Fine Tuning Plant-based Diets

- Focus on Nutrients

Overview

PART 1: Nutritional Adequacy

- Evidence of adequacy throughout the life cycle

PART 2: Specific Nutrients

- Protein
- Iron
- Zinc
- Calcium
- Vitamin B12
- Omega-3 fatty acids

Part 1:
Nutritional Adequacy

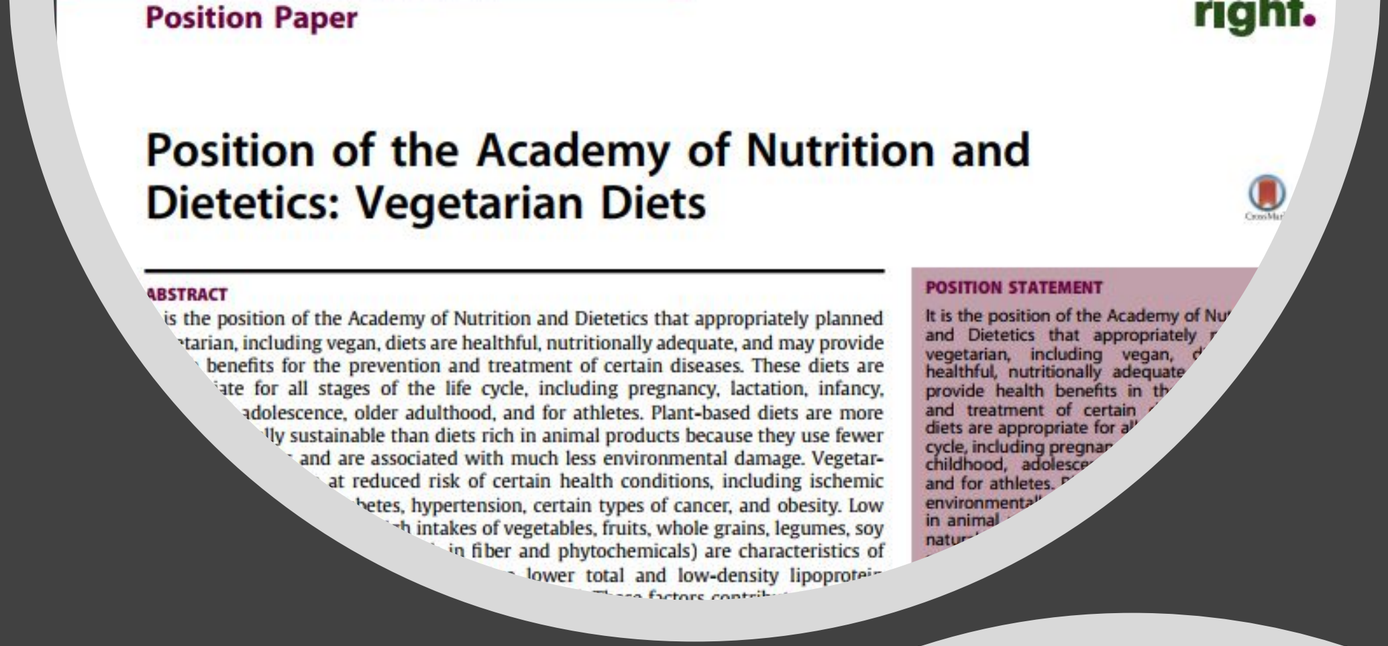
Long-standing Beliefs

1. Plant-based diets are inadequate during infancy, childhood, pregnancy, and lactation.

2. Plant-based diets are lacking in protein and many other nutrients.

#1 Evidence-Based Resource

- http://www.eatrightpro.org


Position Paper

right.

Position of the Academy of Nutrition and Dietetics: Vegetarian Diets

ABSTRACT

POSITION STATEMENT

Academy of Nutrition and Dietetics

AND Position Statement 2016

"It is the position of the Academy of Nutrition and Dietetics that appropriately planned **vegetarian, including vegan diets,** are healthful, **nutritionally adequate**, and **may provide health benefits** in the prevention and treatment of certain diseases. These diets are **appropriate for all stages of the life cycle, including pregnancy, lactation, infancy, childhood, adolescence, older adulthood, and for athletes**."

Melina V. *J Acad Nutr Diet.* 2016;116(12):1970-1980.

Do plant-based eaters meet nutrient requirements?

The Evidence

Study	Year	Participants
USA, Rizzo, AHS-2	2013	71,751
UK, Sobiecki, EPIC-Oxford	2016	30,251
Switzerland, Schupbach	2017	206
Belgium, Clarys	2014	1,475

AHS-2 2013

71,751 similar, health-conscious participants with different dietary patterns.

Meat Eaters

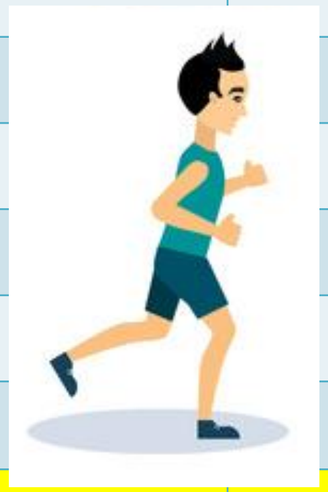
- Highest intakes of calories, protein, zinc, total fat, saturated fat, and trans fat.
- No nutritional shortfalls except vitamin D.

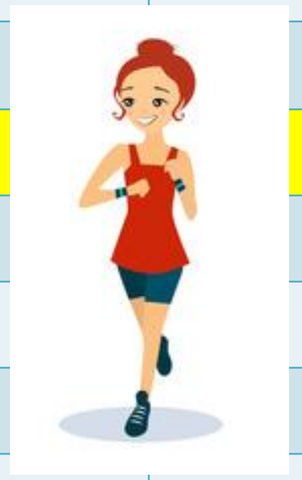
Vegans

- Highest intakes fiber, vitamin C, iron, potassium, and magnesium.
- No nutritional shortfalls except vitamin D.

Rizzo NS. *J Acad Nutr Diet*. 2013;113(12):1610-9.

Nutrient	RDA/AI (19-50 yrs)	Non-veg	Lacto-ovo veg	Vegans
Protein (g)	46F/56M	74.7	70.6	70.7
Fat (g)	44-77	76.7	73.4	65.4
Saturated Fat (g)	<22	19.1	15.6	11.2
Fiber (g)	25 F/38 M	29.8	37.3	46.4
Vitamin B6 (mg)	1.3	3.1	3.3	3.2
Vitamin B12 (µg)	2.4	7.1	8	6.3
Vitamin C (mg)	75 F/90 M	250	271	293
Vitamin D (µg)	15	6.1	4.6	2.4
Vitamin E (mg)	15	20	24.7	18.5
Calcium (mg)	1,000	1,072	1,145	933
Iron (mg)	18 F/8 M	20	22.1	22.2
Potassium (mg)	2,600 F/3,400 M	3,487	3,667	4,120
Magnesium (mg)	320 F/ 420 M	448	514	591
Sodium (mg)	<2,400	3,272	3,432	3,066
Zinc (mg)	8 F/ 11 M	11.9	11.5	11.3





EPIC Oxford 2016

30,251 similar, health-conscious people with different dietary patterns.

Meat eaters

Highest intakes – protein, vitamins B2, B12 and D, zinc, and iodine.

Vegans

Highest intakes – fiber, vitamins C and E, folate, magnesium, iron, copper, and PUFA.

Sobiecki JG. *Nutr Res*. 2016;36(5):464-77.

Nutritional Shortfalls
(Intakes below DRI IOM)

Meat Eaters

- Over 50% had low intakes of vitamin E.
- Meat eaters had the highest calorie intakes, the highest intakes of total and saturated fat, and the lowest intakes of fiber.

Vegetarians (LOV)/Vegans

- **B12**
  - LOV: 17% low
  - Vegan: 85-90% low
- **Iodine**
  - LOV: ≈30% low
  - Vegan: >90% low

Sobiecki JG. *Nutr Res*. 2016;36(5):464-77.

Conclusion

- Compliance with dietary goals was high and prevalence of inadequate intakes was low among all dietary groups.
- Vegan diets appear most protective against cardiometabolic diseases.
- Vegans need to use fortified foods or supplements to ensure adequate vitamin B12 and iodine.

Switzerland 2017

206 omnivores, vegetarians and vegans

- **Meat eaters** – lowest intakes – magnesium, vitamin C, vitamin E, and folate.
- **Vegetarians** – lowest intakes of B6 and niacin.
- **Vegans** – lowest intakes of vitamin D, vitamin B12, calcium, and zinc.

ALL diets were nutritionally sound. Despite low dietary B12 intake among vegans, deficiency was very low due to supplement use.

Diet Quality Belgium, 2014

1,475 participants with varying dietary patterns.

- Assessed diet quality using the Healthy Eating Index (HEI) and the Mediterranean Diet Score (MDS).
- Limited nutrient assessment: vegans had the highest intake of fiber and iron, pesco- and semi-vegetarians had the highest calcium intakes.

Clarys P, et al. *Nutrients.* 2014;6(3):1318-32.

Vegans scored the highest and omnivores the lowest for both healthy eating indicators:

- **HEI** – 65.4 vs 54.2
- **MDS** – 5.8 vs 4.1

Clarys P, et al. *Nutrients.* 2014;6(3):1318-32.

Some Plant-based Diets....

