

Nutritional and Health Benefits of Soy



Vijaya Jain, MS, RD, CDN

National Soybean Research Laboratory
University of Illinois, Urbana- Champaign
Urbana, IL

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Apple Pie



What is Nutrition?

- The science or study that deals with food and nourishment
- The process by which living organisms obtain food and use it for growth, metabolism and repair. The stages of nutrition include ingestion, digestion, absorption, transport, assimilation and excretion
- The scientific study of food and nourishment, including food composition, dietary guidelines for normal and therapeutic health



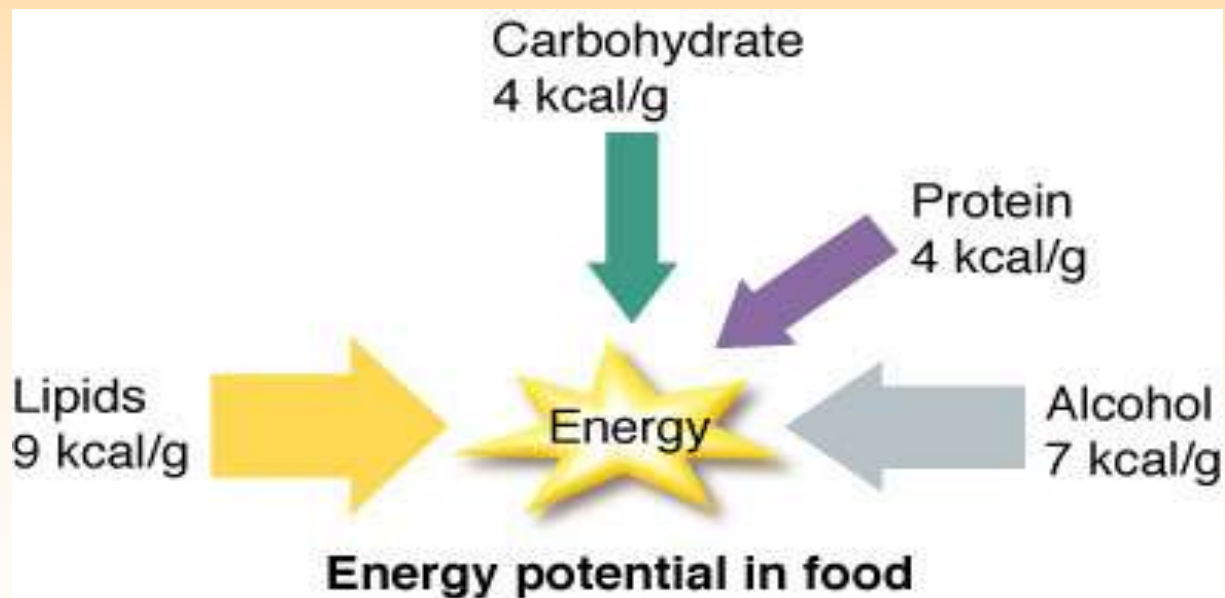
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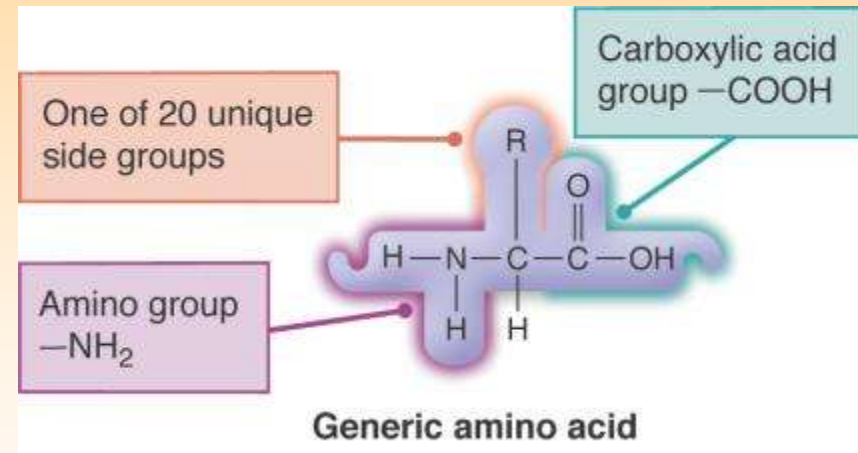
Energy in Foods

