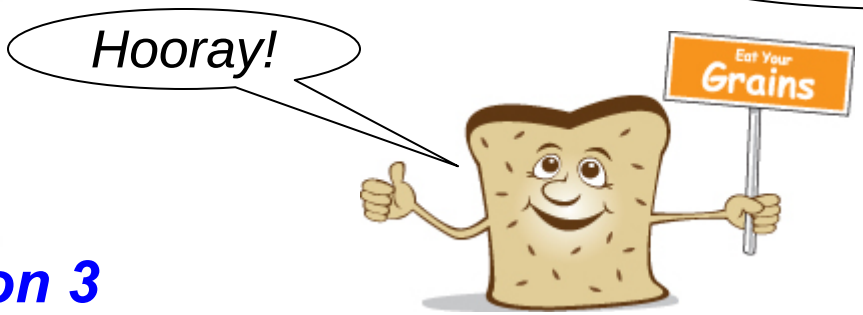
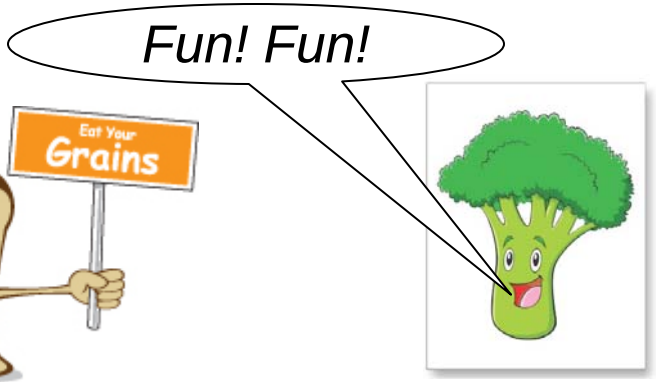
...Field trip tonight!!





BI 199 Discussion 3

I. ***Announcements*** **Paper & presentation topics due by e-mail. Questions? Tonight *Market of Choice* activity. Next M 20th *Shopping Spree Analyses*; M 27th Paper outline due + Dietary analyses: DA+ & *https://www.supertracker.usda.gov***

II. ***Connections*** **Review of *MyPlate*? S&W pp 47-9**
AICR Dietary Guidelines? Eating Like the Rainbow…?

III. ***Label Help?*** **DA+ Activity, S&W p 49-57**
American Heart Association Reading Food Nutrition Labels
FDA How to Understand & Use the Nutrition Facts Label

IV. ***Think Fitness*** **S&W p 42+ ACSM/CDC, USDA/HHS guidelines**
cf: **Diet *vs.* Exercise? Zuti & Golding 1976!**

V. ***Quiz Bowl Chapter 2*** **New groups**

VI. ***Controversy 2*** **Are some foods "superfoods"…? S&W pp 63-9**

VII. ***The Remarkable Body*** **S&W ch 3 pp 70-81**

VIII. ***Market of Choice Shopping Label Activity*** **1960 Franklin Blvd, meet in Lobby in 15-17 min, ~ 5:35 pm.**

MyPlate launched June 2, 2011!

2. **Focus on fruits. Whole fruit preferable to juice, but any fruit counts! Fill ½ your plate with fruits & vegetables!**

3. **Make at least ½ of your grains whole grains!**

5. **Get your calcium-rich foods. Buy skim or 1% milk. Go easy on cheese!**

1. **Vary your veggies. Fill ½ your plate with fruits & vegetables!**

4. **Go lean with protein. Keep protein to < ¼ plate! Nuts, beans, peas, seeds, poultry, lean meat, seafood,…**

Diet & Health Guidelines for Cancer Prevention

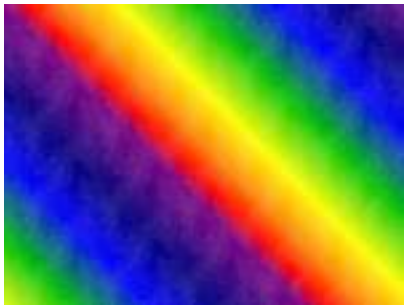
1. **Choose a diet rich in variety of plant-based foods.**
2. **Eat plenty of vegetables & fruits.**
3. **Maintain a healthy weight & be physically active.**
4. **Drink alcohol only in moderation, if at all.**
5. **Select foods low in fat & salt.**
6. **Prepare & store food safely.**

And <u>always</u>, remember...

