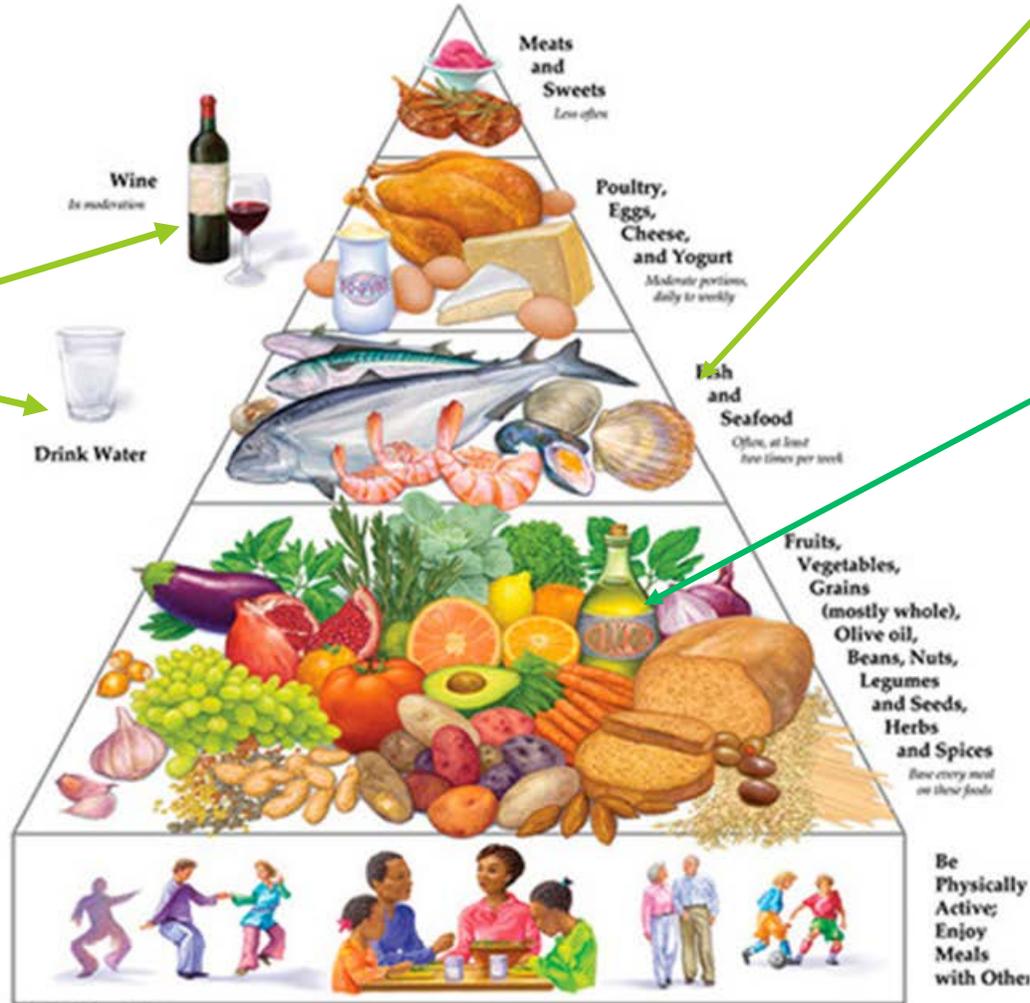
Slow neurodegeneration



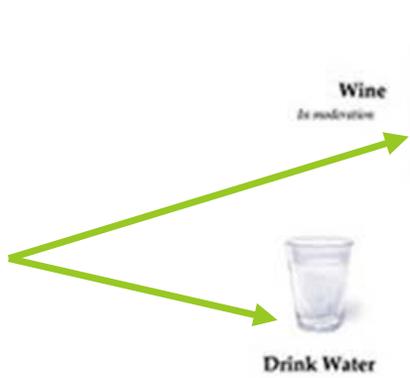
US DASH Diet  
1992  
Hypertension  
LF, LSF, LS

Spain PREDIMED  
2005-2010  
MedDiets + EVOO  
MedDiet + mixed nut  
LF control diet