Measured in kilocalories (kcal)

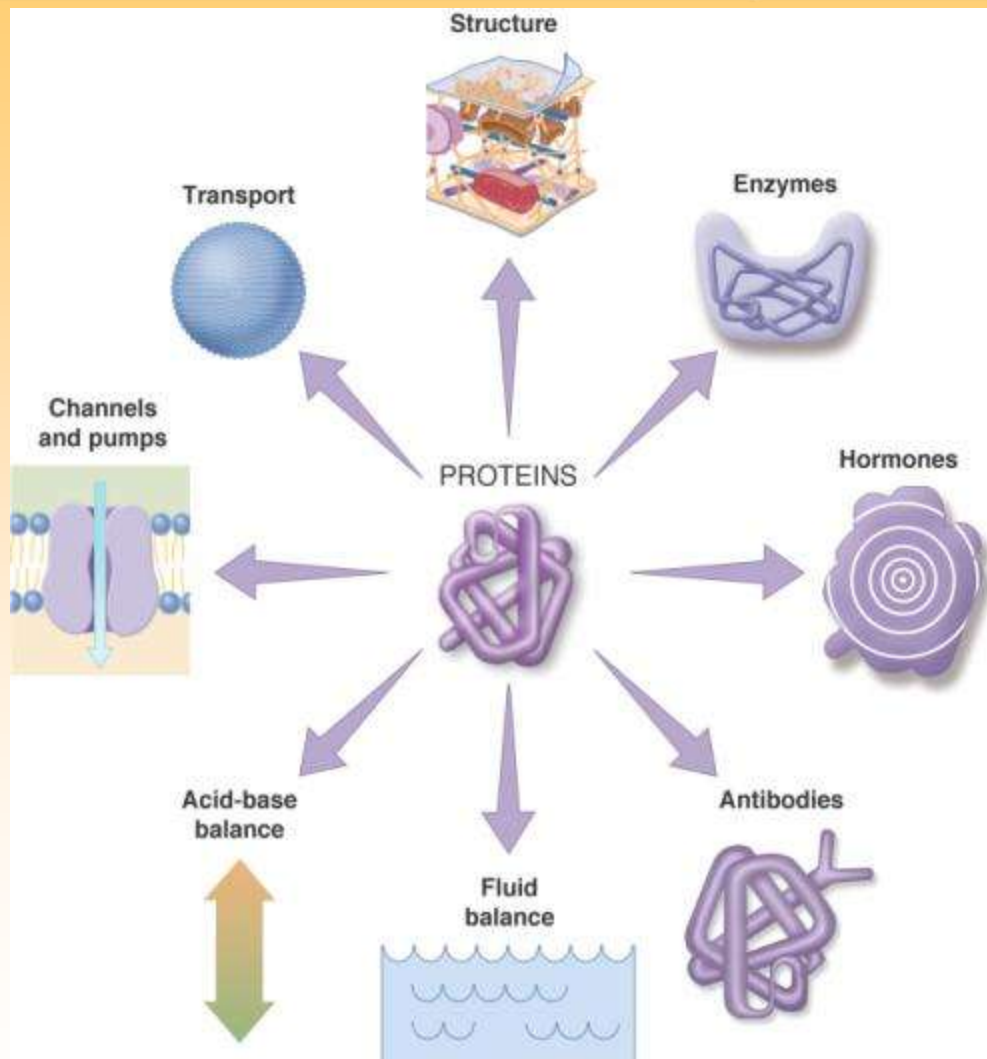


Amino Acids Are the Building Blocks of Protein

- Proteins are sequences of amino acids
- Types of amino acids
 - Essential: most come from diet
 - Nonessential: can be made in the body



Functions of Body Protein



Recommended Protein Intake for Infants, Children and Teenagers

AGE	Protein RDA (g/kg body weight)
0-6 months	1.52
7-12 months	1.20
1-3 years	1.05
4-8 years	0.95
9-13 years	0.95
14-18 years	0.85

Infants who are growing rapidly have the highest protein needs relative to body weight

Source: Institute of Medicine, Food and Nutrition Board.

