

Selecting Supplements: Know the Source



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Objectives



- Understand existing regulations and protections
- Identify factors which affect supplement quality
- Be able to evaluate label claims
- Know the appropriate form of the nutrient or botanical
- Learn about interactions and depletions
- Know the appropriate dose and schedule

History of Dietary Supplementation....

- 2000 B.C. Here, eat this root.
- 1000 A.D. That root is heathen. Here, say this prayer.
- 1850 A.D. That prayer is superstition. Here, drink this potion.
- 1940 A.D. That potion is snake oil. Here, swallow this pill.
- 1985 A.D. That pill is ineffective. Here, take this antibiotic.
- 2000 A.D. That antibiotic is artificial. Here, eat this root.

What is Evidence Based Integrative Research

- Question Western research standards which test only one parameter in isolation
- Consider traditional cultures and historic use
- Introduce systems approach to research (more consistent with integrative principles)
- Consider best available evidence
- Evaluate relative risk/efficacy data
- Incorporate practice based evidence

Evidence Based Grading System



A-Strong Positive Scientific Evidence

B-Positive Scientific Evidence

C-Unclear Scientific Evidence

D-Negative Scientific Evidence

F-Strong Negative Scientific Evidence

Dietary Supplements



- Products intended to supplement the diet that contain at least one dietary ingredient to include:
 - Vitamins
 - Minerals
 - Herbs or other botanicals
 - Amino acids
 - and substances such as enzymes, organ tissues, glandulars, and metabolites

Dietary Supplements

- Supplements are taken by mouth
- Oral forms include:
 - Tablets
 - Capsules
 - Softgels
 - Gelcaps
 - Liquids
 - Powders
 - Bars

Do NOT include transdermal, injected etc.

The Dietary Supplement Health and Education Act 1994

- Limit impediments to marketing/promoting DS
- Provide for wide availability of DS to consumers
- Enhance information available to consumers
- Food and Drug Administration (FDA) given regulatory control over DS

Dietary Supplement Health and Education Act 1994

- Allows for product labeling claims as long as it does not diagnose, prevent, treat or cure a specific disease.
- The statements must be truthful and not misleading, but no a review/approval process by the FDA is established.
- No longer regulated as foods and are not subject to pre-market safety evaluations.

Dietary Supplement Claims

- Health claim: describes the relationship between a substance and a disease condition; FDA does not approve, but must be notified
- Qualified health claim: based on emerging scientific evidence; must be approved by FDA
- Structure-function claim: most common; does not claim to prevent disease, but a physiological effect is noted

Allowed Claims

Allowed

- Helps increase blood flow to the heart.
- Promotes urinary tract health
- Supports cognitive function.
- Reduces stress and frustration

Not Allowed

- Prevents heart disease
- Prevents urinary tract infections.
- Reduces risk of Alzheimer's Disease.
- Improves depression.

What Makes a Good Supplement?

- Free of contamination
- Contains the ingredients on the label
- Contains an effective form of the ingredient
- Dosage is safe and efficacious
- Free of allergens
- Well absorbed
- Trackable
- Follows Good Manufacturing Practices (GMP)

Caveat Emptor (Buyer Beware)

- No regulatory control or premarket testing
- Marketing/advertisements can be misleading and deceptive
- Effectiveness claims may not be credible
- The concentration and quality of active ingredients can differ from product to product

Caveat Emptor (Buyer Beware)

- Study of 12 brands
 - 11/12 contained <90% or >110% of amount listed on label
 - 5/12 contained at least one ingredient not listed on label
 - 2/12 were missing at least one ingredient listed on label
- Study of 240 supplements
 - 18.8% contained steroids or pro-hormones not listed on label

Green, 2001; Geyer, 2004

Purity



- 25% supplements are contaminated with heavy metals, steroids and/or medications
- FDA requires that DS are
 - Produced in a quality manner
 - Free of contaminants or impurities
 - Accurately labeled
- ***Manufacturers are required to test all ingredients to ensure quality***

Caveat Emptor (Buyer Beware)



- Sales from large internet retailers are not recommended
- If you find a name brand online that is markedly cheaper than elsewhere question why
 - May be expired and relabeled, or counterfeit
 - Can you track the source of the item? Major third party retailers are not responsible for the quality of the items processed through them
 - If the manufacturer does not sell to the retailer, how are they getting the product?