## Mediterranean Diet Pyramid



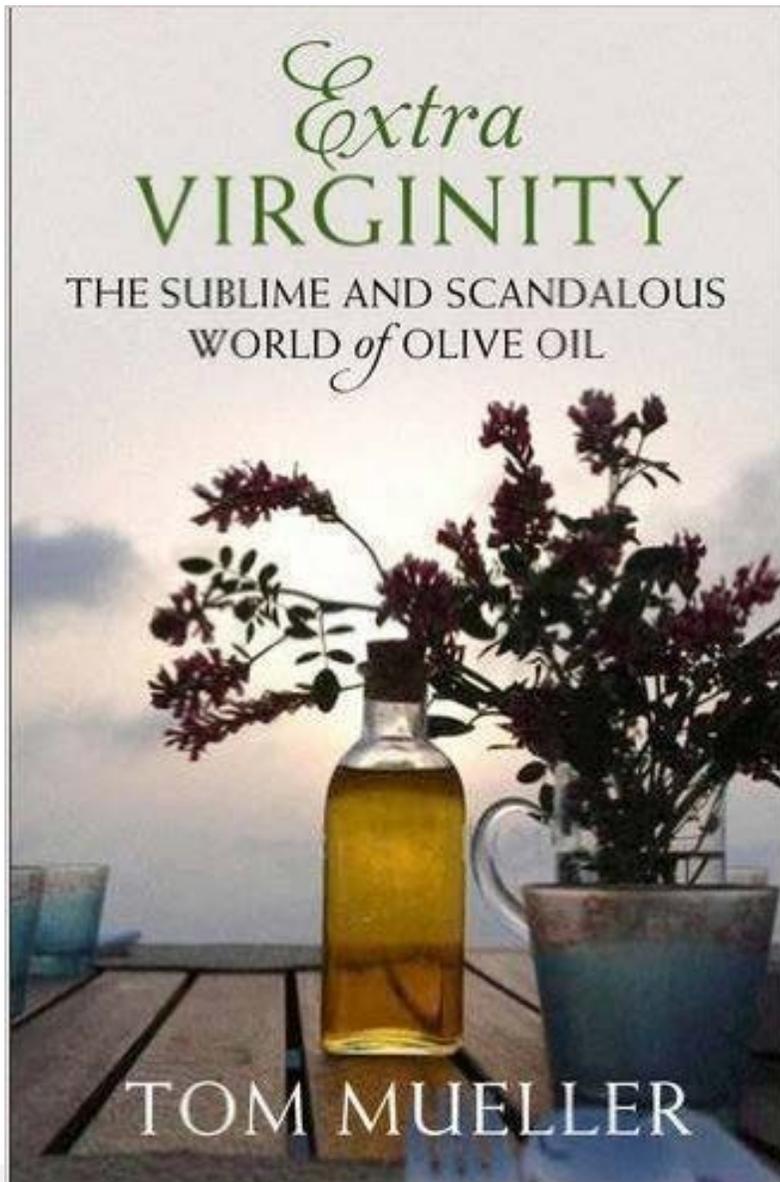
Red  
wines  
&  
water



More fruits & nuts, vegetables, legumes & minimally processed cereals) plus more fish, seafood. Decrease butter and other dairy, t butter, other dairy products and meat. Cook with olive oil.



EVOO  
Spain PREDIMED Sub Study



## Extra Virgin Olive Oil (EVOO)

Fatty acid	Percentage
<u>Oleic acid</u>	55 to 83%
<u>Linoleic acid</u>	3.5 to 21%
<u>Palmitic acid</u>	7.5 to 20%
<u>Stearic acid</u>	0.5 to 5%
<u><math>\alpha</math>-Linolenic acid</u>	0 to 1.5%

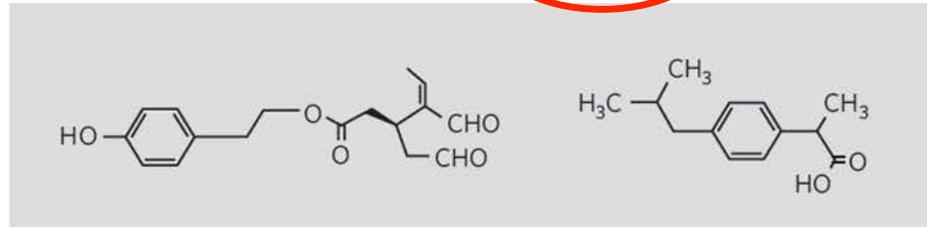
- \_Olive is cold mechanically pressed to extract the oil
- \_No heat or chemicals have been used during the extraction process
- \_Pure and unrefined
- \_Highest levels of polyphenols (up to 36 types), they are antioxidants that have been linked with better health
- \_Often are adulterated by mixing with other vegetable oils