Protein Intake for Adults

Daily range of protein intake for adult males 71- 101 gms
(This is app. 1.0 to 1.4 gms/ Kg of reference body wt. of 70 Kg)

Daily range of protein intake for adult females 55- 62 gms
(This is app. 0.96 to 1.1 gms/ Kg of reference body wt. of 57 Kg)

Pregnant and lactating women need extra protein 1.1 gms/Kg
(This is an increase of 25 gms over the RDAs for women)

Severe physical stress, infections, burns, fevers, and surgery all increase protein losses and diet must replace that lost protein

Proteins in the Diet

- Protein quality
 - Complete proteins
 - Supply all essential amino acids
 - Animal proteins, soy proteins
 - Incomplete proteins
 - Low in one or more essential amino acids
 - Most plant proteins
 - Complementary proteins
 - 2 incomplete proteins = complete protein



Proteins in the Diet

- Evaluating protein quality
 - Amino acid composition
 - Digestibility
 - Protein Digestibility–Corrected Amino Acid Score (PDCAAS)
 - Used to determine %DV
- Protein and amino acid supplements
 - Generally not needed with risks unknown



Protein Digestibility Corrected Amino Acid Score

- Commonly referred to as PDCAAS
- Official method used by WHO, FDA and USDA
- PDCAAS is amino acid score (amino acid pattern of a protein relative to amino acid needs) with a correction factor for digestibility
- PDCAAS uses human amino acid requirements to calculate the amino acid score
- The amino acid requirements developed by WHO
- Reference is for 2 - 5 year old children. This is the most demanding group besides infants