Are More Healthful Than Others!




The most healthful plant-based diets are centered around whole plant foods!




Vegetables and Fruits:
9+ Servings Daily

1 serving = ½ cup raw or cooked OR 1 cup raw leafy greens




Legumes: 2+ Servings Daily

1 serving = ½ cup beans, lentils, split peas, tofu, tempeh;
1 cup sprouted lentils or peas; 2 Tbsp peanut butter







Choose whole grains. Mostly intact.
Vary intake with energy needs.

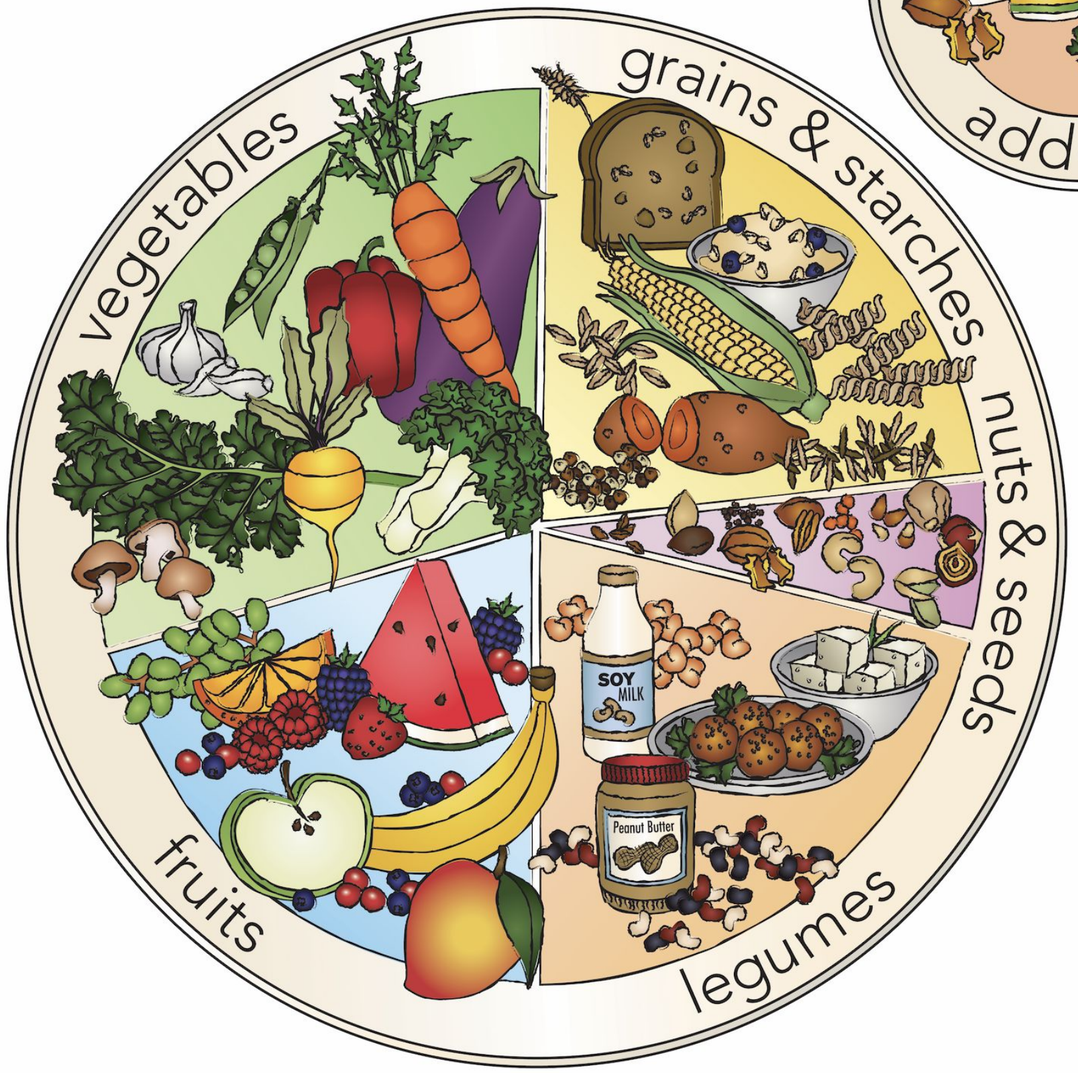


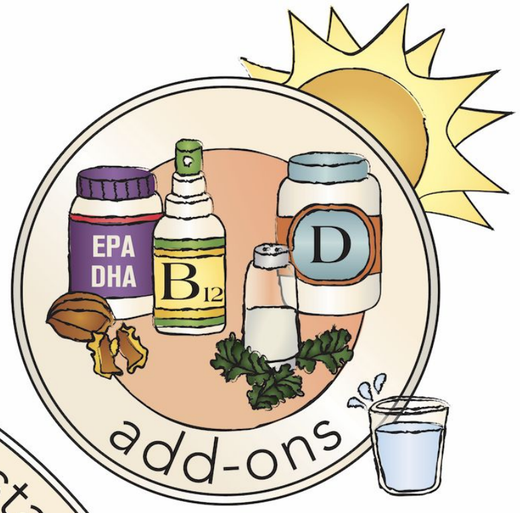

Nuts and Seeds: 1+ Serving Daily

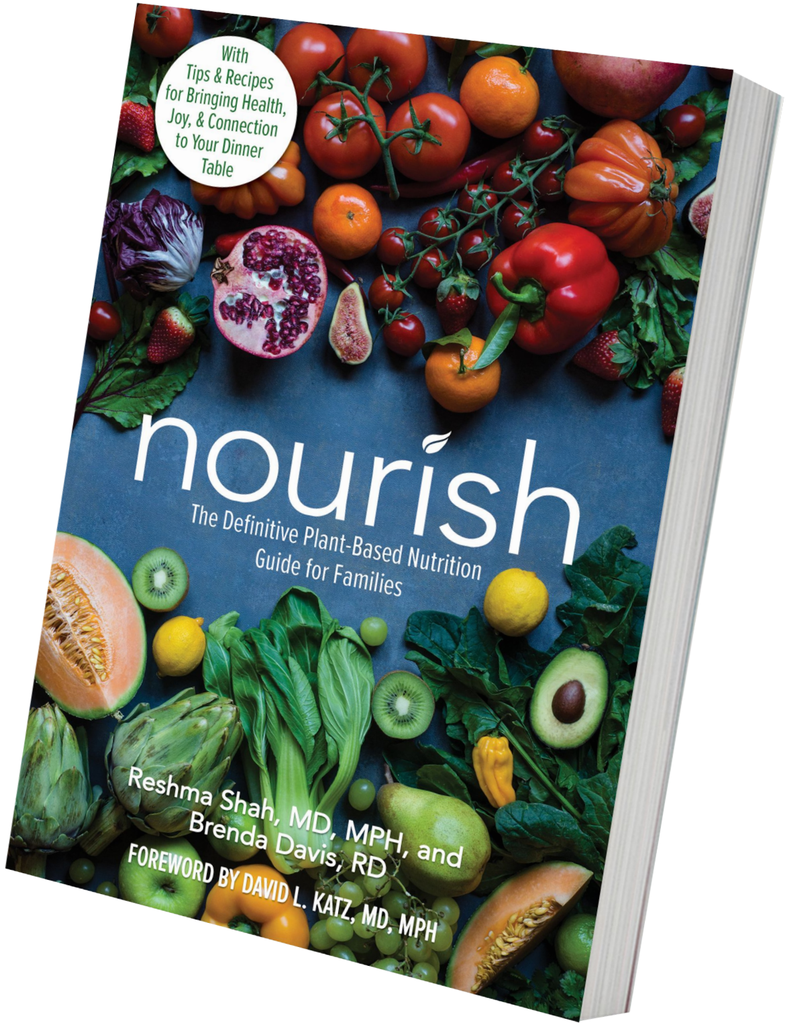
1 serving = 1 oz or 2 Tbsp nut or seed butter

Generous Amounts of Herbs and Spices!

