

WELLNESS @ DICKINSON

VITAMINS, MINERALS, AND HERBS

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WELLNESS @ DICKINSON

- 1) What are vitamins and minerals and where do we find them?
- 2) Should we be taking supplements?
- 3) How do we know if the supplements are safe and effective?





Vitamins & Minerals

Defined



Vitamins and minerals...

Examples

B Vitamins
Calcium
Iron
Vitamin C
Vitamin D

B Vitamins

- **Thiamin (B1)** : Energy metabolism
- **Niacin (B3)** : Energy metabolism
- **Riboflavin (B2)** : Energy Metabolism
- **Vitamin B6** : create neurotransmitters, involved in immune function, heme production, and amino acid conversion
- **Folic Acid (B9)** : tissue turnover, cell division, production of DNA
- **Vitamin B12** : energy metabolism, function of brain, nerves, blood cells
- **Pantothenic Acid (B5)** : energy metabolism
- **Biotin (B7)** : energy metabolism, skin health

B Vitamins

Deficiency

B12 & folic acid - anemia

Folic acid - neural tube defect

B12 - tingling and numbness in extremities

B6 - cardiac disorders; depression,
inflammation



B Vitamins

Sources

Animal products: meat, fish, eggs, dairy

Plant sources: green veggies, beans, peas

Fortified foods: cereals, breads



Calcium

- Involved in muscle function, nerve function, vascular function, hormonal secretion, and cellular signaling, bone structure (ODS, 2018)
- supplement forms include carbonate and citrate. Carbonate absorbed most efficiently with food. Citrate can be taken with or without food.
- Calcium is stored in bone and teeth
- Absorption in doses 500mg or less



Calcium *Deficiency*

- Deficiency occurs as function of disease in renal failure, gastric surgery, diuretic use
- Concern for deficiency in postmenopausal women, amenorrheic women (female athlete triad), those allergic/intolerant to cows milk, vegetarians
- **Symptoms of deficiency:** muscle cramps, tingling fingers, convulsions, lethargy, impaired appetite, cardiac arrhythmia, death, osteopenia, osteoporosis, bone fracture



Calcium

In the Diet

Table 1: Recommended Dietary Allowances (RDAs) for Calcium [1]

Age	Male	Female	Pregnant	Lactating
0–6 months*	200 mg	200 mg		
7–12 months*	260 mg	260 mg		
1–3 years	700 mg	700 mg		
4–8 years	1,000 mg	1,000 mg		
9–13 years	1,300 mg	1,300 mg		
14–18 years	1,300 mg	1,300 mg	1,300 mg	1,300 mg
19–50 years	1,000 mg	1,000 mg	1,000 mg	1,000 mg
51–70 years	1,000 mg	1,200 mg		
71+ years	1,200 mg	1,200 mg		

* Adequate Intake (AI)



Calcium

In the Diet

Table 2: Selected Food Sources of Calcium [2]

Food	Milligrams (mg)	
	per serving	Percent DV*
Yogurt, plain, low fat, 8 ounces	415	42
Mozzarella, part skim, 1.5 ounces	333	33
Sardines, canned in oil, with bones, 3 ounces	325	33
Yogurt, fruit, low fat, 8 ounces	313–384	31–38
Cheddar cheese, 1.5 ounces	307	31
Milk, nonfat, 8 ounces**	299	30
Soy milk, calcium-fortified, 8 ounces	299	30
Milk, reduced-fat (2% milk fat), 8 ounces	293	29
Milk, buttermilk, lowfat, 8 ounces	284	28
Milk, whole (3.25% milk fat), 8 ounces	276	28
Orange juice, calcium-fortified, 6 ounces	261	26
Tofu, firm, made with calcium sulfate, ½ cup***	253	25
Salmon, pink, canned, solids with bone, 3 ounces	181	18
Cottage cheese, 1% milk fat, 1 cup	138	14
Tofu, soft, made with calcium sulfate, ½ cup***	138	14
Ready-to-eat cereal, calcium-fortified, 1 cup	100–1,000	10–100
Frozen yogurt, vanilla, soft serve, ½ cup	103	10