## BRIEF COMMUNICATIONS

## Ibuprofen-like activity in extra-virgin olive oil

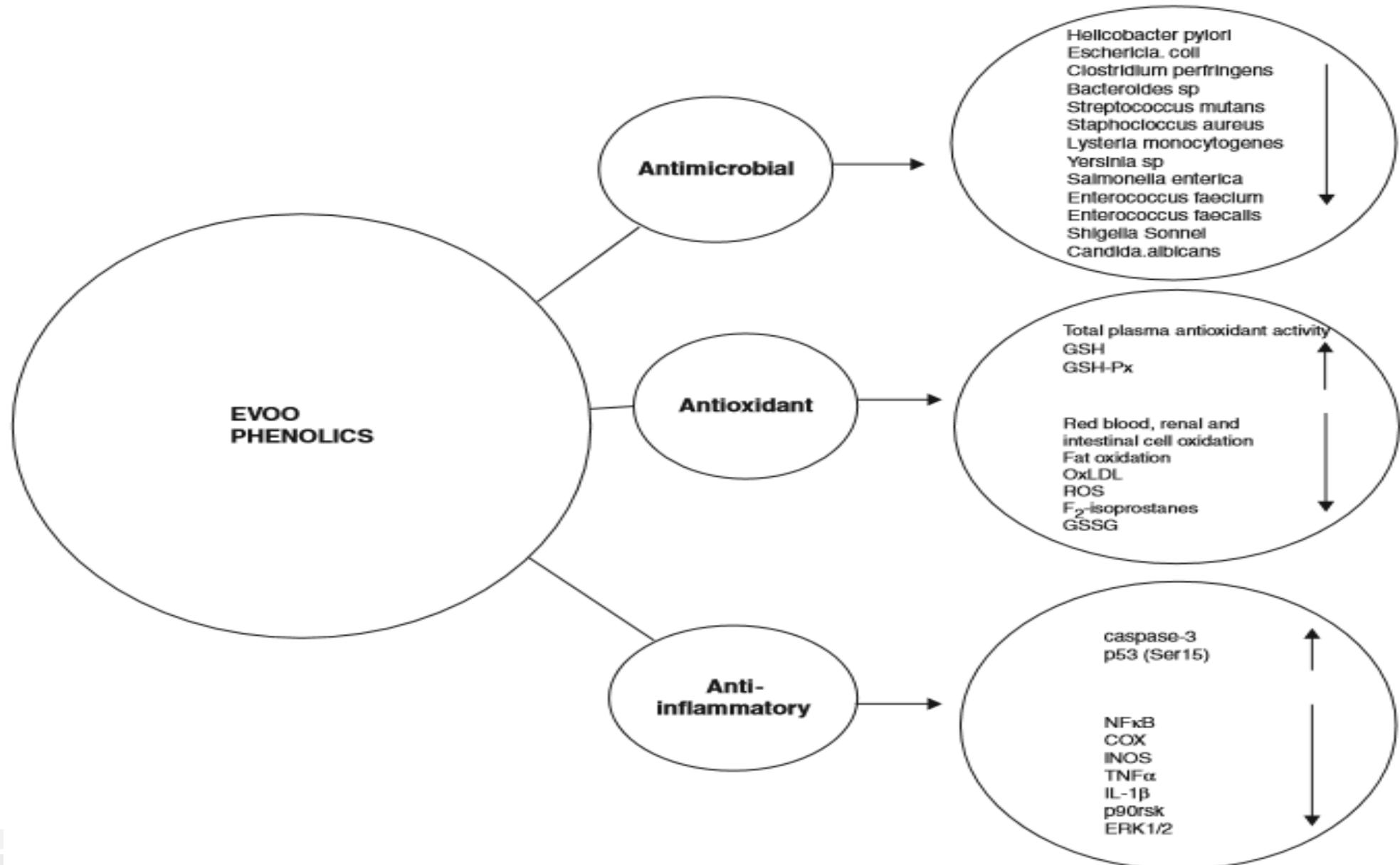
Enzymes in an inflammation pathway are inhibited by **oleocanthal**, a component of olive oil.

Newly pressed extra-virgin olive oil contains oleocanthal — a compound whose pungency induces a strong stinging sensation in the throat, not unlike that caused by solutions of the non-steroidal anti-inflammatory drug ibuprofen<sup>1</sup>. We show here that this similar perception seems to be an indica-



**Figure 1 | Structures of (–)oleocanthal (left) and the anti-inflammatory drug ibuprofen (right).** How they underpin the similar throat-irritating and pharmacological properties of the two compounds is unclear as yet.

inhibitor of the cyclooxygenase enzymes COX-1 and COX-2, but not of lipoxygenase<sup>4</sup>, which catalyse steps in the biochemical inflammation pathways derived from arachidonic acid. We found that, like ibuprofen, both enantiomers of oleocanthal caused dose-dependent inhibition of



### Vegetable oils

Type	Processing Treatment	Saturated fatty acids <sup>[17]</sup>	Mono-unsaturated fatty acids <sup>[17]</sup>	Polyunsaturated fatty acids			Oleic acid (ω-9)	Smoke point
				Total poly <sup>[17]</sup>	linolenic acid (ω-3)	Linoleic acid (ω-6)		
Avocado		11.560	70.554	13.486	1	12.5		480 °F (249 °C)
Canola (rapeseed)		7.365	63.276	28.142	10	10		400 °F (204 °C)
<b>Coconut</b>		<b>91.000</b>	<b>6.000</b>	<b>3.000</b>		<b>2</b>	<b>6</b>	<b>350 °F (177 °C)</b>
Corn <sup>[20]</sup>		12.948	27.576	54.677	1	58	28	450 °F (232 °C)
Cottonseed		25.900	17.800	51.900	1	54	19	420 °F (216 °C)
Flaxseed/Linseed (European) <sup>[21]</sup>		7.500	15.500	79.000	64	15	11	225 °F (107 °C)
Olive		14.000	72.000	14.000	1.5	15		380 °F (193 °C)
Palm		49.300	37.000	9.300		10	40	455 °F (235 °C)
Peanut		16.900	46.200	32.000		32	48	437 °F (225 °C)
Safflower (>70% linoleic)		8.000	15.000	75.000				410 °F (210 °C)
Safflower (high oleic)		7.541	75.221	12.820				410 °F (210 °C)
Soybean		15.650	22.783	57.740	7	50	24	460 °F (238 °C)
Sunflower (<60% linoleic)		10.100	45.400	40.100	0.2	39.8	45.3	440 °F (227 °C)
Sunflower (>70% oleic)		9.859	83.689	3.798				440 °F (227 °C)



## To get most health benefits from EVOO

- Primary oil in diet
- Unheated :
  - drizzled over fish, meat, steamed vegetables or baked potatoes
  - salad dressings
  - bread dipper, as the base for mayonnaise and uncooked
- Pair it with foods, find the right match
  - Use a mild to medium strength oil for salad dressings or as a condiment over mild food, such as mozzarella
  - Switch to a robust olive oil to drizzle over fresh tomatoes or a hearty dish



## DASH Diet

**D**ietary **A**pproaches to  
**S**top **H**ypertension

\_No Special Food

\_Low salt, 1500 - 2300 mg  
sodium/day

\_Low fat, low saturated  
fats

[https://www.nhlbi.nih.gov/files/docs/public/heart/dash\\_brief.pdf](https://www.nhlbi.nih.gov/files/docs/public/heart/dash_brief.pdf)

## Following the DASH Eating Plan

Use this chart to help you plan your menus—or take it with you when you go to the store.