The Plant-Based Plate



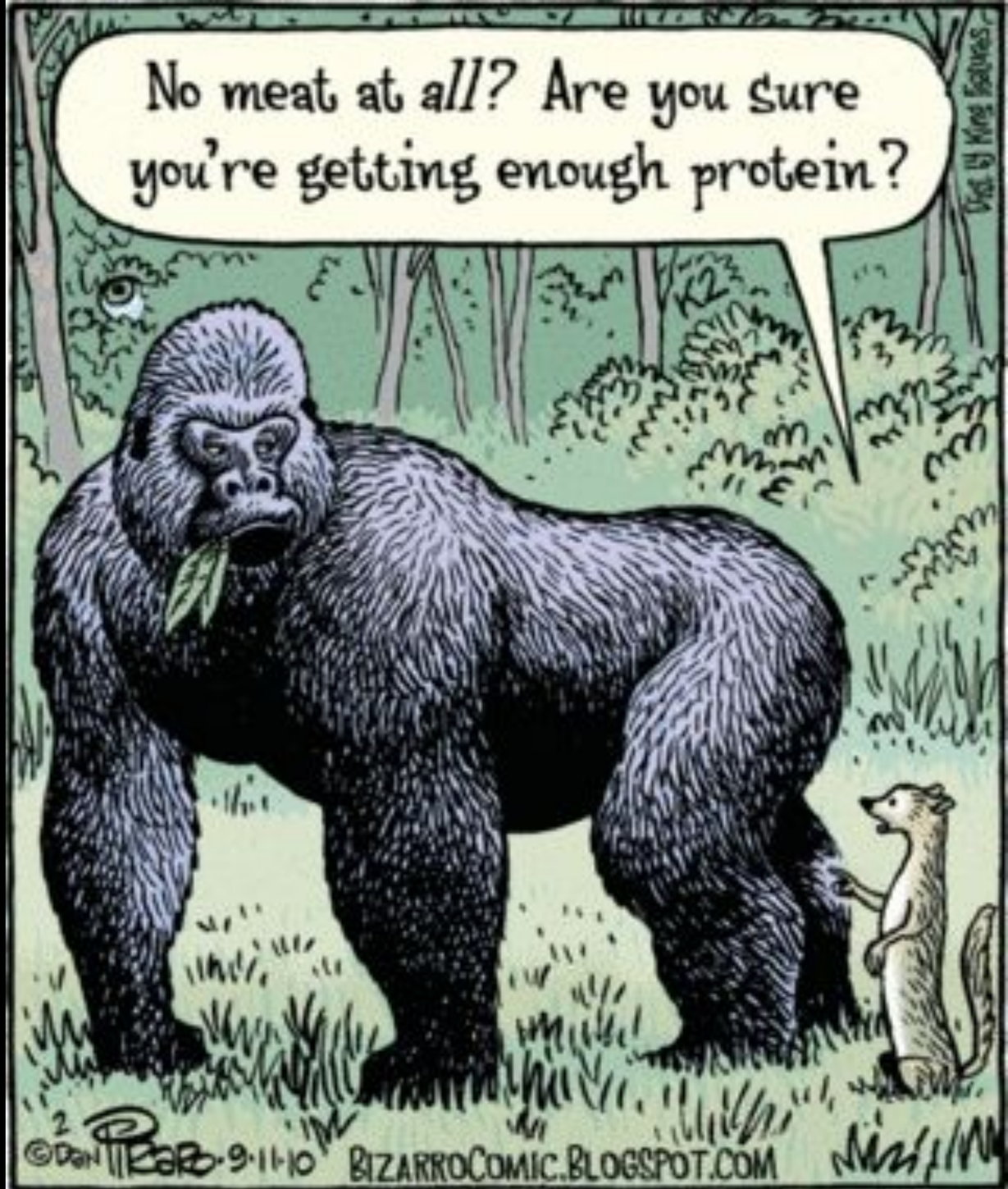


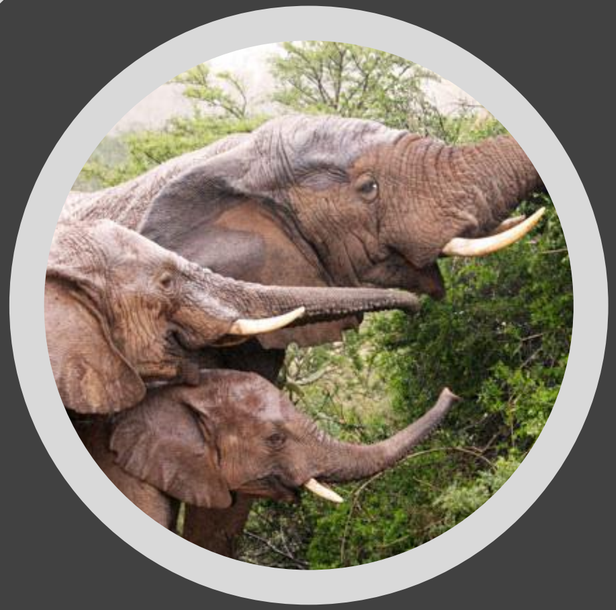


Common Nutrient Concerns

- Protein
- Iron
- Zinc
- Calcium
- Vitamin B_{12}
- Omega 3s

PROTEIN


No meat at *all*? Are you sure you're getting enough protein?
©Don Piccard 9-11-10
BIZARROCOMIC.BLOGSPOT.COM



Even the largest mammals on the planet manage to build huge muscles from plants.


No meat.
No Problem.
Derek Tresize
Vegan Bodybuilder
VEGAN BODYBUILDING & FITNESS
www.veganbodybuilding.com

How Much Protein Do We Need?

Protein RDA - Life Stage		g/kg/day	g/day
Infants	2–6 m (5.9 kg)	1.52	9.1
	6–12 m (9.1 kg)	1.2	11
Children	1–3 (12.3 kg)	1.05	13
	4–8 (20 kg)	0.95	19
	9-13 (36 kg)	0.95	34
Males	14–18 (60.9 kg)	0.85	52
	19+ (70 kg)	0.80	56
Females	14-18 (54.1 kg)	0.85	46
	19+ (57.3 kg)	0.80	46
Pregnancy, Lactation		1.1	71

Based on healthy body weight.

This RDA is not individual.

It applies only to the specific "**reference body weight**" shown for each category.

More for Athletes

The Academy of Nutrition and Dietetics, Dietitians of Canada and the American College of Sports Medicine recommend 1.2 to 2.0 grams of protein per kilogram of body weight per day for athletes, depending on training.

Thomas DT, et al. J Acad Nutr Diet. 2016 Mar;116(3):501-528.

More for Seniors?

- No separate RDA for seniors in North America, although protein digestibility and synthesis are reduced.
- Consensus is building that consumption of 1.0-1.3 g/kg/day reduces age-related muscle loss.

Nowson C and O'Connell S. *Nutrients.* 2015;7(8):6874-6899.

More For Whole Food Eaters?

- ✔ 10-15% for adults
- ✔ 15-20% for children 7+ years
- ✔ 20-30% for children 2-6 years

WHY?

- To compensate for fiber in plant cell walls that reduces digestibility.

NOT NECESSARY FOR:

- LOV eating dairy and eggs.
- Those regularly eating lower fiber foods such as meat alternatives, tofu, soy milk, and peanut butter.

Protein Digestibility

- Reduced by fiber in plant cell walls.
- Increased by soaking, sprouting, cooking, blending.

Food	Digestibility (%)
Plant products	
White (refined) flour or bread	96
Soy protein isolate	95
Peanut butter	95
Tofu	93
Whole wheat flour or bread	92
Oatmeal	86
Lentils	84
Most other legumes	72-89
Animal products	
Eggs	97
Milk, cheese	95
Beef, fish	94

Average Requirements

Women – 46 grams
Men – 56 grams

+10%

Women – 51 grams
Men – 62 grams

Actual Intakes?

	Meat Eaters	Vegetarians	Vegans
AHS-2			
Total protein (g)	74.7	70.6	70.7
EPIC Oxford			
Total protein (g)	92.9	74.2	67.4

Actual Intakes in Children

- Studies from the US and Australia reported that preschoolers consume 3-4 times more protein than age-appropriate RDAs.
- Strong associations with early rapid growth, overweight and obesity.

Berryman CE et al. *Am J Clin Nutr*. 2018;108(2):405–413.
Campbell K et al. *J Acad Nutr Diet*. 2017;117(8):1188-1197.

What about vegetarian and vegan children?

- **Germany – VeChi Study**
- 430, 1-3-year old children

Average intakes:

- *Omnivores* – 2.7 mg/kg/day
- *LOV* – 2.3 mg/kg/day
- *Vegans* – 2.4 mg/kg/day

RDA - 1.05 g/kg/day

Weder S et al. *Nutrients*. 2019;11(4)

Plant Protein Sources

Plant Food	Protein (g)
Soybeans, ½ c, ckd	15
Tofu, firm, ¼ c	10
Veggie meat, 2 oz	10-15
Lentils, ½ c, ckd	9
Other legumes, ½ c, ckd	7-9
Soy milk, 1 cup	6-8
Hempseeds, 2 Tbsp	6.5
Pumpkin seeds, 2 Tbsp	5
Kamut, spelt, wheat, ½ c, ckd	5-6
Amaranth, ½ c, ckd	5
Quinoa, ½ c, ckd	4
Nuts, most, 2 Tbsp	2.5-4
Oatmeal, ½ c, ckd	3

Animal Food	Protein (g)
Meat, 2 oz	10-15
Poultry, 2 oz	10-15
Fish , 2 oz	10-15
Milk, 2%, 1 c	8
Cheese, 1 oz	7
Eggs, 1 large	6

Sources: USDA Nutrient Database Release 27
(Manitoba Hemp Hearts Product Label)

Plant-Based Eaters Generally Get Enough Protein Unless:

- They get insufficient calories.
- They eat nutritionally inadequate diets that are low in protein:
  - High fat, high sugar, junk-food diets.
  - Fruitarian diets.

But isn't plant protein inferior to animal protein?

- The concern is that plant protein in "incomplete" or missing one or more of the 9 essential amino acids (EAA).

- ALL plant foods contain ALL 9 essential amino acids, although sometimes the amounts of lysine or methionine are low. Soy has a similar amino acid profile to animal protein, and other legumes and many seeds are close.

The Big Surprise
All EAAs are made by plants..