Calcium

In the Diet

Turnip greens, fresh, boiled, ½ cup	99	10
Kale, fresh, cooked, 1 cup	94	9
Ice cream, vanilla, ½ cup	84	8
Chinese cabbage, bok choy, raw, shredded, 1 cup	74	7
Bread, white, 1 slice	73	7
Pudding, chocolate, ready to eat, refrigerated, 4 ounces	55	6
Tortilla, corn, ready-to-bake/fry, one 6" diameter	46	5
Tortilla, flour, ready-to-bake/fry, one 6" diameter	32	3
Sour cream, reduced fat, cultured, 2 tablespoons	31	3
Bread, whole-wheat, 1 slice	30	3
Kale, raw, chopped, 1 cup	24	2
Broccoli, raw, ½ cup	21	2
Cheese, cream, regular, 1 tablespoon	14	1

* DV = Daily Value. The U.S. Food and Drug Administration (FDA) developed DVs to help consumers compare the nutrient contents among products within the context of a total daily diet. The DV for calcium used for the values in Table 2 is 1,000 mg for adults and children aged 4 years and older [3]. This DV, however, is changing to 1,300 mg as the updated Nutrition and Supplement Facts labels are implemented [4]. The updated labels and DVs must appear on food products and dietary supplements beginning in January 2020, but they can be used now [5]. FDA requires both current and updated food labels to list calcium content. Foods providing 20% or more of the DV are considered to be high sources of a nutrient, but foods providing lower percentages of the DV also contribute to a healthful diet.

** Calcium content varies slightly by fat content; the more fat, the less calcium the food contains.

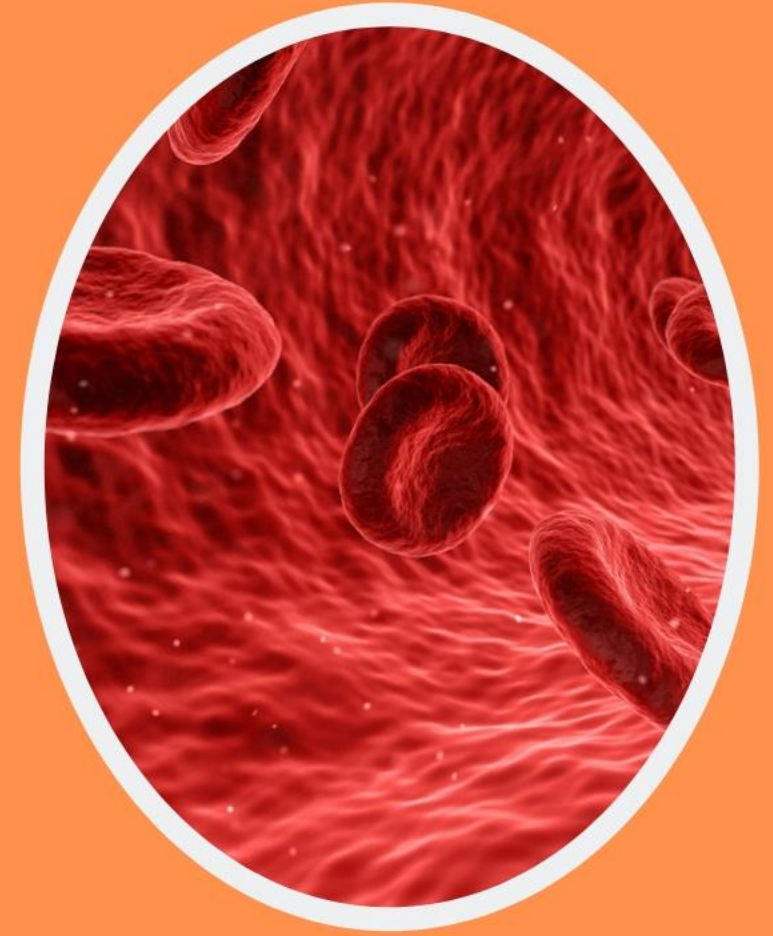
*** Calcium content is for tofu processed with a calcium salt. Tofu processed with other salts does not provide significant amounts of calcium.