**Fat-free or low-fat milk and milk products**

**Lean meats, poultry, and fish**

**Nuts, seeds, and legumes**

Food Group	Servings Per Day			Serving Sizes	Examples and Notes	Significance of Each Food Group to the DASH Eating Plan
	1,600 Calories	2,000 Calories	2,600 Calories			
Grains*	6	6-8	10-11	1 slice bread 1 oz dry cereal† ½ cup cooked rice, pasta, or cereal	Whole wheat bread and rolls, whole wheat pasta, English muffin, pita bread, bagel, cereals, grits, oatmeal, brown rice, unsalted pretzels and popcorn	Major sources of energy and fiber
Vegetables	3-4	4-5	5-6	1 cup raw leafy vegetable ½ cup cut-up raw or cooked vegetable ½ cup vegetable juice	Broccoli, carrots, collards, green beans, green peas, kale, lima beans, potatoes, spinach, squash, sweet potatoes, tomatoes	Rich sources of potassium, magnesium, and fiber
Fruits	4	4-5	5-6	1 medium fruit ¼ cup dried fruit ½ cup fresh, frozen, or canned fruit ½ cup fruit juice	Apples, apricots, bananas, dates, grapes, oranges, grapefruit, grapefruit juice, mangoes, melons, peaches, pineapples, raisins, strawberries, tangerines	Important sources of potassium, magnesium, and fiber
Fat-free or low-fat milk and milk products	2-3	2-3	3	1 cup milk or yogurt 1½ oz cheese	Fat-free (skim) or low-fat (1%) milk or buttermilk; fat-free, low-fat, or reduced-fat cheese; fat-free or low-fat regular or frozen yogurt	Major sources of calcium and protein
Lean meats, poultry, and fish	3-6	6 or less	6	1 oz cooked meats, poultry, or fish 1 egg‡	Select only lean meats; trim away visible fat; broil, roast, or poach; remove skin from poultry	Rich sources of protein and magnesium
Nuts, seeds, and legumes	3 per week	4-5 per week	1	½ cup or 1½ oz nuts 2 Tbsp peanut butter 2 Tbsp or ½ oz seeds ½ cup cooked legumes (dry beans and peas)	Almonds, hazelnuts, mixed nuts, peanuts, walnuts, sunflower seeds, peanut butter, kidney beans, lentils, split peas	Rich sources of energy, magnesium, protein, and fiber
Fats and oils§	2	2-3	3	1 tsp soft margarine 1 tsp vegetable oil 1 Tbsp mayonnaise 2 Tbsp salad dressing	Soft margarine, vegetable oil (such as canola, corn, olive, or safflower), low-fat mayonnaise, light salad dressing	The DASH study had 27 percent of calories as fat, including fat in or added to foods
Sweets and added sugars	0	5 or less per week	≤2	1 Tbsp sugar 1 Tbsp jelly or jam ½ cup sorbet, gelatin 1 cup lemonade	Fruit-flavored gelatin, fruit punch, hard candy, jelly, maple syrup, sorbet and ices, sugar	Sweets should be low in fat



## MIND Diet



- **M**editerranean-DASH **I**ntervention for **N**eurodegenerative **D**elay, funded by the National Institute on Aging
- Hybrid of DASH diet and MedDiet for Brain Health, Helped lower the risk of developing Alzheimer's disease
- Memory and Aging Project at Rush University 1997 to 2013
- 923 participants, aged 58 -98 years, followed on average 4.5 years of Rush Memory and Aging Project.
- Diet was assessed by a semiquantitative FFQ.



# MIND Diet



Alzheimer's & Dementia ■ (2015) 1-8

Alzheimer's  
&  
Dementia

## MIND diet associated with reduced incidence of Alzheimer's disease

Martha Clare Morris<sup>a,\*</sup>, Christy C. Tangney<sup>b</sup>, Yamin Wang<sup>a</sup>, Frank M. Sacks<sup>c</sup>,  
David A. Bennett<sup>d,e</sup>, Neelum T. Aggarwal<sup>d,e</sup>

<sup>a</sup>Department of Internal Medicine and the Rush Alzheimer's Disease Center at Rush University Medical Center, Chicago, IL, USA

<sup>b</sup>Department of Clinical Nutrition and the Rush Alzheimer's Disease Center at Rush University Medical Center, Chicago, IL, USA

<sup>c</sup>Department of Nutrition, Harvard School of Public Health, Boston, MA, USA

<sup>d</sup>Department of Behavioral Sciences and the Rush Alzheimer's Disease Center at Rush University Medical Center, Chicago, IL, USA

<sup>e</sup>Department of Neurology and the Rush Alzheimer's Disease Center at Rush University Medical Center, Chicago, IL, USA

Result estimated rate of getting AD:

- \_ 53% reduction for persons in the highest tertile MIND scores
- \_ 35% reduction for the middle tertile of scores compared to the lowest tertile scores

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES

Issue: *Nutrition in Prevention and Management of Dementia*

## Nutrition and risk of dementia: overview and methodological issues

Martha Clare Morris



Participants with top tertile MIND diet score had a slower rate of cognitive decline approximately equivalent to being **7.5 years younger in age**.