Do not smoke or use tobacco in any form.

American Institute for Cancer Research

American Institute for Cancer Research (AICR)



Eating the Rainbow Hawaiian Style!!

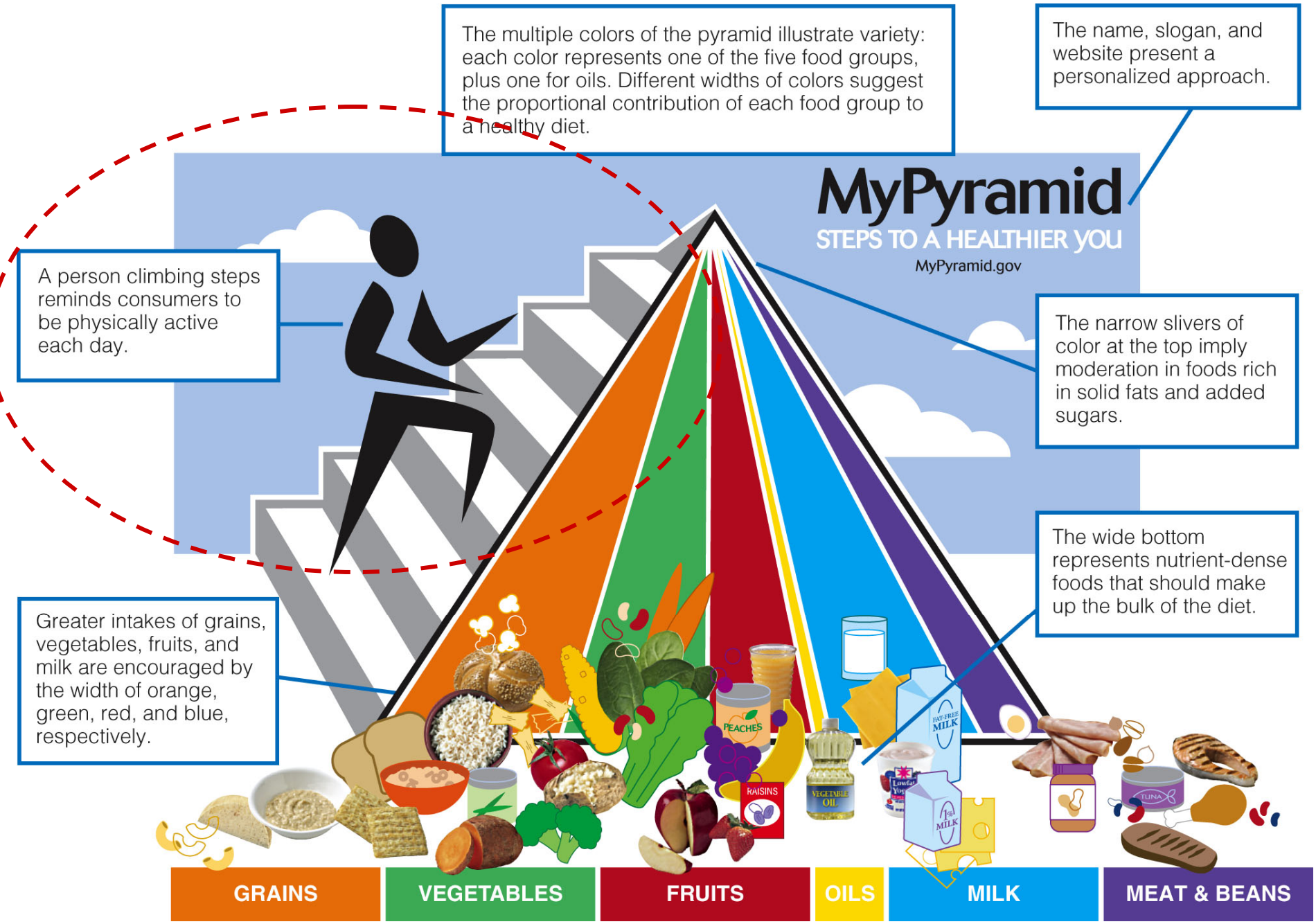
Your plate should be the size of a Frisbee, not a manhole cover.