We get them directly from plants…

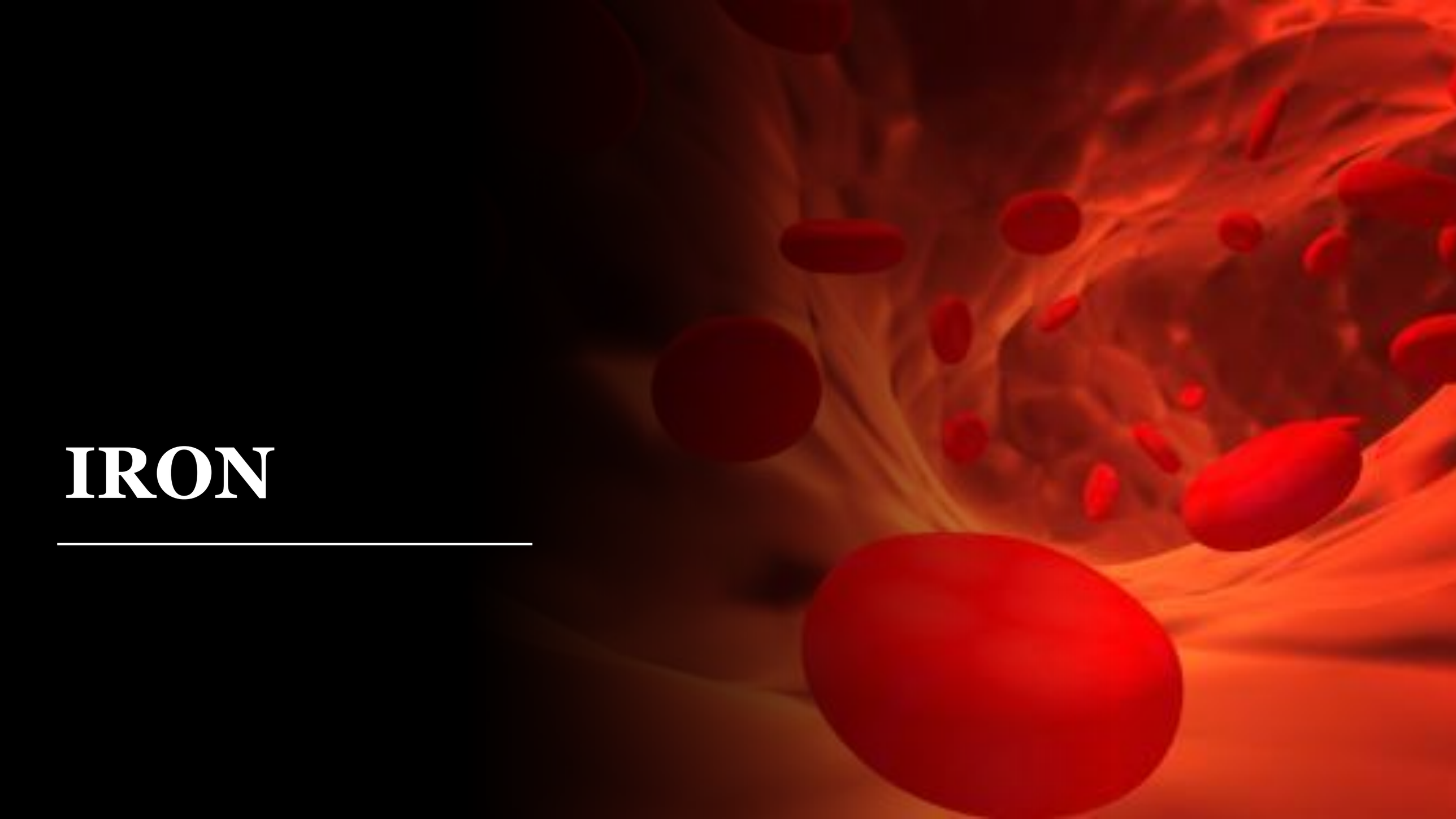
…or indirectly by eating animals that ate plants.

How do we ensure sufficient amounts of all EAA?

We <u>do not</u> need to "complement" protein as once believed. We simply need to:

1. Eat variety of plant foods over the course of the day.
2. Include lysine-rich choices such as soy products (e.g. tofu, tempeh, soy milk), beans, lentils, split peas, peanuts, quinoa, pistachios and seeds (e.g. hemp and pumpkin) as part of the mix.

IRON



How much iron do we need?

Group	RDA
Women (child bearing age)	18 mg
Men and older women	8 mg
UL-Tolerable Upper Intake Level	45 mg

More for Vegetarians?

- **IOM** recommends 1.8x higher intake for vegetarians.
- Controversial as figure was based on one test diet that maximized iron inhibitors and minimized iron enhancers which is not reflective of typical plant-based diets.

Actual Iron Intakes

Study	# People	Nonveg	Lacto-Ovo Veg	Vegan
AHS-2 2013 (US/Canada)	71,751	20 mg	22.1 mg	22.2 mg
EPIC-Oxford 2016 (UK)	30,251	17.6 mg	18.3 mg	19.9 mg
Diet Quality 2014 (Belgium)	1,475	17 mg	20 mg	23 mg

Plant-based diets do not increase risk for iron deficiency anemia.

Lower Serum Ferritin (Iron Stores)

- People eating plant-based diets do tend to have lower serum ferritin (iron stores) than meat-eaters.
- Lower iron stores (within normal range) do not affect how a person feels and do not appear to be a disadvantage when diet replenishes iron losses.
- May turn out to be an advantage as higher serum ferritin is associated with increased risk of some chronic diseases.

Bao W, et al. BMC Med. 2012 Oct 10;10:119.
Chang VC, et al. BMC Cancer. 2019 Jun 6;19(1):543.

Two Forms of Iron in Food

1. HEME IRON

- Only in meat
- 50-60% of iron in meat is heme
- 15-35% bioavailable

2. NON-HEME IRON

- In both plants and meat
- 1-23% bioavailable, **depending on physiological iron requirements**
- Absorption in iron-deficient individuals can be 10x higher than in iron replete individuals

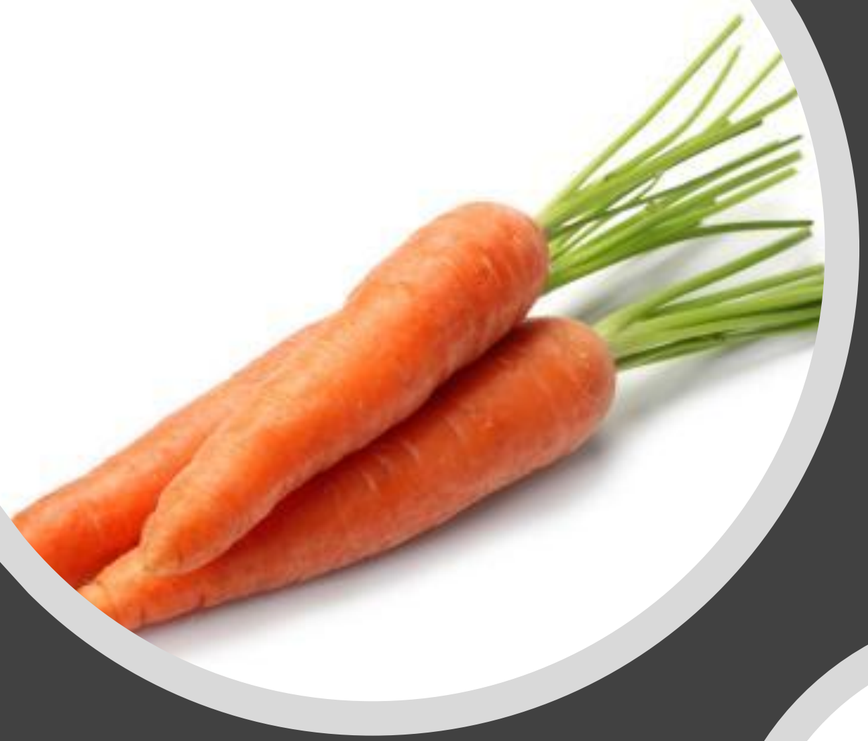
Melina V. *J Acad Nutr Diet.* 2016;116(12):1970-1980.

Maximizing Iron Status

1. Moderate intake of iron absorption inhibitors.
2. Boost intake of iron absorption enhancers.
3. Replace meat with legumes rather than dairy.
4. Select iron-rich foods within each food group.

1. Moderate intake of iron absorption inhibitors.

- Phytates
- Polyphenolic compounds
- Zinc (single mineral supplements)
- Calcium (and dairy products)



2. Boost intake of absorption enhancers.

- Foods rich in vitamin C and organic acids.
- Allium vegetables such as onions and garlic.
- Beta-carotene-rich foods such as carrots.
- Spices such as pepper, turmeric, and ginger.

3. Replace meat with legumes rather than dairy.

Why?

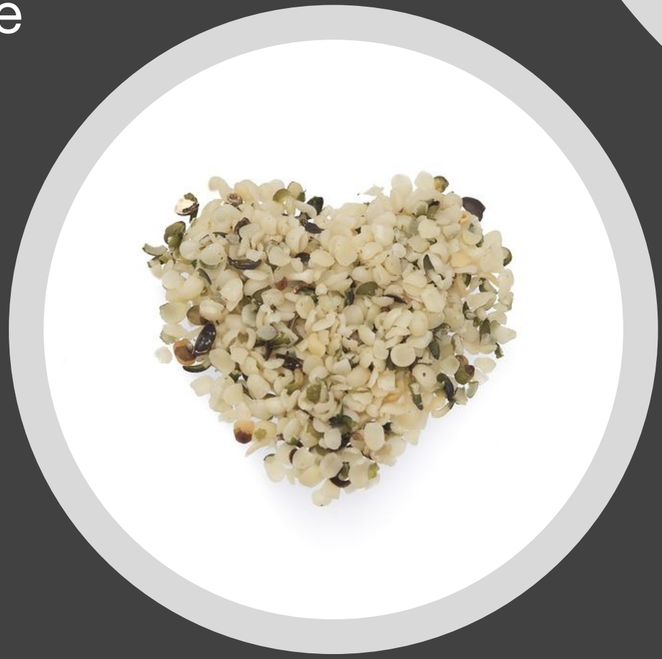
1. Dairy is low in iron; meat is high in iron.
2. Dairy inhibits iron absorption.