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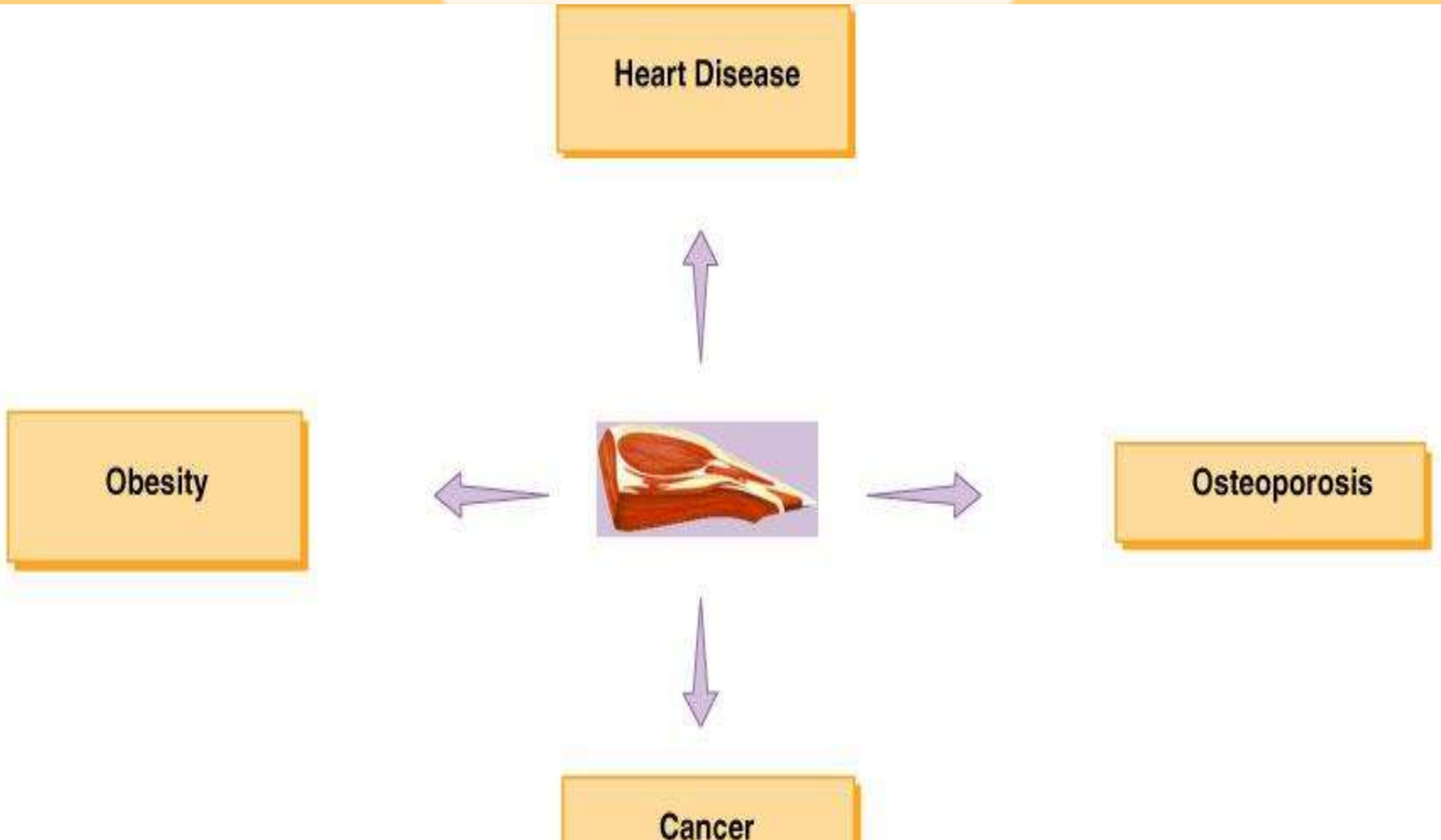
Effects of Too Little Protein

Protein-energy malnutrition (PEM)

- Kwashiorkor
- Marasmus
- Stunting
- Wasting
- Underweight



The Health Effects of Too Much Protein



Protein (Nitrogen) Balance

- A pregnant woman adds protein so she has a positive nitrogen balance.
- A healthy person who is neither gaining nor losing nitrogen is in nitrogen equilibrium.
- A person who is severely ill and losing protein has a negative nitrogen balance.

Proteins in the Diet

Meat, poultry, fish, eggs, milk, legumes, grains, and vegetables are all sources of protein.



ADA Position on Vegetarian Eating

- It is the position of the American Dietetic Association and Dietitians of Canada that appropriately planned vegetarian diets are healthful, nutritionally adequate, and provide health benefits in the prevention and treatment of certain diseases.

What is Soy?



- One of nature's wonderful *nutritional* gifts
- Excellent, *inexpensive* source of *plant protein* with the potential to be used as substitutes for animal protein sources
- Cultivated for many centuries in south east Asia, a *versatile* and common food

Soy is Nutritious

- Contains all 3 macronutrients
- Contains all essential amino acids
- Good quality fatty acid profile
- Rich in most minerals
- Contains all important vitamins
- Good source of complex carbohydrates
- Contains many phytochemicals



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SOY: A BETTER PROTEIN

Product	Protein Digestibility Corrected Amino Acid Score (PDCAAS)
<i>Soy protein</i>	<i>0.90 -1.00</i>
Whole wheat	0.4
Wheat gluten	0.25
Rice	0.47
Corn	0.42
Oats	0.57
Kidney bean	0.68
Chickpeas	0.71
Pea	0.73
<i>Egg white</i>	<i>1.00</i>
Beef	0.92



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Higher Protein

Commodity	Protein per 100 gms (in gms)	Calories per 100 gms (in Kcal)
Defatted Soy Flour	53	329
Textured Soy Protein	60.5	334
Wheat Flour	10.3	364
Corn meal	8.5	366
Rice	7.1	365
Wheat Soy Blend	21.5	355
Soy Bulgur	18.2	340
Corn Soy Blend	17.2	376
Lentils	28.1	338
Peas	24.6	341