Top

Iron

- Involved in creation of hemoglobin and myoglobin which is used to **carry oxygen in red blood cells** from the lungs to the body including muscles. Also involved in some hormones and connective tissue (ODS Consumer Fact Sheet, 2016)
- Take with vitamin C to aid absorption
- **Symptoms of deficiency:** fatigue, increased infections, poor concentration and memory, impaired ability to control body temperature



Iron *In the Diet*

Table 1: Recommended Dietary Allowances (RDAs) for Iron [5]

Age	Male	Female	Pregnancy	Lactation
Birth to 6 months	0.27 mg*	0.27 mg*		
7–12 months	11 mg	11 mg		
1–3 years	7 mg	7 mg		
4–8 years	10 mg	10 mg		
9–13 years	8 mg	8 mg		
14–18 years	11 mg	15 mg	27 mg	10 mg
19–50 years	8 mg	18 mg	27 mg	9 mg
51+ years	8 mg	8 mg		

* Adequate Intake (AI)



Iron *In the Diet*

Table 2: Selected Food Sources of Iron [17]

Food	Milligrams per serving	Percent DV*
Breakfast cereals, fortified with 100% of the DV for iron, 1 serving	18	100
Oysters, eastern, cooked with moist heat, 3 ounces	8	44
White beans, canned, 1 cup	8	44
Chocolate, dark, 45%–69% cacao solids, 3 ounces	7	39
Beef liver, pan fried, 3 ounces	5	28
Lentils, boiled and drained, ½ cup	3	17
Spinach, boiled and drained, ½ cup	3	17
Tofu, firm, ½ cup	3	17
Kidney beans, canned, ½ cup	2	11
Sardines, Atlantic, canned in oil, drained solids with bone, 3 ounces	2	11
Chickpeas, boiled and drained, ½ cup	2	11
Tomatoes, canned, stewed, ½ cup	2	11
Beef, braised bottom round, trimmed to 1/8" fat, 3 ounces	2	11
Potato, baked, flesh and skin, 1 medium potato	2	11
Cashew nuts, oil roasted, 1 ounce (18 nuts)	2	11
Green peas, boiled, ½ cup	1	6
Chicken, roasted, meat and skin, 3 ounces	1	6
Rice, white, long grain, enriched, parboiled, drained, ½ cup	1	6
Bread, whole wheat, 1 slice	1	6



Iron *In the Diet*

Bread, white, 1 slice	1	6
Raisins, seedless, ¼ cup	1	6
Spaghetti, whole wheat, cooked, 1 cup	1	6
Tuna, light, canned in water, 3 ounces	1	6
Turkey, roasted, breast meat and skin, 3 ounces	1	6
Nuts, pistachio, dry roasted, 1 ounce (49 nuts)	1	6
Broccoli, boiled and drained, ½ cup	1	6
Egg, hard boiled, 1 large	1	6
Rice, brown, long or medium grain, cooked, 1 cup	1	6
Cheese, cheddar, 1.5 ounces	0	0
Cantaloupe, diced, ½ cup	0	0
Mushrooms, white, sliced and stir-fried, ½ cup	0	0
Cheese, cottage, 2% milk fat, ½ cup	0	0
Milk, 1 cup	0	0

* DV = Daily Value. The U.S. Food and Drug Administration (FDA) developed DVs to help consumers compare the nutrient contents of products within the context of a total diet. The DV for iron is 18 mg for adults and children age 4 years and older [18,19]. FDA requires food labels to list iron content. Foods providing 20% or more of the DV are considered to be high sources of a nutrient, but foods providing lower percentages of the DV also contribute to a healthful diet.

Vitamin C

- Water Soluble, essential (we cannot produce it internally)
- possibly prevent or delay onset of cancer because of antioxidant properties
- Helps with iron absorption
- Those at greatest risk for deficiency include smokers, infants fed boiled or evaporated milk (heat destroys vitamin C), those with limited food intake/variety, those with certain diseases like renal disease , those who abuse drugs and alcohol



Vitamin C

- **Symptoms of deficiency:** scurvy (within 1 month of deficiency), fatigue, impaired carnitine biosynthesis, inflammation of gums, weakened connective tissue, joint pain, impaired wound healing, depression, iron deficiency anemia



Vitamin C

In the Diet

Table 1: Recommended Dietary Allowances (RDAs) for Vitamin C [8]

Age	Male	Female	Pregnancy	Lactation
0–6 months	40 mg*	40 mg*		
7–12 months	50 mg*	50 mg*		
1–3 years	15 mg	15 mg		
4–8 years	25 mg	25 mg		
9–13 years	45 mg	45 mg		
14–18 years	75 mg	65 mg	80 mg	115 mg
19+ years	90 mg	75 mg	85 mg	120 mg
Smokers	Individuals who smoke require 35 mg/day more vitamin C than nonsmokers.			