Third Party Verification

- Optional
- Often requires payment to verifying organization
- Some examples
 - US Pharmacopeia (USP) Verified
 - Consumer Labs (CL)
 - NSF International
 - Non-GMO Project Verified

Quality Management

- United States Pharmacopeial Convention (USP)
Dietary Supplement Verification Program (DSVP)
- Certification mark (**USP®**) indicates that the product contains the dietary supplement listed on the label in the stated amount and that the product is manufactured properly
 - Does not speak to the safety or efficacy of the ingredients, only to good manufacturing practices

Identifying Quality

- Certain Manufacturers will not show verification seal on packaging



ConsumerLab Evaluation of 20 Multivitamins

Vitamins that failed:

- The Vitamin Shoppe Multivitamins Especially for women: Contaminated with lead
- — Hero Nutritionals Yummi Bears: Had twice the labeled amount of vitamin A
- — Nature's Plus Especially Yours for Women: Took twice as long as allowed to disintegrate
- — AARP Maturity Formula: Took nearly twice as long as allowed to disintegrate
- — Eniva VIBE: Only 54 percent of claimed vitamin A
- — Pet-Tabs Complete Daily Vitamin-Mineral Supplement for Dogs: Contained lead

- Accessed at MSNBC <http://www.msnbc.msn.com/id/16655168/>
- Released 1/2007

Is a stamp of approval enough?

ConsumerLab Study of 20 Multivitamins

Vitamins that passed:

- Centrum Silver
- Member's Mark Complete Multi
- One A Day Women's
- Flintstones Complete

✦ <http://www.msnbc.msn.com/id/16655168/> January, 2007

Supplement Facts

Serving Size 1 Tablet

	Amount Per Serving	% Daily Value Children 2-3 years old	% Daily Value Adults & Children 4 or more years old
Calories	5		
Total Carbohydrate	1 g	†	<1%**
Sugar	1 g	†	†
Vitamin A (as palmitate) (as beta carotene)	1498 IU 500 IU	100%	50%
Vitamin C (as sodium ascorbate)	60 mg	150%	100%
Vitamin D (as cholecalciferol)	400 IU	100%	100%
Vitamin E (as dl-alpha tocopheryl acetate)	15 IU	150%	50%
Thiamin (Vitamin B-1)	1.05 mg	150%	70%
Riboflavin (Vitamin B-2)	1.2 mg	150%	71%
Niacin (niacinamide)	1.0 mg	111%	50%
Vitamin B-6 (as pyridoxine HCl)	1.05 mg	150%	53%
Folic Acid	0.3 mcg	150%	75%
Vitamin B-12 (as cyanocobalamin)	4.5 mcg	150%	75%
Sodium	10 mg	<1%	<1%

**Percent Daily Values are based on a 2,000 calorie diet.
†Daily Value not established.

Other ingredients: Sucrose, vegetable magnesium stearate, silicon dioxide, adipic acid, FD&C yellow #6 lake (sunset yellow), SD flavors (orange, grape, cherry, raspberry, strawberry), FD&C blue #1 lake, carmine #40 lake, FD&C red #40 lake, ethyl maltol, FD&C blue #2 lake, food starch, dextrose, dl-a-tocopherol, hydrolyzed gelatin, sodium citrate, sorbic acid, sodium benzoate, dibasic calcium phosphate, mono and diglycerides, vegetable stearic acid and citric acid.

Directions: For children 2 years and older, chew one tablet daily.

FLINTSTONES COMPLETE includes

**Sucrose, FD&C
yellow #6, lake,
FD&C blue 31
lake, carmine
#40lake, FD&C
red 340 lake,
FD&C blue #1
lake, destrose,
sodium benzoate,
citric acid**

Check the Label

- The appropriate daily dosage
- The list of ingredients used to identify fillers, potential allergens
- Lot number
- Expiration date
- Recognized seal of approval (Good Housekeeping, USP, Consumerlab)
- Compare prices from reputable suppliers

Debusk, RM. A practical guide to herbal supplements for nutrition practitioners. *Top Clin Nutr* 16:53, 2001

Allergens and Excipients

- Free of Common allergens?
 - Vitamin C may be corn based
 - Soy Lecithin
 - Dairy or yeast substrates
- Fillers-
 - e.g. magnesium, stearate, rice starch