**Dark leafy vegetables had strongest protective effects** against cognitive decline, those who had 2 servings leafy green vegetables/day was the equivalent of being **11 years younger in age**, compared with those who rarely/never consumed green leafy vegetables.

# MIND Diet Score

For having 10 brain-healthy food groups

\_ **Green leafy vegetables** (lutein, folate, vitamin E, beta carotene, and polyphenols, nutrients that have been related to brain health)

\_ **Berries** (a source of polyphenols)

\_ **Fish & seafood** (source of n-3 fatty acids)

\_ Legume, poultry, nuts, beans (low/good fat source of protein)

\_ Wine, whole grains

\_ EVOO (source of MUFS and Polyphenols),

Discourage 5 unhealthy food groups

- red meats, butter and stick margarine, cheese, pastries and sweets, and fried/fast food.

Green, leafy vegetables – daily



Other vegetables – daily



Nuts – at least once a day



Berries – at least twice a week



Beans or legumes – at least every other day



Whole grains – at least 3 servings a day



Fish – at least once a week



Poultry – at least twice a week



Olive oil – always in place of butter



Wine – 1 5-ounce glass of red wine a day



# What If I Have No Time To Cook?

## Try Black Bean and Corn Taco Salad !



### Ingredients

- 1/2 cup canned black beans, drained & rinsed
- 1/2 cup corn kernels (fresh, canned or frozen)
- 1/2 cup tomatoes, diced
- 1 cup romaine lettuce, grated
- 2 tablespoons salsa
- 1 teaspoon fresh lime juice
- 1 ounce grated low fat cheddar cheese

<http://blog.myfitnesspal.com/5-no-cook-meals-under-500-calories/>

utm\_source=mfp&utm\_medium=email&utm\_campaign=MFP\_Newsletter\_Recipes\_20180104&os\_ehash=55@sfmc:52799266



# Antioxidants in Fruit and Vegetable/Nutrient Loss

\_Time between harvest and distribution: 5 days within US, days to weeks from Southern America

\_Storage:

- Squash, pumpkin, grapes, 8-10 weeks. Apples and pears up to 12 months. Berries 8 to 10 days

\_Displayed typically 3 days before purchase

\_Effect of processing:

- water-soluble vitamins (C, B and the polyphenolics) are degraded by processing treatments and may be leached into cooking water or the canning medium.
- Fat-soluble vitamins A and E and carotenoids may be released from their cellular matrices by thermal, freezing, high-pressure, or other preservation treatments.
- Game Plan:
  1. Buy local when possible or grow your own
  2. Eat raw, use fast cooking method.
  3. Share your tips !



# Fiber or Lack of Fiber Have a Role in Constipation?

- USDA Nutrient Database: 871 foods that have 30 to 0 g fiber/serve

\_Beans (All kind include black eye peas and Edamame)

\_Fruits with skin on (Pear, Apple, Berries, breadfruit) and dried fruits

\_Nuts, seeds

\_Whole grain flour, Fiber One cereal, squash, corn meal, currants, raisin, whole wheat pasta, brown rice

\_Vegetables potato with skin on, greens...



# Nutrition Report on Constipation

796 ORIGINAL CONTRIBUTIONS

nature publishing group

GI DISORDERS

## Association of Low Dietary Intake of Fiber and Liquids With Constipation: Evidence From the National Health and Nutrition Examination Survey

Alayne D. Markland, DO, MSc<sup>1,2</sup>, Olafur Palsson, PsyD<sup>3</sup>, Patricia S. Goode, MSN, MD<sup>1,2</sup>, Kathryn L. Burgio, PhD<sup>1,2</sup>, Jan Busby-Whitehead, MD<sup>4</sup> and William E. Whitehead, PhD<sup>3</sup>

Data from 10,914 adults ( $\geq 20$  years) from the 2005 – 2008 cycles of the NHANES, 10 % women and 4% men experienced constipation and fluid consumption remained a predictor of constipation among both genders.

Fibers however not a predictor.

Food	Amount	Total Fiber (g)
Bran cereal	1/3 cup	8.6
Cooked kidney beans	1/2 cup	7.9
Cooked lentils	1/2 cup	7.8
Cooked black beans	1/2 cup	7.6
Canned chickpeas	1/2 cup	5.3
Baked beans	1/2 cup	5.2
Pear	1	5.1
Soybeans	1/2 cup	5.1
Quinoa	1/2 cup	5
Baked sweet potato, with skin	1 medium	4.8
Baked potato, with skin	1 medium	4.4
Cooked frozen green peas	1/2 cup	4.4
Bulgur	1/2 cup	4.1
Cooked frozen mixed vegetables	1/2 cup	4
Raspberries	1/2 cup	4
Blackberries	1/2 cup	3.8
Almonds	1 oz	3.5
Cooked frozen spinach	1/2 cup	3.5
Vegetable or soy patty	1 each	3.4
Apple	1 medium	3.3
Dried dates	5 pieces	3.3

- All-bran and 100% bran cereal
- Kidney, pinto, and navy beans
- Barley
- Buckwheat
- Whole wheat pasta
- Lentils and dried peas
- Fresh fruit and berries
- Dried fruit
- Fresh or frozen vegetables
- Corn
- Potatoes with skin
- Whole wheat bread
- Brown rice and wild rice
- Whole wheat couscous
- Quinoa

# Fibers and Regularity Benefits in Large Bowel



RESEARCH

Review



Understanding the Physics of Functional Fibers in the Gastrointestinal Tract: An Evidence-Based Approach to Resolving Enduring Misconceptions about Insoluble and Soluble Fiber