* Adequate Intake (AI)



Vitamin C

In the Diet

Table 2: Selected Food Sources of Vitamin C [12]

Food	Milligrams (mg) per serving	Percent (%) DV*
Red pepper, sweet, raw, ½ cup	95	158
Orange juice, ¼ cup	93	155
Orange, 1 medium	70	117
Grapefruit juice, ¼ cup	70	117
Kiwifruit, 1 medium	64	107
Green pepper, sweet, raw, ½ cup	60	100
Broccoli, cooked, ½ cup	51	85
Strawberries, fresh, sliced, ½ cup	49	82
Brussels sprouts, cooked, ½ cup	48	80
Grapefruit, ½ medium	39	65
Broccoli, raw, ½ cup	39	65
Tomato juice, ¼ cup	33	55
Cantaloupe, ½ cup	29	48
Cabbage, cooked, ½ cup	28	47
Cauliflower, raw, ½ cup	26	43
Potato, baked, 1 medium	17	28
Tomato, raw, 1 medium	17	28
Spinach, cooked, ½ cup	9	15
Green peas, frozen, cooked, ½ cup	8	13

*DV = Daily Value. The U.S. Food and Drug Administration (FDA) developed DVs to help consumers compare the nutrient contents of products within the context of a total diet. The DV for vitamin C used for the values in Table 2 is 60 mg for adults and children age 4 years and older [13]. This DV, however, is changing to 90 mg as the updated Nutrition and Supplement Facts labels are implemented [14]. The updated labels and DVs must appear on food products and dietary supplements beginning in January 2020, but they can be used now [15]. FDA requires current food labels to list vitamin C content, but this requirement will be dropped with the updated labels. Foods providing 20% or more of the DV are considered to be high sources of a nutrient, but foods providing lower percentages of the DV also contribute to a healthful diet.

The U.S. Department of Agriculture's (USDA's) [National Nutrient Database](#) lists the nutrient content of many foods and provides a comprehensive list of foods containing vitamin C arranged by [nutrient content](#) and by [food name](#).



Vitamin D

- **Deficiency:** poor bone health, muscle spasms, impaired immune system
- Needs - 600-800IU depending on age



Vitamin D *In the Diet*

Table 3: Selected Food Sources of Vitamin D [11]

Food	IUs per serving*	Percent DV**
Cod liver oil, 1 tablespoon	1,360	340
Swordfish, cooked, 3 ounces	566	142
Salmon (sockeye), cooked, 3 ounces	447	112
Tuna fish, canned in water, drained, 3 ounces	154	39
Orange juice fortified with vitamin D, 1 cup (check product labels, as amount of added vitamin D varies)	137	34
Milk, nonfat, reduced fat, and whole, vitamin D-fortified, 1 cup	115-124	29-31
Yogurt, fortified with 20% of the DV for vitamin D, 6 ounces (more heavily fortified yogurts provide more of the DV)	80	20
Margarine, fortified, 1 tablespoon	60	15
Sardines, canned in oil, drained, 2 sardines	46	12
Liver, beef, cooked, 3 ounces	42	11
Egg, 1 large (vitamin D is found in yolk)	41	10
Ready-to-eat cereal, fortified with 10% of the DV for vitamin D, 0.75-1 cup (more heavily fortified cereals might provide more of the DV)	40	10
Cheese, Swiss, 1 ounce	6	2

* IUs = International Units.

** DV = Daily Value. The U.S. Food and Drug Administration (FDA) developed DVs to help consumers compare the nutrient contents of products within the context of a total diet. The DV for vitamin D used for the values in Table 3 is 400 IU for adults and children age 4 years and older [15]. This DV, however, is changing to 20 mcg as the updated Nutrition and Supplement Facts labels are implemented [16]. The updated labels and DVs must appear on food products and dietary supplements beginning in January 2020, but they can be used now [17]. FDA does not currently require food labels to list vitamin D content unless a food has been fortified with this nutrient, but it requires vitamin D content to be listed on the updated labels. Foods providing 20% or more of the DV are considered to be high sources of a nutrient, but foods providing lower percentages of the DV also contribute to a healthful diet.