When it comes to colorful foods, Fruit Loops don't count.

A surprising number of people get 1/5 of their calories from sodas or other liquids.

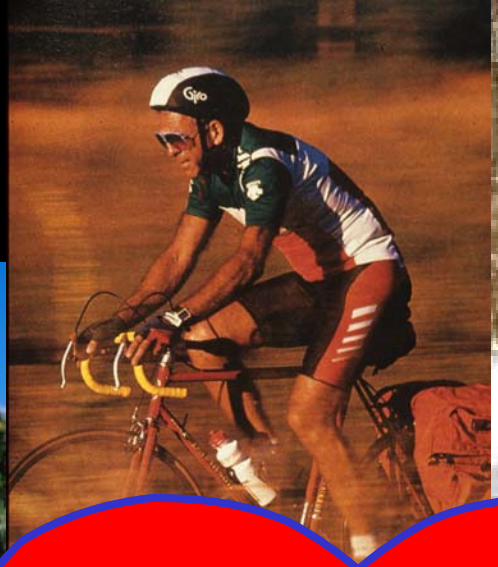
If you look at the label & need a chemistry degree to read it, put the item back on the shelf!

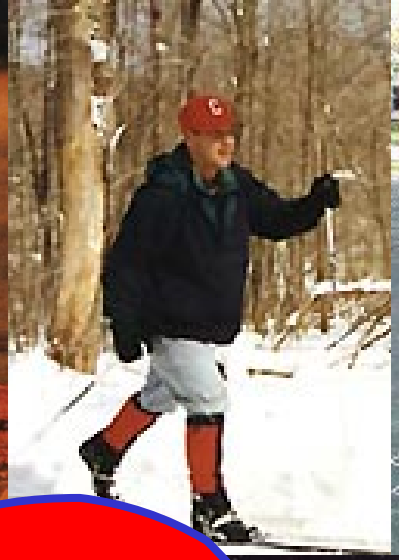
***SOURCE*:** P. Rath, *Honolulu Advertiser*, Sept 11, 2008 citing D. Chong & N. Kerr.



S&W 2011 fig 2-9 p 47

How much aerobic?





Continuous exercise

≥ 50% muscle mass

≥ Conversational pace

20-60 min/session

3-5 days/wk

http://www.acsm.org/about-acsm/media-room/news-releases/2011/08/01/acsm-issues-new-recommendations-on-quantity-and-quality-of-exercise

Federal exercise guidelines include strength training for all
http://www.health.gov/paguidelines/guidelines/default.aspx


Diet *vs.*
Exercise?