Johnson W. McRorie, Jr, PhD; Nicola M. McKeown, PhD



**Two mechanisms** drive a regularity/laxative benefit by increasing stool water content, provide the bulk and make easy to pass stools

1. Mechanically insoluble fiber irritates the gut mucosa to stimulate mucous/water secretion
2. Soluble gel-forming fiber retains a high-water holding capacity & resists dehydration

**Size of fiber particles matter:**

1. Large size/coarse insoluble fiber (wheat bran) have more laxative effect
2. Finer/smooth fibers (fine wheat bran) can have a constipating effect, add to the dry mass and decreases percent water content/hardening stools)

**Psyllium** with high water holding capacity and being a non-fermented gel-forming fiber can provide a dichotomous stool normalizing effect:

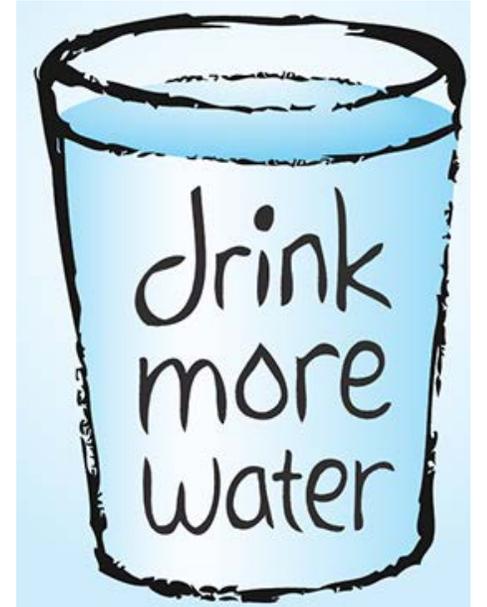
- soften hard stool in constipation
- firm-up loose/liquid stools in diarrhea, and normalizing stool form in patients with IBS

## Need Water Along with Fibers

Constipation defined as having infrequent as less than 3 bowel movements / week, elimination of small/hard stools that are difficult to pass

Water content of stool:

- \_Liquid stool ~ 90% water
- \_Soft stool ~ 77% water
- \_Formed stool ~ 75% water,
- \_Hard stool ~ 72% water.



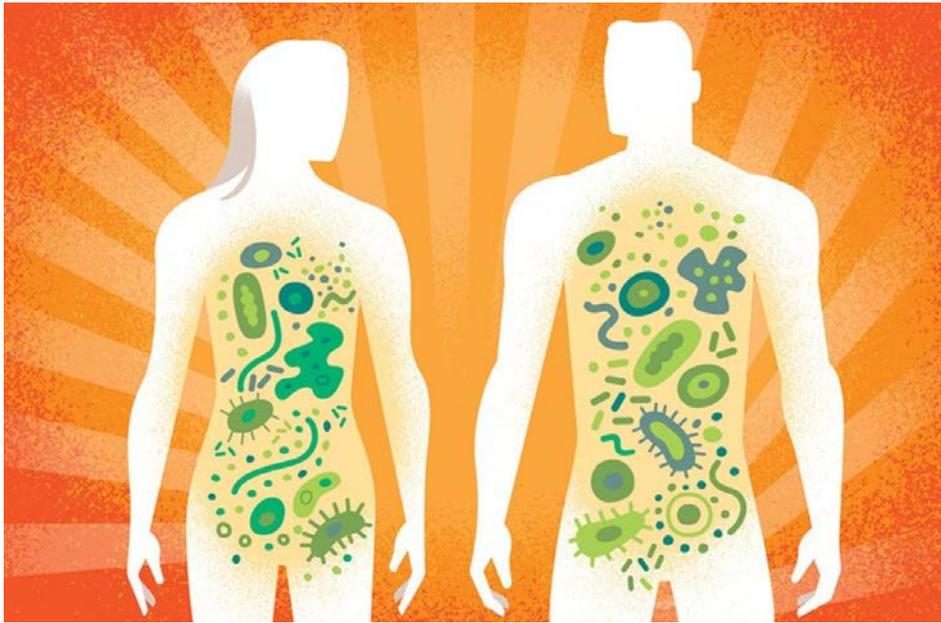
This 18% difference in stool water content represents a 240-fold increase in stool viscosity

AMN issues with fluid: Limit or Timing intake, share your tips! [chicagohealthandwellness.com](http://chicagohealthandwellness.com)

## Some High Fiber Rich Foods are Prebiotic Source

- Fiber and Liquid Best go hand in hand
  - \_Fruit Salad with Fruits and lot of Juice
  - \_Bean based soup
  - \_Asian liquid dessert with Chia/Basil seeds and fruit