Other Supplements and Functional Foods/Ingredients

Examples

Probiotics
Fish Oil/Omega 3
Weight loss supplements

Probiotics

Research based uses

- Digestive issues
- Allergic issues
- Oral health problems
- Liver disease
- Common cold



Probiotics

In food

- Yogurt
- Kefir
- Fermented foods such as non-pasteurized sauerkraut and kimchi



Omega 3

Research based uses

- ESSENTIAL nutrient - meaning body can't create it from other nutrients
- Cardiovascular benefits
- Anti inflammatory properties
- Improved pulmonary function
- Possible mental health benefits



Omega 3

In food

- shrimp, tuna, sardines, anchovies, salmon, catfish, mackerel, herring
- flax seed, flax oil
- walnuts, walnut oil



WHAT ABOUT

Weight Loss?



Common ingredients in weight-loss dietary supplements

ODS Fact Sheet

INGREDIENT	DOES IT WORK?	IS IT SAFE?
<input checked="" type="checkbox"/> African mango		
<input checked="" type="checkbox"/> Beta-glucans		
<input checked="" type="checkbox"/> Bitter orange		
<input checked="" type="checkbox"/> Caffeine		
<input checked="" type="checkbox"/> Calcium		
<input checked="" type="checkbox"/> Capsaicin		
<input checked="" type="checkbox"/> Carnitine		
<input checked="" type="checkbox"/> Chitosan		
<input checked="" type="checkbox"/> Chromium		
<input checked="" type="checkbox"/> Coleus forskohlii		
<input checked="" type="checkbox"/> Conjugated linoleic acid (CLA)		
<input checked="" type="checkbox"/> Fucoxanthin		
<input checked="" type="checkbox"/> Garcinia cambogia		
<input checked="" type="checkbox"/> Glucomannan		
<input checked="" type="checkbox"/> Green coffee bean extract		
<input checked="" type="checkbox"/> Green tea and green tea extract		
<input checked="" type="checkbox"/> Guar gum		
<input type="checkbox"/> Guarana (see the section on Caffeine)		
<input checked="" type="checkbox"/> Hoodia		
<input type="checkbox"/> Kola (or cola) nut (see the section on Caffeine)		
<input type="checkbox"/> Mate (see the section on Caffeine)		
<input checked="" type="checkbox"/> Probiotics		
<input checked="" type="checkbox"/> Pyruvate		
<input checked="" type="checkbox"/> Raspberry ketone		
<input checked="" type="checkbox"/> Vitamin D		
<input checked="" type="checkbox"/> White kidney bean/bean pod		
<input type="checkbox"/> Yerba mate (see the section on Caffeine)		
<input checked="" type="checkbox"/> Yohimbe		

Spices & Herbs

The background of the slide features several bundles of fresh herbs. On the left, there are bundles of rosemary with its characteristic needle-like leaves. In the center, there is a bundle of thyme with small, opposite leaves. On the right, there are bundles of cilantro with its distinctively lobed leaves. The herbs are tied with light-colored twine and are set against a soft, light green background.

Some spices, herbs, and aromatics have medicinal properties

- Antioxidants
- Anti-inflammation
- Disease prevention
- Antimicrobial and antifungal

Antioxidants

In food

- Cinnamon
- Cloves
- Cumin
- Ginger
- Oregano
- Turmeric
- Dill
- Marjoram
- Peppermint
- Rosemary
- Sage



Anti - Inflammation

In food

- Turmeric: cancer prevention, lower cholesterol, reduce platelet aggregation; possible remission of ulcerative colitis



Anti - Inflammation

In food

- Capsaicin: ingredient in chili peppers
 - anti-cancer (pancreas, breast, lung, prostate, colon, brain, liver, stomach, skin, bladder)



Anti - Inflammation

In food

- Cinnamon
 - may improve blood sugar control



Anti - Inflammation

In food

- Ginger
 - reduce nausea and vomiting
 - reduce platelet aggregation
 - improve blood pressure
 - improve blood sugars



Anti-Microbe and Anti-Fungal

In food

- Chili peppers, garlic, onion, anise, cinnamon, coriander, cumin, ginger, lemongrass, tumeric





Supplementation

Safety and Effectiveness



How to Read a Supplement Label

A step-by-step guide to understanding the supplement label and the assurances of the USP Verified Mark

Look for the USP Verified Mark

USP stands for the "United States Pharmacopeia"—a scientific, nonprofit organization that sets federally recognized public standards of quality for medicines, dietary supplements, and foods. The USP mark means the supplement has been independently tested to confirm the product meets USP quality standards.