What Form

- **Folate/Folinic/5MTHF**
 - Concerns re folic acid
- **Vitamin E-**
 - mixed tocopherols vs. alpha, d
 - vs. dl
- **Niacin or niacinamide-**
 - Heart disease
 - Flushing
- **B6 or P5P-most active form**

What Form

- **Calcium**
 - citrate , carbonate, others- absorption
 - single or combined with Mg, D, etc.
- **Magnesium**
 - Purpose? Calming, laxative. muscle soreness
 - Citrate, taurate, glycinate etc.
- **Chelated minerals-combined with an amino acid for increased bioavailability**

Formulations Used in Research

- Tishcon Qgel ® , HydroQSorb ® CoQ10
- PharmaNAC™
- Quatrefolic ® 5MTHF
- Meriva ® or BCM-95 ® curcumin

Testing Raw Materials

- Strength
- Heavy Metal, pesticide or solvent contamination
- Fungus, mold, aflatoxins or other microbial contamination
- Rancidity
- GMOs, other environmental pollutants

Proof and Testing

- Where do the raw materials come from?
 - proof of routine testing of each batch of raw materials
- Are products lot tested and tests available?
 - Is there proof of finished product testing to verify label claims
- Are samples from each lot archived
- Can the retailer be identified?
- Is there proof of stability testing to verify label claim for strength through expiration

Know Your Botanicals

- Complete botanical name of the product
 - **Siberian Ginseng** – *Eleutherococcus Senticosus*
 - **American ginseng**-*Panax Quinquefolius*
- The part of the plant used to make the product;
 - Should be the active component
 - Root, leaf, rhizome
- The concentration of the botanical

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Scheduling

- With meals, or between? e.g. Amino acids
- AM or PM e.g. B complex
- Which compounds can be combined or should not be taken together?
 - Antibiotics and probiotics
 - Iron and Vitamin C

Common Nutrient Deficiencies in ASD

- Calcium
- Vitamin D
- Magnesium
- Omega-3 fatty acids
- Fiber
- Zinc
- Vitamin B12
- Folate

DRI vs. Therapeutic Dose

- DRI recommendations designed to avoid a deficiency disease
- Do not address therapeutic or optimal doses
- Designed for general population, not those with disorders, diseases, or maldigestion

Pediatric Dosing

- Not always the same as adult dosing
- If using adult products, determine appropriate dose
 - Often 1/3 adult dose
 - May be based on weight
 - Clinical judgement

Drug/ Supplement/Nutrient Interactions

Antifungals

- **pH dependant**
 - Can be impaired by acid suppressors

- **Depletions**
 - ✦ Magnesium
 - ✦ Potassium
 - ✦ Ketoconazole inhibits 25 OH D synthesis

Corticosteroids

- Commonly prescribed for Asthma
- LT use may stunt growth and cause bone loss
- Depletes
 - Calcium
 - D
 - Selenium
 - Phosphorous
 - Glucose

Valproic Acid

- CALCIUM
- Moderate
- Folic Acid
 - L-carnitine, acetyl carnitine
 - Niacin and Niacinamide
 - Selenium

Acid Suppressors

Pepcid, Zantac, Nexium

- Moderate: Vitamin B12 (protein bound, not supplemental)

Nexium

- Major: Magnesium

Oral Contraceptives

- Moderate: Folic Acid, Magnesium

Antibiotics

Depletions:

- GI FLORA
- Calcium, Mg, Mn, Zn
- Biotin
- Potassium
- Vitamin C,K
- All B vitamins

Essential Fatty Acids

Caution:

- May reduce platelet aggregation-Stop fish oil before surgery
- May increase LDL cholesterol

Supportive:

- Asthma
- Antidepressants

Probiotics and Prebiotics

Interactions

Antibiotic therapy-take at a different time of day

Supportive

Increases production of B vitamins

Caution

9 reported cases of severe invasive fungal infection after use of *saccharomyces boulardii* in people with prior debilitation or impaired immune function

B vitamins

LT use of NSAIDS, Ibuprofen depletes B vitamins

- Folate
 - Interferes with absorption of and should be taken away from Antibiotics (along with all other B vitamins)
- B1, B2, B3
 - should be taken together for optimal effect
 - Enhance action of antidepressants
 - Take during antibiotic tx but at different time