Soy Improves Food Products

- Bland
- Absorbs flavor
- Emulsifies
- Increases whiteness
- Improves texture
- Retains moisture
- Absorbs fat
- Keeps product fresh for longer time

Asian vs. Western Consumption of Soy Foods

- **Asian use dates back 100s of years**
 - Entire soybean is used to make foods
 - Fermented products more common
 - Soy sauce, miso, tempeh
 - **Intake of soy protein from soy in Japan and China is 8-12 grams per day, 10% of total protein intake**
- **Western countries use more processed products**
 - Soy protein isolate, soy flour, soy oil, textured soy
 - Intake of soy protein is small--1-3 grams per day
 - **Health claim is for 25 g/d, based on clinical studies of cholesterol lowering effect**



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Health Benefits of Soy and Soy Products

- Help lower cholesterol levels
- Reduce hypertension
- Risk of certain cancers reduced
- Regulate glucose levels in diabetes
- Bone density may increase
- Improve renal function in kidney disease
- Help regulate menopause
- Promote weight loss



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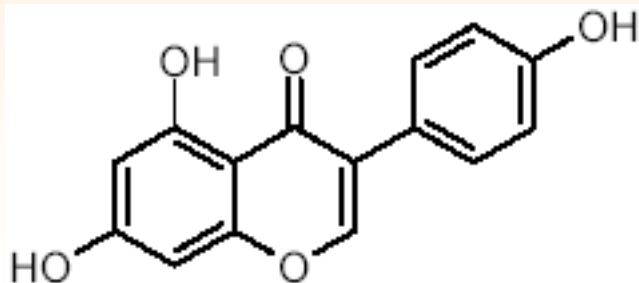
Phytonutrients

- Beneficial compounds in plants that are protective or disease fighting
- Fruits, vegetables and grains are good sources of phytonutrients
- Soybeans provide phytonutrients



Possible Cancer Reduction by Soy Protein & Isoflavones

- Reduce risk of certain kinds of breast cancer
 - Timing is everything: early life exposure to soy reduces adult risk?
- Prostate cancer risk lowered



Questions About Isoflavones

- Why is it good to include foods that are good sources of isoflavones in the diet?
- What activities of isoflavones are a concern?
- What foods are sources of isoflavones?
- Are there reasons why we should not consume foods with isoflavones?



Some Isoflavones in Foods (mcg/g fresh wt)

Type of Food	Genistein	Daidzein	Glycitein
Soybeans	335–1201	452–1138	37–145
Soy milk [mg/mL]	52–168	26–126	2–16
Tofu	111–304	73–191	15–39
Miso	51–398	35–363	4–53
Soy oil	ND.-3	ND-1	ND
Soy sauce [mg/mL]	ND-3	ND-9	ND-5
Soy flour	876–1155	715–1496	306–593
Soy protein isolate	272–1106	77–689	54–264
Tempeh	316–320	193–273	22–32
Soy cheese	3–150	3-98	3–53
Garbanzo beans	<1	ND	NI
Beans, dry, different varieties	ND-7	ND-0.2	ND

Soy Based Infant Formulas

- Maternal breast milk is safest, most nutritionally adequate form of infant feeding
- Use of soy based infant formulas (SBIF)
 - Nutritional needs not met by breast or cow's milk-based formula
 - Lactose-free for galactosemia and lactase def.
 - Vegetarian-based
- American Academy of Pediatrics in 1998 confirmed safety of SBIF for most term infants



Conclusions



- ❖ Adequate and good nutrition is essential for everyone
- ❖ Soy helps increase protein and other nutrients in the meals
- ❖ Soy products are an excellent of complete proteins
- ❖ Soy products are easy to use in feeding programs
- ❖ Soy foods are highly acceptable





Thank You!!

Questions??



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