Get the Facts—Check the Back

The back of the label is where you will find a wealth of information. In addition to items required by law*—like the manufacturer's address, lot number, or notice of potential allergens—USP verifies the label claims for accuracy and requires additional information to help you make an informed choice.

1 Suggested Use and Serving Size

Dietary supplements are regulated as food, so the recommended amount is listed in terms of "Serving Size"—often in the form of the number of tablets or capsules to be consumed. USP tests each product for performance to ensure it will break down and release the ingredients into the body as intended.

2 Supplement Facts Panel

The supplement label lists the individual ingredients contained in each tablet or capsule. USP tests products to positively confirm the identity and purity of each ingredient.

SUGGESTED USE: For best results, take one tablet daily with a meal. Keep bottle tightly closed. Store in a cool, dry place.

Supplement Facts

Serving Size 1 Tablet
Servings Per Container 50

Amount Per Serving	% Daily Value*
Vitamin D3 400 IU, USP	80%
Vitamin B6 (as Hydrochloride) 10 mg	100%
Calcium (as Calcium Citrate) 500 mg	20%
Magnesium (as Magnesium Oxide) 1 mg	6%
Zinc (as Zinc Oxide) 10 mg	50%
Copper (as Copper Gluconate) 1 mg	50%
Sodium 0 mg	Less than 1%
Green Tea Leaf Extract 1 mg	-

*Daily Value not established.

OTHER INGREDIENTS: Cellulose, gel, Croscarmellose Sodium, Magnesium Stearate

Manufacturer's Contact Information:
Distributed by: Company Name
Company Address,
Phone Number and Website

CAUTION: Consult with your physician before taking this product if you are pregnant.

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, or prevent any disease.

04/19 LOT 000776

3 % Daily Value

Where applicable, this value indicates the percent of the Reference Daily Intake (RDI) or Daily Reference Value (DRV) of a dietary ingredient that is in a serving of the product. USP tests each ingredient to ensure the potency—that is, the strength or amount of the ingredient—matches what is declared on the label.

4 Expiration Date

USP requires participants to provide expiration date information and tests the product to ensure it will contain the claimed potency at the date specified.

5 Cautions & Warnings

Where applicable, this information helps you understand who should avoid or take precautions when taking certain products. USP requires cautionary statements when appropriate as part of participation in our program.

* For additional information about FDA labeling requirements, see <http://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/DietarySupplements/ucm070597.htm#4.59>



From the Experts...

"Dietary supplements are not intended to treat, diagnose, mitigate, prevent, or cure disease."

Office of Dietary Supplements

Supplements defined

- **A product that is intended to supplement the diet**
- **contains one or more dietary ingredients,**
- **is intended to be taken by mouth as a pill, capsule, tablet, or liquid,**
- **and is labeled on the front panel as being a dietary supplement**

Dietary Supplement Health and Education Act,



Mineral

**Herbs/
Botanicals**

Vitamin

Amino Acid

*Contains One or More
Dietary Ingredients...*

SAFETY CONCERNS

Ephedra: A Case Study

- Plant ingredient popular in 1990's - Weight loss, athletic performance
- Stimulate nervous system, suppress appetite
- Banned in 2004 by the FDA due to safety