Choose Legumes

Legumes provide iron in a form that is absorbed as we need it, without being a pro-oxidant.

4. Select iron-rich foods within each food group.

- **Legumes** – beans, tofu, lentils, chickpeas
- **Grains** – amaranth, quinoa, fortified grains
- **Seeds and nuts** – all seeds; cashews, pine nuts, almonds, Brazil nuts
- **Vegetables** – peas, string beans, leafy greens
- **Fruits** – prune juice, dried fruits
- **Other** – fortified meat analogs, molasses



Zinc

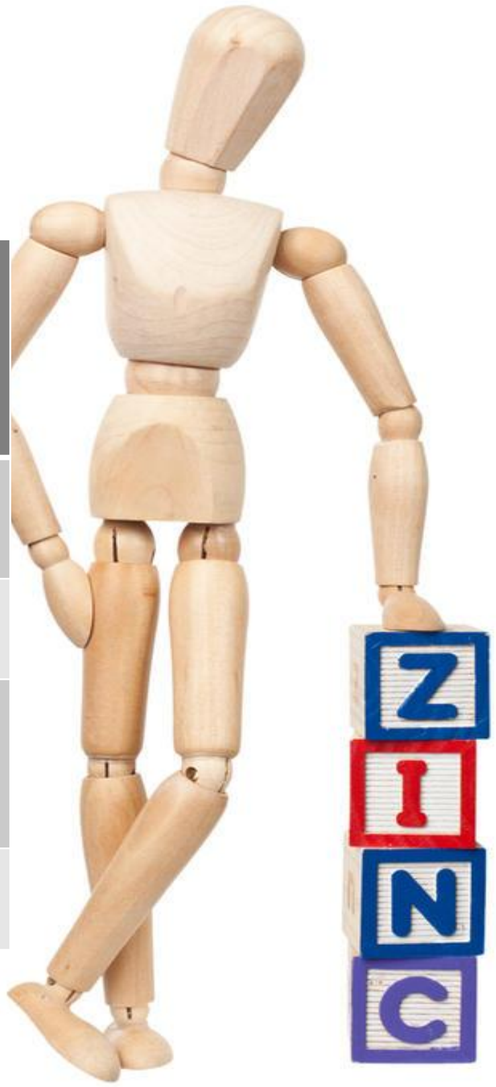
Sufficient zinc is necessary for:

- Growth and reproduction
- Wound healing
- Immune function
- Cell division
- Building proteins and DNA

Recommended Intakes

- Needs can be up to 50% higher, particularly in people eating very high phytate diets.
- Homeostatic mechanisms appear to help people adjust to lower intakes over time.

AGE	ZINC RDA (MG)
1-3 Years	3
4-8 years	5
9-13 years; females 19+ years	8
Males 14+ years	11



Factors Increasing Risk

1. Inadequate zinc intakes

2. Poor zinc absorption

Inadequate Intakes

Those consuming few zinc-rich foods or many refined foods:

- Picky eaters
- Exclusive breastfeeding >6 m
- Junk food eaters
- Alcoholics

Those consuming limited calories:

- Restrictive diets
- Eating disorders
- Illness

Poor Zinc Absorption

High phytate diet

- Emphasis on high phytate foods (e.g. wheat bran, unleavened breads)
- Failure to employ techniques that reduce phytate (e.g. soaking, sprouting, fermenting, and leavening)

Reduced absorption ability

- GI diseases
- Malabsorption syndrome, liver disease, renal disease, diabetes, cancer

Zinc Deficiency

Moderate

- Impaired immune function
- Loss of appetite
- Hair loss
- Diarrhea

Severe

- Stunted growth in children
- Delayed sexual maturation
- Impotence
- Hypogonadism
- Eye and skin lesions

How to Boost Zinc

- Include zinc-rich foods at each meal.
- Limit the use of very high phytate foods (e.g. wheat bran).
- Use food preparation techniques that reduce phytates.
- Ensure sufficient calories – include regular nutritious snacks for small children.

Zinc Sources

Food/ Serving Size	Zinc, mg	Food/ Serving Size	Zinc, mg
Legumes		**Grains**	
Hummus, ½ cup	**2.3**	**Oatmeal, 1 cup**	**2.4**
Adzuki beans, ½ cup	**2.1**	**Wheat sprouts, 1 cup**	**1.9**
Tofu, ½ cup	**2**	**Kamut, ½ cup**	**1.6**
Lentils, cooked ½ cup	1.3	Quinoa, cooked ½ cup	1.1
Black beans, ½ cup	1	**Vegetables and Fruits**	
Soymilk, I cup	0.6 to 0.9	Avocado, 1 medium	1.3
Nuts and Seeds		Blackberries, 1 cup	0.8
Pumpkin seeds, ¼ cup	**2.6**	Vegetables, most, 1 serving	0.1-0.5
Chia seeds, ¼ cup	**2**	Fruit, most, 1 serving	0.1-0.3
Cashews, ¼ cup	**1.9**	**Animal Products**	
Brazil nuts, ¼ cup	1.4	**Beef, 3 oz**	**3.5**
Sesame tahini, 2 Tbsp	1.4	Cow's milk, 1 cup	0.9-1
Almonds, ¼ cup	1.1	Egg, large	0.6

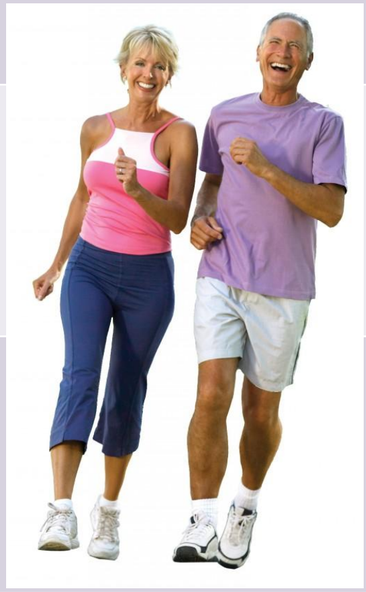
Zinc Supplements?

- Too much zinc can impair copper and iron status, reduce immune function, cause nausea, vomiting, stomach pain, and headaches.
- Single nutrient zinc supplements are not advised unless medically indicated.
- Most multivitamin/mineral supplements contain safe levels of zinc and can provide a boost for those who have low intakes.

Calcium

How Much Calcium Do We Need?

Life Stage Group	Calcium RDA (mg/day)
1-3 years	700
4-8 years	1000
9-18 years	1300
19-50 years - females 51-70 years - males	1000
51-70 years - females >70 years - males	1200



Actual Calcium Intakes

- Lacto-ovo vegetarians generally as much or more calcium than non-vegetarians.
- Vegans or 100% plant-based eaters often fall below the RDA for calcium.

Dietary Patterns & Bone Health
EPIC-Oxford

Diet Group	Fracture Incidence Rate Ratio (95% CI)*	Fracture Incidence Rate Ratio (≥525 mg calcium/day)
Meat Eaters	1.00	1.00
Fish Eaters	1.01 (0.88-1.17)	1.05
LOV	1.00 (0.89-1.13)	1.02
Vegans	1.30 (1.02-1.66)	1.00

*Adjusted for age, sex, non-dietary factors.

45% of vegans had calcium intakes < 525 mg/day.
76% of vegans had intakes < 700 mg/day.

Take Home Message

- Bone health of vegans may be compromised when calcium intake is very low.
- Vegans need to consume at least 525 mg calcium per day, and preferably meet the RDA for calcium.

Is Dairy Necessary?

- Cow’s milk has a lot of calcium – about 300 mg per cup. Moose milk has about 600 mg per cup, yet we don’t consider it an essential food.