B vitamins



- **B6**
 - Supportive with Acid suppressors, antidepressants, antibiotics
 - Enhances Mg uptake
 - May damage sensory nerves at doses >100mg/d
- **B12**
 - Supportive with Acid suppressors, antidepressants, antibiotics
 - Depleted by Seizure meds, Antibiotics
 - Absorption decreased by GERD medication

B Vitamins



- **Biotin**
 - Depleted by antibiotics, anticonvulsants (phenytoin, phenobarbital)

Antioxidants



- **Vitamin C**
 - Laxative effect
 - Supportive with some antipsychotics
 - Caution-may increase oxalates
- **Vitamin E-depleted by anticonvulsants**
- **Selenium**
 - No more than 200mcg daily-skin rash, neurologic alterations
 - Depleted by valproic acid
- **Glutathione-depleted by acetaminophen**

Minerals



- **Calcium**
 - Caution-impairs antibiotic uptake give 4 h away
 - Take with Mg and D for improved utilization
 - Depleted by seizure meds (e.g.phenytoin)
 - Depletes fe, mg, Mn, Zn
- **Magnesium**
 - May cause diarrhea, bind antibiotics, ↓Mn
- **Zinc**
 - competes with Cu, Fe, Ca. Mg
 - May bind antibiotics

Mitochondrial Support

- Carnitine
 - Depleted by valproic acid
- CoQ10
 - Depleted by Tricyclic antidepressants, antipsychotics

Vitamins A and D

- Vitamin A
 - Supportive- synergistic effect with iron supplement
 - Teratogen?
- Vitamin D
 - Supportive with antidepressants
 - Depleted by anticonvulsants, stimulant laxatives

Amino Acids



- **Taurine**
 - Reduces platelet aggregation
 - May lower blood sugar
- **GABA-caution with antianxiety meds-additive**
- **5-HTP**
 - Caution with SSRIs and other antidepressants. May cause serotonin syndrome
 - May improve seizure activity

Antimicrobials



ALWAYS take away from probiotics!!

- **Garlic**
 - Enhances effect of Blood thinners
 - May lower blood sugar-caution with DM medications (Actos)
- **Cat's Claw**
 - Protects against GI damage from NSAIDS
 - Avoid with immunosuppressants, since Cat's Claw is an immune stimulator
 - Antiplatelet effects
 - Avoid with renal dysfunction- may be nephrotoxic

Antimicrobial



- **Oil of Oregano**
 - Avoid if allergic to mint, sage, thyme, basil, marjoram
- **Cinnamon**
 - May reduce platelet aggregation
 - Lowers blood sugar
- **Uva Ursi**
 - Short term use only-hepatotoxicity, seizure activity
 - Caution in pediatrics
 - Avoid with Spironolactone

Antimicrobials



- **Goldenseal/Berberine**
 - May increase stomach acid- avoid with acid suppressors
 - May reduce effects of tetracycline
 - Improves insulin resistance- caution with DM meds

Pycnogenol



Take with food

May have antimicrobial properties

- **Caution:**
 - DM- may lower BG
 - Reduces platelet aggregation
 - May reduce histamine release

Anti inflammatories



- **Curcumin**
 - Cautions with allergy to ginger, yellow food coloring
- **Quercetin**
 - Nephrotoxic in doses > 945g

Gut Healers



Mucilaginous herbs may block absorption of medication taken simultaneously

- **Slippery Elm**
 - SCD illegal
- **Marshmallow**
 - SCD illegal
- ***Deglycyrrhizinated* licorice**
 - SCD illegal
 - Caution- glycyrrhizinated form may cause HTN
 - Increases Iron absorption

Melatonin



- Reduces effect of SSRI in animals. Fluoxetine (Paxil) depletes Melatonin levels
- May increase bleeding-caution with blood thinners
- May inactivate steroids and immunosuppressants
- Depleted by anticonvulsants, NSAIDS

Enzymes

Proteolytic enzymes inhibit folate absorption

Activated Charcoal

Caution

Absorbs all other medications, supplements

Separate by 2 hours

Take Away

- Manufacturers of DS do not have to demonstrate safety or effectiveness
- Quality of supplements can vary widely
- Third party testing is important but not sufficient
- Know the appropriate form of the nutrient or botanical
- Learn about interactions and depletions
- Know the appropriate dose and schedule
- Find a knowledgeable practitioner

Thank you.

Questions?