20,000+
emergency
room visits
yearly
related to
supplements



BE SURE YOU SEE A LABEL

Third Party Certification



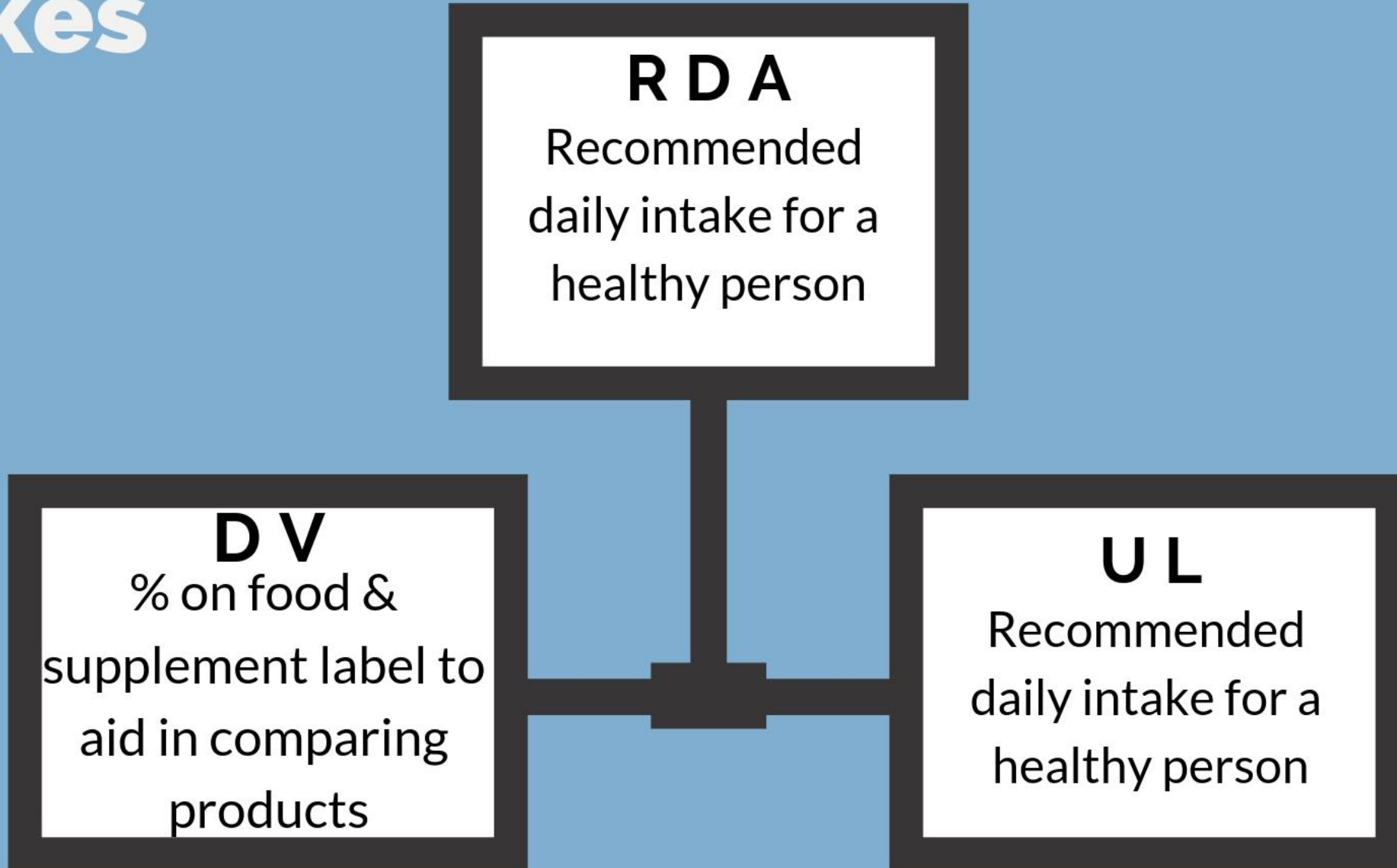
Vitamins and minerals...

More



Better

Reference Recommended Intakes



Nutrient and Drug Interactions



Certain nutrients interfere with absorption or effectiveness of certain drugs.

Some examples:

- **Vitamin K** reduces effectiveness of warfarin/coumadin
- Tetracycline has poor absorption with **iron, calcium, zinc, or magnesium**
- Levodopa is less effective when taken with **amino acids** from diet/supplements
- Many medications including those for high blood pressure, high cholesterol, "fluid pills", and sertraline, a common anti-depressant are actually MORE biologically available when also consuming **grapefruit, grapefruit juice, tangelos, and seville oranges**. This may be a problem because the dose may end up being too high!

CONCLUSION:

1) What are vitamins and minerals and where do we find them?

(Food First+ Supplements)

2) Should we be taking supplements?

(Deficient or at risk for deficiency? In need of extra due to disease? Get tested and talk to a doctor or dietitian!)

3) How do we know if the supplements are safe and effective?

(Check for third party labeling, check Office of Dietary Supplements fact sheets, and check with doctor or dietitian!)



Extra Links and Info

- [Soy](#) for hot flashes, etc.
- [Echinacea](#) for colds/immune system