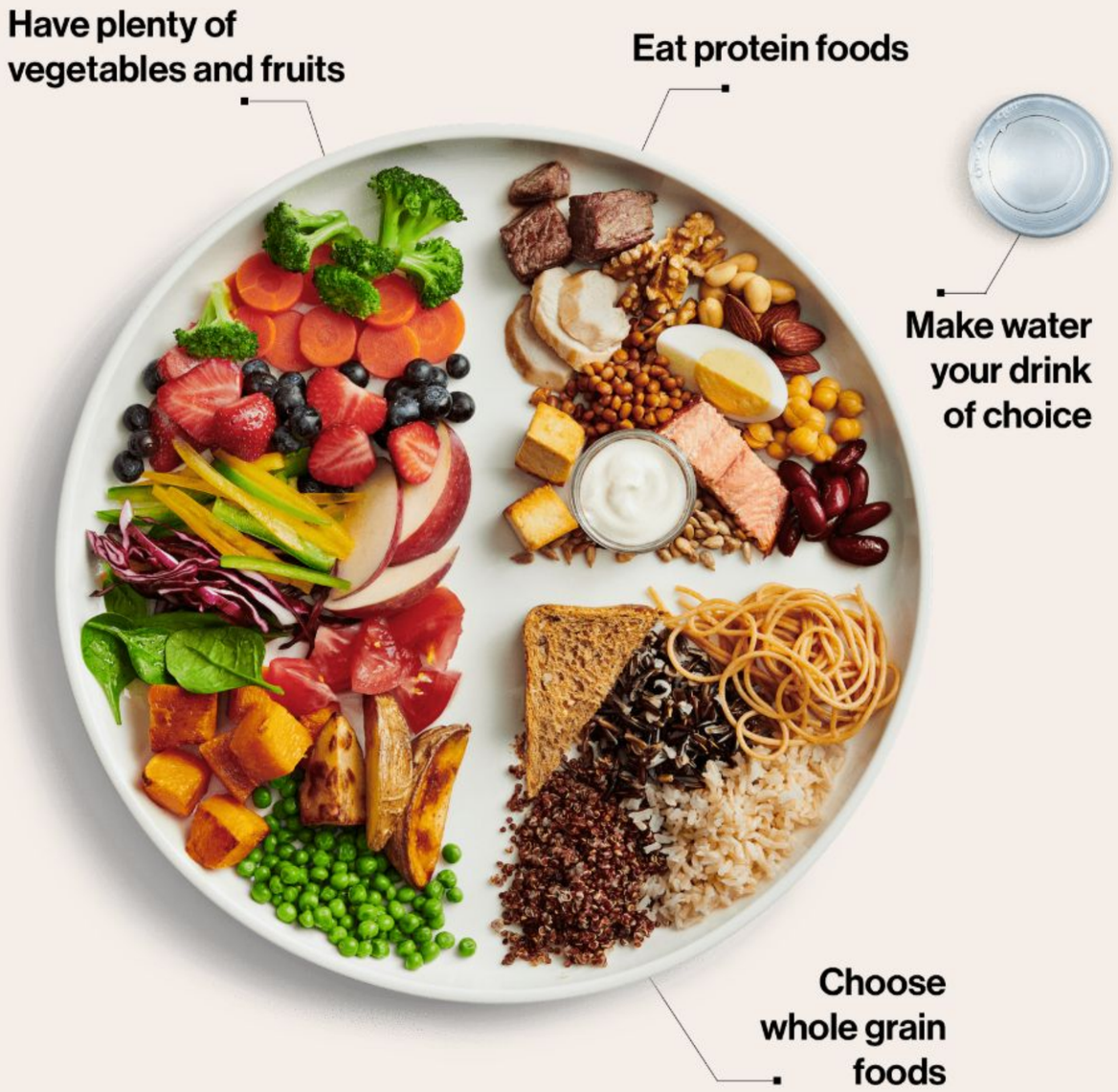
- In pre-agricultural populations, humans averaged about 1,000-2,000 mg calcium per day – without a single drop of cow’s milk.

Most came from plants.

Calcium-rich plant foods offer impressive advantages over dairy:

- Low in saturated fat
- Cholesterol-free
- Rich sources of:
  - ✔ fiber
  - ✔ antioxidants and phytochemicals
  - ✔ vitamin C and K, and folate
  - ✔ magnesium, potassium, and boron

Canada's Food Guide 2019

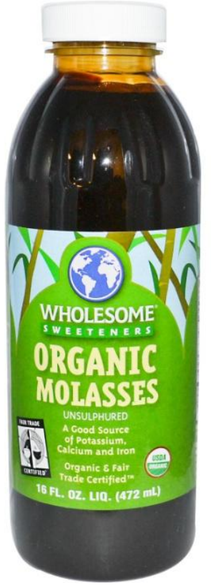


How can we get enough calcium without dairy?

1. By including sufficient calcium-rich plant foods and calcium-fortified foods

2. By being aware of factors that can impact calcium absorption

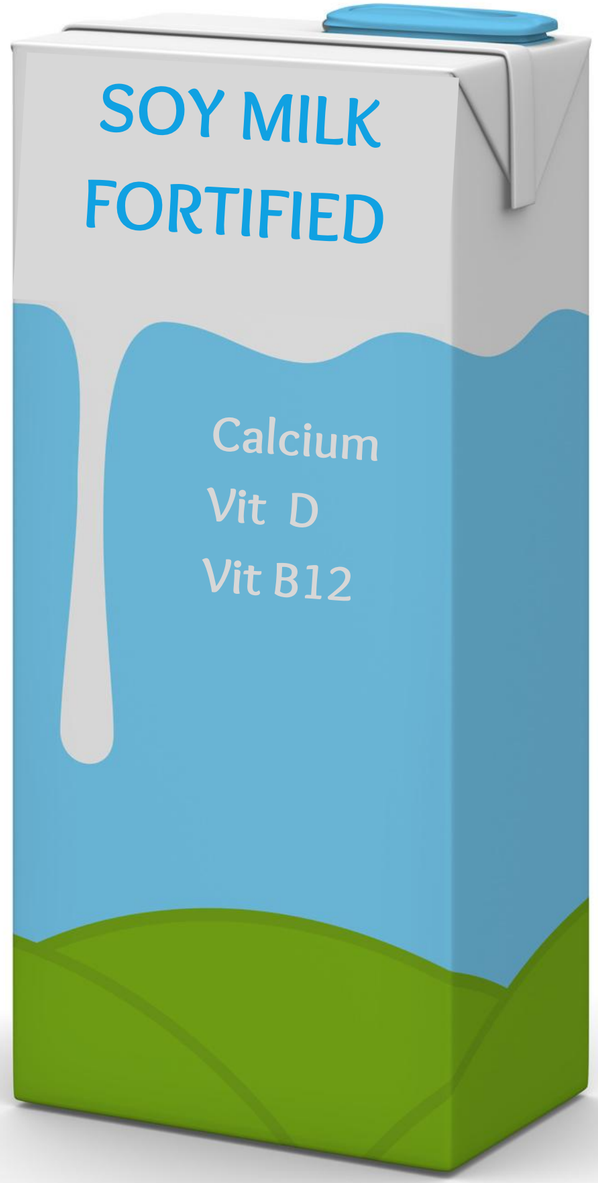
Calcium-rich Plant Foods



Select Calcium-fortified Non-Dairy Milks and Other Foods with Added Calcium

- It is easier to get 1,000 mg calcium or more when calcium-fortified foods are included.

- Calcium-fortified milks provide about 300-450 mg calcium per cup, so 2 servings along with other calcium-rich choices will generally meet needs.



Child Menu with 1000 mg Calcium		Calcium (mg)
Breakfast	Oatmeal + berries, ½ cup each	14 + 5
	Fortified non-dairy milk, 1 cup	300
	Chia seeds, 1 Tbsp	27
Snack	Small whole grain muffin	43
Lunch	Peanut butter and banana wrap	124
	Veggies and cashew dip	36
Snack	Smoothie -1 cup fortified non-dairy milk	330
Dinner	Black beans, ½ cup	23
	Quinoa, ¼ cup	8
	Broccoli, ½ cup	31
	Chocolate pudding, 1/3 cup	90
TOTAL		**1,000**

Be Aware of Factors that Impact Calcium Absorption

Negative Impact

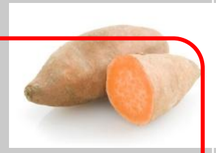
- Excessive oxalates or phytates
- Excessive sodium
- High acid load
- Alcohol
- Caffeine

Positive impact

- Vitamin D

Calcium Bioavailability

Calcium Bioavailability

High (40-60%)	Moderate (30%+)	Fair (20%+)	Low (~5%)
Juice (with calcium citrate malate)	Tofu (with calcium) 	Sweet potatoes 	Rhu 
Greens (low oxala  □ broccoli □ kale □ Chinese greens □ turnip greens □ mustard greens	Dairy products □ milk □ cheese □ yogurt 	Legumes (most) Soymilk  	Greens (high oxalate) □ spinach □ beet greens □ Swiss cha 

Other Factors Affecting Absorption

Amount Consumed

- Absorption efficiency decreases as calcium intake increases

Age and Life Stage

- Calcium absorption is as high as 60% in infants and young children.
- Absorption decreases to 15-20% during adulthood, except for pregnancy when it is higher.

Bone-Wise Choices

Diet

- Meet RDA's for calcium.
- Include some calcium and vitamin D-fortified foods.
- Design the diet to ensure optimal intakes of bone building nutrients.

Exercise

- Get plenty of weight-bearing exercise.
- Aim for 60 minutes 6-7 times a week.

VITAMIN

How much vitamin B12 is needed?

- Age 1-3 years – 0.9 mcg
- Age 4-8 years – 1.2 mcg
- Age 9-13 years – 1.8 mcg
- 14 years+ – 2.4 mcg
- Pregnancy – 2.6 mcg
- Lactation – 2.8 mcg

Are Plant Eaters at Higher Risk?

- **Yes!** Plant foods are not reliable B12 sources, unless they are fortified.
- Even foods commonly thought to be reliable sources – organic vegetables, seaweed, fermented foods and mushrooms – cannot be relied on as sources of vitamin B12.