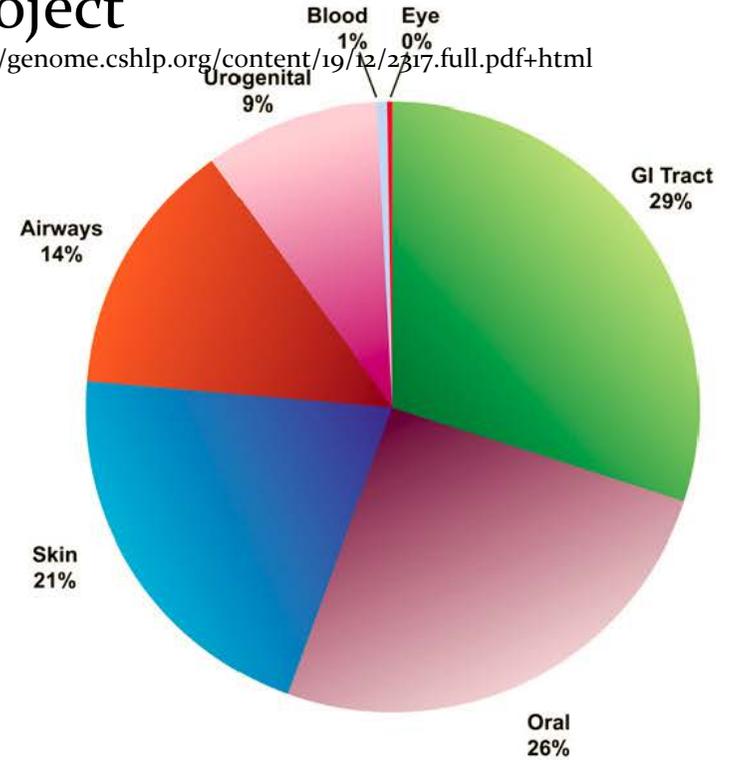




Jane Brody's Unlocking the secrets of the microbiome [https://www.nytimes.com/2017/11/06/well/live/unlocking-the-secrets-of-the-microbiome.html?\\_r=0](https://www.nytimes.com/2017/11/06/well/live/unlocking-the-secrets-of-the-microbiome.html?_r=0)

# The NIH Human Microbiome Project

<http://genome.cshlp.org/content/19/12/2317.full.pdf+html>



**Figure 3.** Bacterial distribution by body site. This figure shows the distribution by body site of bacteria that have been sequenced under the HMP or are in the sequencing pipelines.

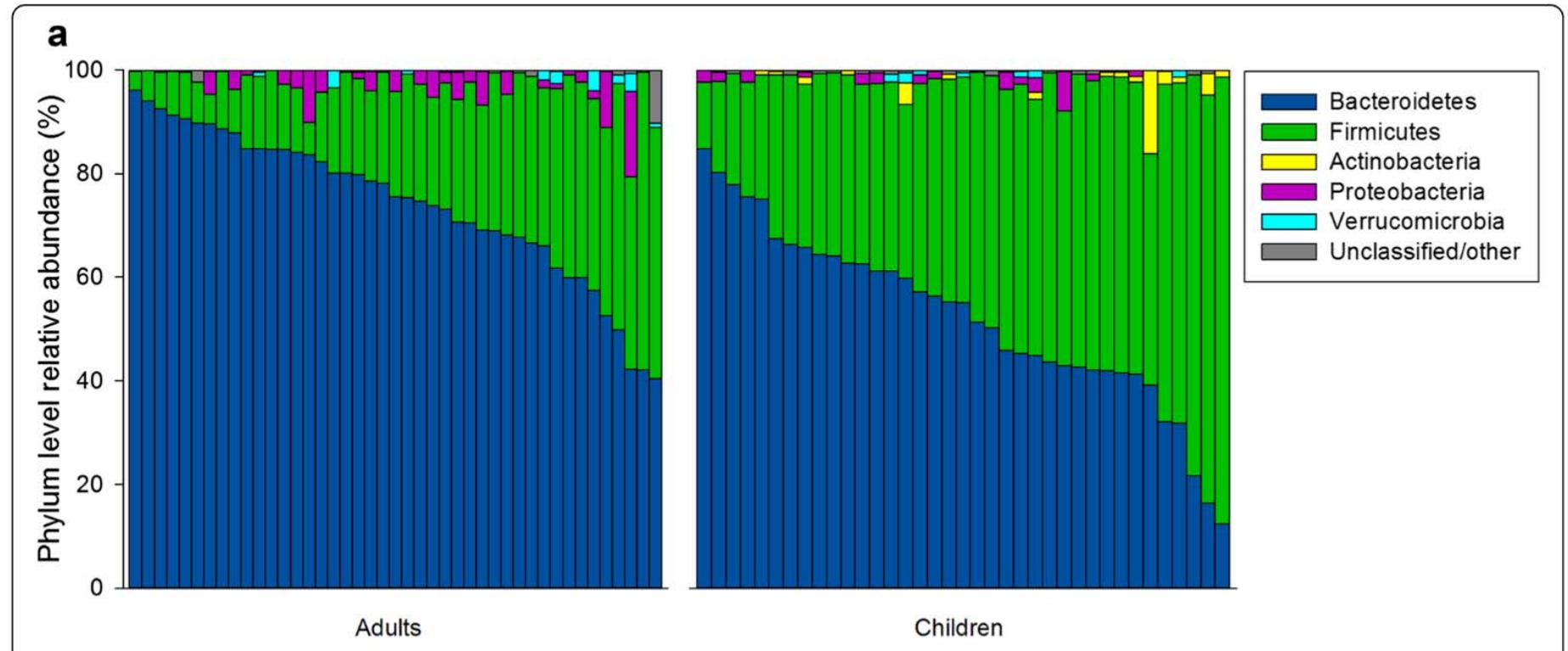
Expanding  
Our View of  
the Human  
Microbiome





# Healthy Human Microbiome shapes by

- 1. Diet
- 2. Sex
- 3. Race
- Age;
- Obesity



[https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4550057/pdf/40168\\_2015\\_Article\\_101.pdf](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4550057/pdf/40168_2015_Article_101.pdf)