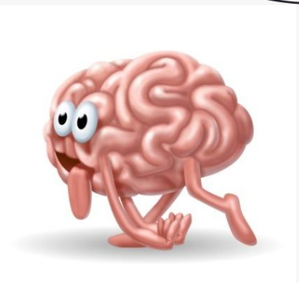
Vitamin B12 Stores

- Stores *may* last 2-3 years or more in adults.
- However, breast fed babies born to B_{12} deficient mothers can develop B_{12} deficiency within months or even weeks of birth.

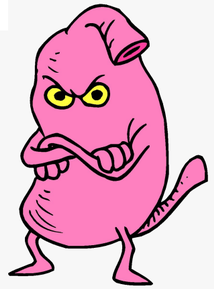
Deficiency Symptoms

- ✓ Megaloblastic (large cell) anemia

- ✓ Nerve and brain damage



- ✓ Gastrointestinal disturbances



- ✓ Elevated homocysteine

Don’t Mess With Vitamin B_{12}!

Vegans, vegetarians and everyone over 50 needs to:

1. Ensure reliable daily sources of vitamin B_{12}.
2. Regularly monitor vitamin B_{12} status.

What are Reliable B_{12} Sources?

1. Supplements
2. Vitamin B_{12}-fortified foods
3. Animal products (for those <50 years)

Vitamin B_{12} for 50+

- The IOM recommends B_{12} come from supplements or fortified foods for everyone over 50.
- Vitamin B_{12} is bound to protein in animal foods.
- Aging reduces proteases and gastric acid, thus diminishing our ability to cleave B_{12} off the protein it is bound to.

How Much B_{12}?

Age	RDA	Recommended Dose/ 2 doses/day	Recommended Dose/ 1 dose/day
1-3 years	0.9 mcg	1 mcg per dose	10 mcg
4-8 years	1.2 mcg	1.5 mcg per dose	25 mcg
9-13 years	1.8 mcg	2 mcg per dose	50 mcg
14+ years	2.4 mcg	2.5 mcg per dose	100 mcg*
65+	2.4 mcg	2.5 mcg per dose	1,000 mcg
Pregnancy Lactation	P 2.6 L 2.8	3 mcg per dose	1,000 mcg

*50 mcg/day may be sufficient for those 14+ however based on estimated rates of absorption, 100 mcg may be more reliable.

Omega-3 Fatty Acids

Is Fish Necessary?

No! We can get omega-3s from plants.

Land Plants - ALA

- Seeds – chia, flax, hemp
- Nuts – walnuts
- Greens

Sea Plants - EPA/DHA

- Microalgae (supplements)
- Macroalgae (seaweed)

(EPA only)

Do plant-based eaters get enough?

Compared to NV, EPA/DHA in blood, tissue, and breast milk are about 30% lower in LOV and 40-70% lower in vegans.

How Can People Who Don’t Eat Fish Optimize Omega-3 Fats?

1. Be Aware of Factors that Depress Conversion

Non-Diet Factors

- **Genetics**
- **Gender** – men are less efficient converters

- **Smoking**

- **Age**
  - Infancy (especially preterm)
  - Advancing age (seniors)

- **Chronic disease**
  - Diabetes
  - Metabolic syndrome
  - Hypertension

Diet Factors

- High intakes of omega-6 fatty acids
- Inadequate nutrition
  - Insufficient protein
  - Lack of vitamin and mineral cofactors (zinc, magnesium, niacin, pyridoxine, and vitamin C)
- Trans fatty acids and alcohol
- Very high fat diets

2. Ensure sufficient ALA.

For those who do not eat fish, 2-4 g/day is recommended.

Plant Sources of Omega-3 (ALA)

Food	Omega-3 (grams)
Walnuts, 1 oz.	2.6
Chia seeds, 1 Tbsp	2.5
Ground flax, 1 Tbsp	1.6
Hempseeds, 1 Tbsp	1.0
Leafy greens, 1 cup	<0.1

3. Reduce Omega-6, if Excessive

- **Avoid omega-6-rich oils in cooking and in processed foods:**
  - Safflower, grape seed, sunflower, and corn oil (60-75% n-6)
  - Soy, cottonseed, and sesame oil (45-50% n-6)
- Omega-6-rich whole foods such as seeds (e.g. pumpkin, sunflower, sesame) can be enjoyed, in moderation.

4. Consider Direct Sources of Long-chain Omega 3s

Who Needs It?

Those with increased needs:

- Pregnant and breastfeeding women.

Those who may not convert efficiently:

- People with diabetes, metabolic syndrome or hypertension.
- Populations with traditionally high fish intake.

Microalgae-based Supplements

- Some people may do better with direct sources of EPA/DHA. Microalgae-based supplements are widely available.
- Generally 200-300 mg day are recommended; some need more.

Take Home Message

Well designed whole food, plant-based diets are nutritionally adequate and can provide powerful protection against chronic diseases.


Benefits
Beyond
Ourselves

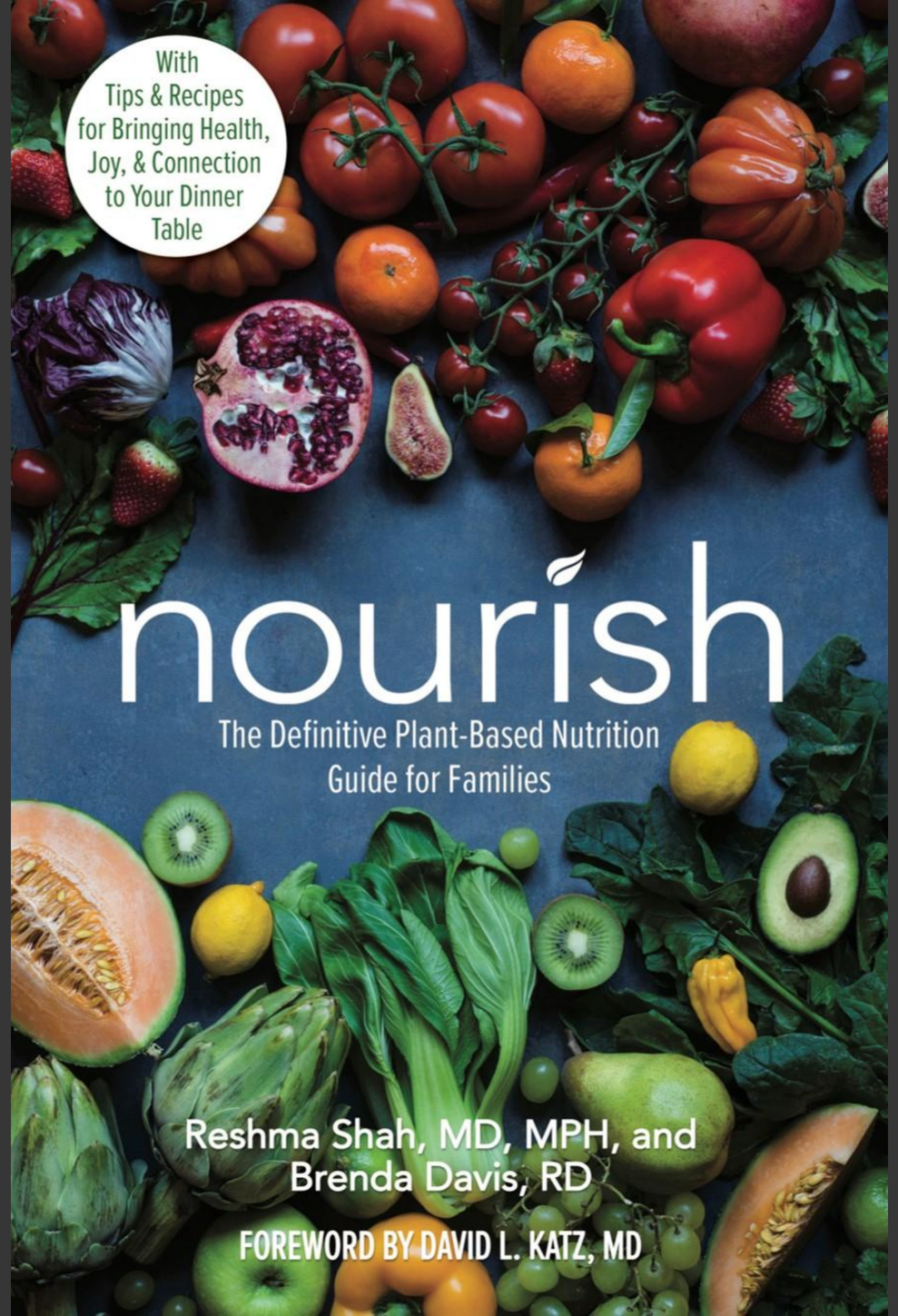
Ecologically Sustainable

Ethically Justifiable

By getting our nutrition from plants... we all win.

We have a choice.