**Table 4** Mechanisms of probiotic and prebiotic host interaction. Symbiosis between microbiota and the host can be optimized by pharmacological or nutritional interventions in the gut microbial ecosystem using probiotics or prebiotics

Probiotics	
Immunologic benefits	<ul style="list-style-type: none"> <li>• Activate local macrophages to increase antigen presentation to B lymphocytes and increase secretory immunoglobulin A (IgA) production both locally and systemically</li> <li>• Modulate cytokine profiles</li> <li>• Induce tolerance to food antigens</li> </ul>
Nonimmunologic benefits	<ul style="list-style-type: none"> <li>• Digest food and compete for nutrients with pathogens</li> <li>• Alter local pH to create an unfavorable local environment for pathogens</li> <li>• Produce bacteriocins to inhibit pathogens</li> <li>• Scavenge superoxide radicals</li> <li>• Stimulate epithelial mucin production</li> <li>• Enhance intestinal barrier function</li> <li>• Compete for adhesion with pathogens</li> <li>• Modify pathogen-derived toxins</li> </ul>
Prebiotics	
	<ul style="list-style-type: none"> <li>• Metabolic effects: production of short-chain fatty acids, absorption of ions (Ca, Fe, Mg)</li> <li>• Enhancing host immunity (IgA production, cytokine modulation, etc.)</li> </ul>

<http://www.worldgastroenterology.org/guidelines/global-guidelines/probiotics-and-prebiotics/probiotics-and-prebiotics-english>

World Gastroenterology Organisation Global Guidelines

## Probiotics and prebiotics

February 2017





Garden



Onion



Garlic



Dandelion



Leek



Banana



Apple



Jerusalem



Whole grain



Artichoke



## Prebiotics:

\_Natural, non-digestible, non starch food components that promote the growth of helpful bacteria in our intestinal track being "Good" bacteria promoters

\_Metabolic effects: production of short chain fatty acids, absorption of ions (Ca, Fe, Mg)

\_Enhancing host immunity (IgA production, cytokine modulation...)

\_Nonstarch polysaccharides and oligosaccharides

- \_Oligofructose
- \_Inulin
- \_Galacto-oligosaccharides
- \_Lactulose
- \_Breast milk oligosaccharides





Tempeh



Kefir



Kimchi



Legume



Kombucha



## Probiotics:

\_ Food sources: fermented foods

\_ “Good” live bacteria

\_ Helps change or re-populate intestinal bacteria, balance gut flora, increase numbers of bifidobacteria in the colon

\_ Increase calcium absorption

\_ Increase fecal weight

\_ Shorten gastrointestinal transit time

\_ Boost immunity with its immunologic benefits



## Clinical Study

### **The Effect of Probiotics on Childhood Constipation: A Randomized Controlled Double Blind Clinical Trial**

**M. Sadeghzadeh,<sup>1</sup> A. Rabieefar,<sup>2</sup> P. Khoshnevisasl,<sup>3</sup> N. Mousavinasab,<sup>4</sup> and K. Eftekhari<sup>5</sup>**

<sup>1</sup> Department of Pediatrics, Zanjan Metabolic Disease Research Center, Zanjan University of Medical Sciences, Zanjan, Iran

<sup>2</sup> Zanjan University of Medical Sciences, Zanjan, Iran

<sup>3</sup> Department of Pediatrics, Social Determinants of Health Research Center, Zanjan University of Medical Sciences, Zanjan, Iran

<sup>4</sup> Department of Epidemiology, Zanjan University of Medical Sciences, Zanjan, Iran

<sup>5</sup> Department of Pediatrics, Zanjan University of Medical Sciences, Zanjan, Iran

This study showed that probiotics had a positive role in increasing the frequency and improving the consistency at the end of 4th week.

**Turk J Gastroenterol** 2014; 25: 650-6

### **Effects of a kefir supplement on symptoms, colonic transit, and bowel satisfaction score in patients with chronic constipation: A pilot study**

#### **COLORECTAL**

*Ilker Turan<sup>1</sup>, Özden Dedeli<sup>2</sup>, Serhat Bor<sup>1</sup>, Tankut İlter<sup>1</sup>*

<sup>1</sup>Department of Gastroenterology, Ege University Faculty of Medicine, Izmir, Turkey

<sup>2</sup>Department of Internal Medicine, Celal Bayar University School of Health, Manisa, Turkey

Pilot study shows that kefir has positive effects on the symptoms of constipation, kefir improves bowel satisfaction scores and accelerates colonic transit. Controlled trials are warranted to confirm these findings.



## Yogurt

Ferment milk  
at **warm** temperature



## Kefir / “búlgaros

\_Milk fermented with kefir “grains”, bacteria and yeast at **room** temperature

\_ Kefir has 2 to 3 times more probiotics than yogurt

\_Kefir has same protein, carbohydrates, and fats as well minerals and vitamins.

\_Milk sugar is fermented makes it a low lactose drink



### Spiced Kefir Smoothie

- ◆ 1 cup plain kefir
- ◆ 1 frozen banana
- ◆ 2 tsp. fresh ginger, grated
- ◆ ½ cup berries
- ◆ 1/2 tsp. ground turmeric
- ◆ 1 tsp. honey
- ◆ ¼ cup kale

Blend all ingredients to a high powered blender and enjoy!

# Food Served at the Conference



# Urinary and Bowel Symptoms in AMN: Strategies and Management