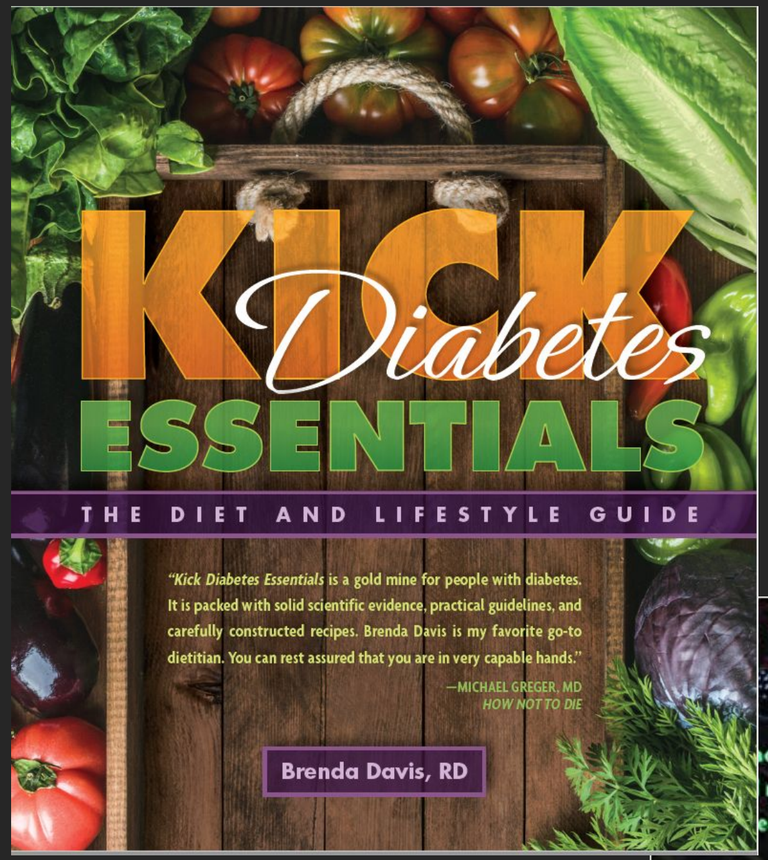
When we consider the consequences of our food choices, not just for ourselves but beyond ourselves, a plant-based diet becomes both an ecological and ethical imperative.



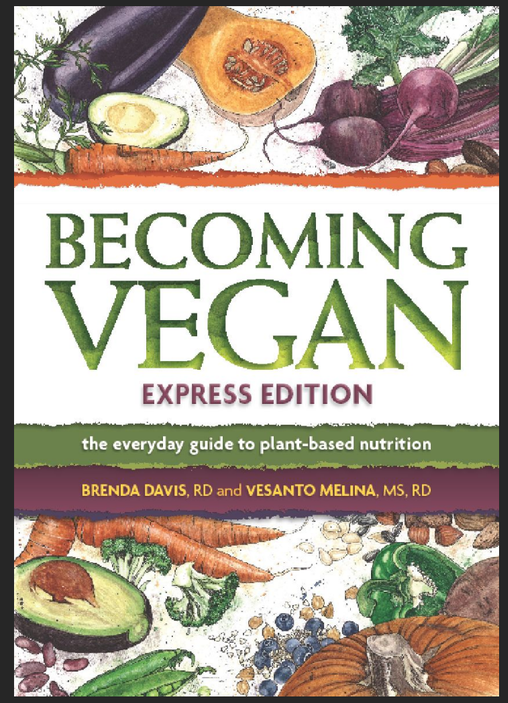
Release Date: Nov. 17

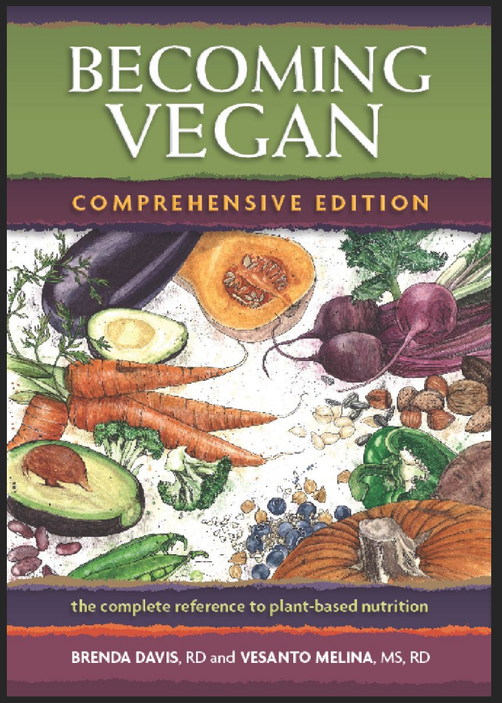
https://nourishthebook.com/
https://prbythebook.com/experts/nourish/

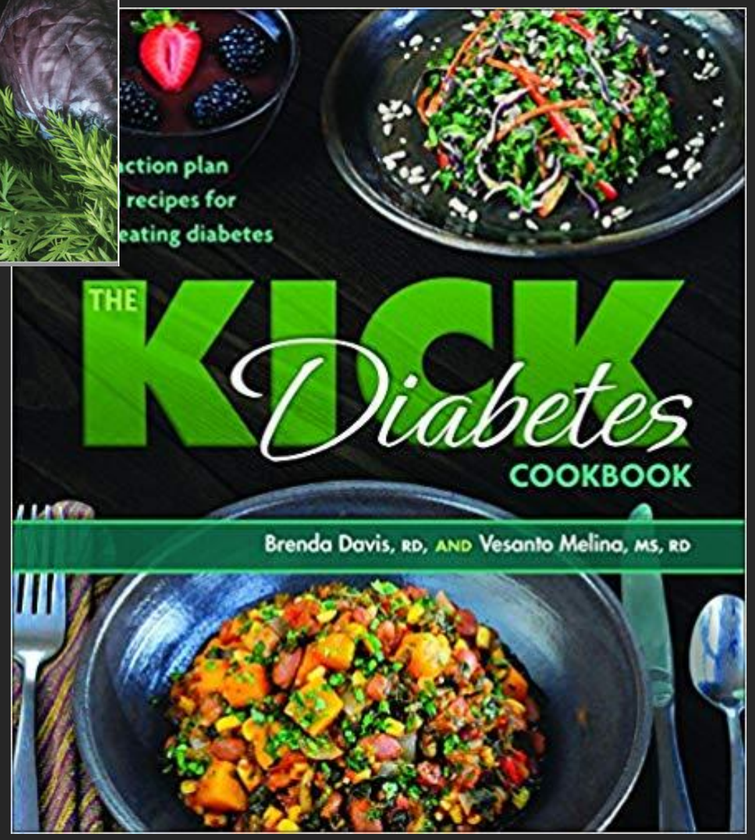
IG Live Every Tuesday
@RESHMASHAH

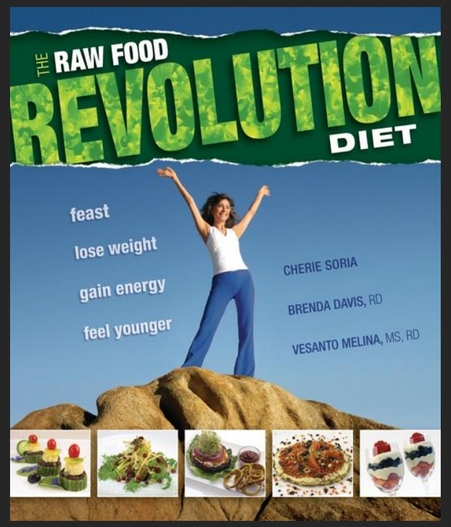


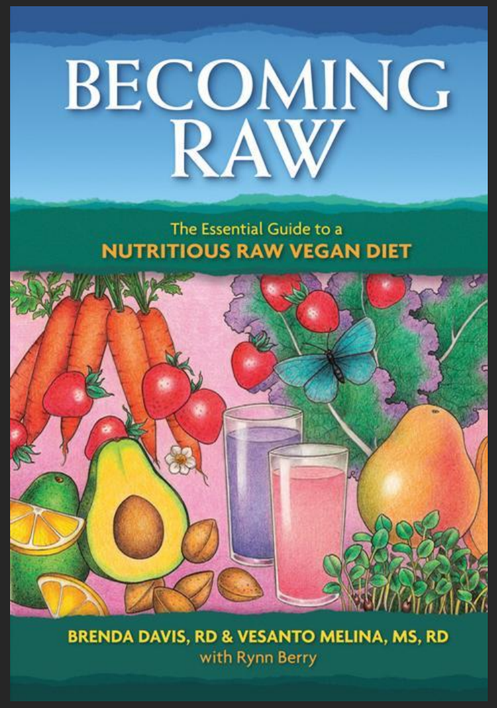
brendadavisrd.com
brendadavis@telus.net

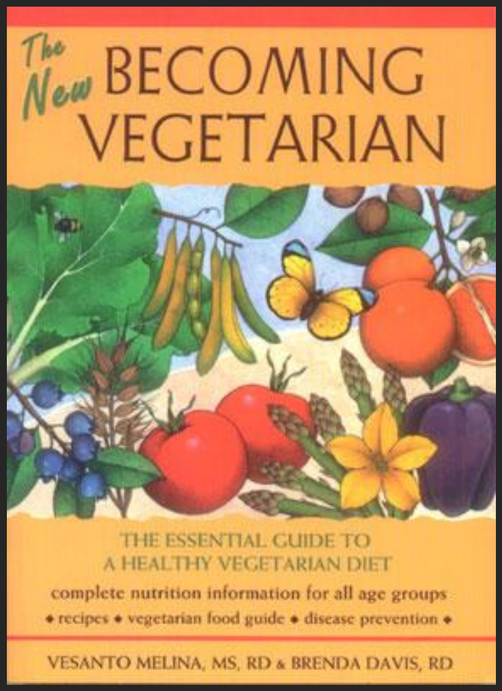













QUESTIONS?