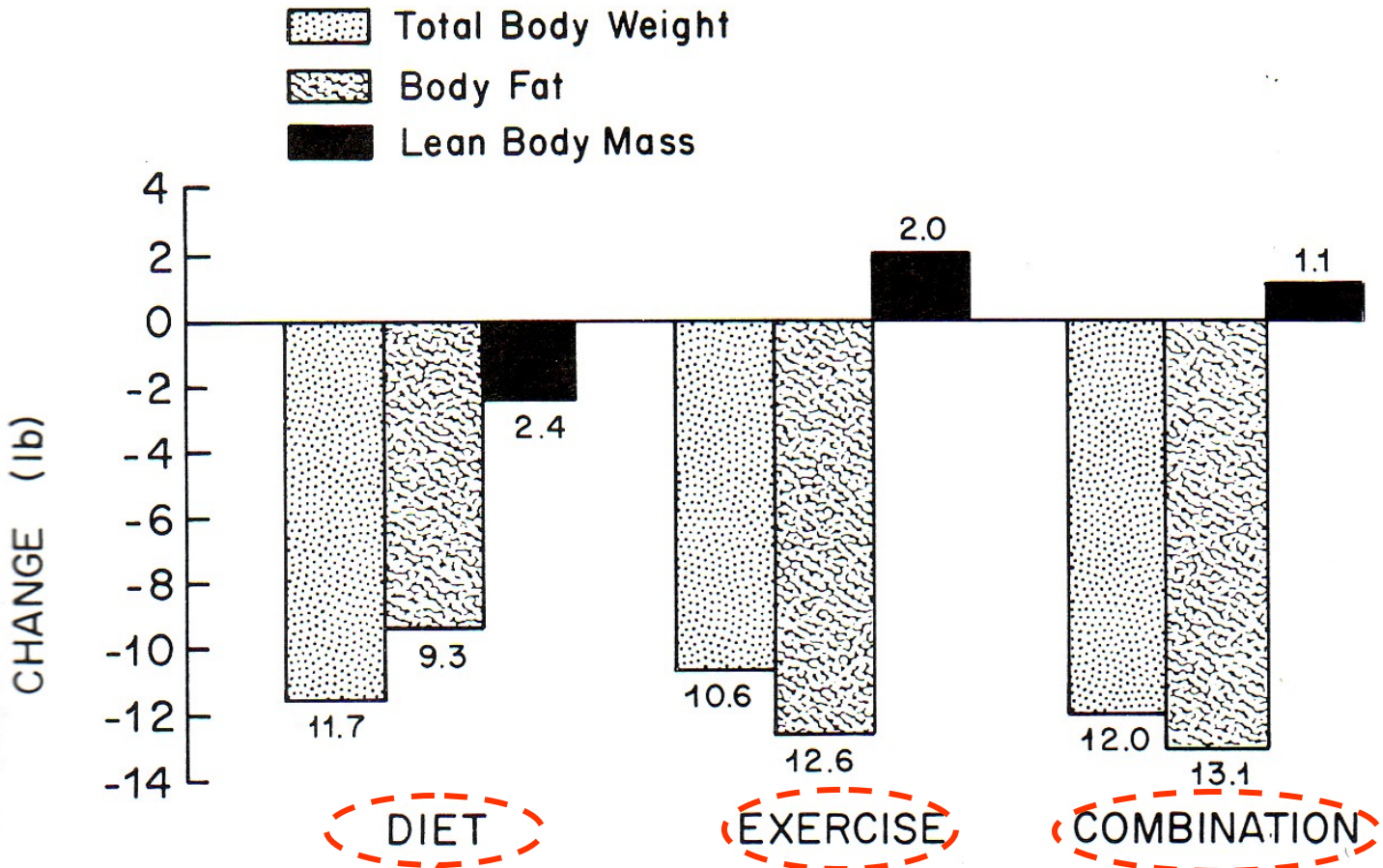


Figure 4–9. Changes in body weight, body fat, and lean body weight for diet, exercise, and combination groups. (From Zuti W. B., and Golding, L. A.: Comparing diet and exercise as weight reduction tools. **Phys. Sportsmed.** 4:49–53, 1976.)

***NB*: Each group 500 kcal deficit/day, 16 weeks**



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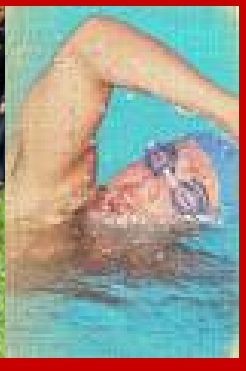


Compared to dieting, *exercise is superior* in inducing % body fat reduction & preserving lean body mass!

Quiz Bowl, Chapter 2: Group Competition

1. The *nutrient standards* in use today include all of the following *except*:
   a. Adequate Intakes (AI)
   b. Daily Minimum Requirements (DMR)
   c. Daily Values (DV)
   d. Tolerable Upper Intake Levels (UL)

2. The *Dietary Reference Intakes* were devised for which of the following purposes?
   a. to set nutrient goals for individuals
   b. to suggest upper intake limits above which toxicity is likely
   c. to set average nutrient requirements for use in research
   d. all of the above

3. According to the *USDA Food Patterns*, which of the following vegetables should be limited?
   a. carrots b. avocados c. baked beans d. potatoes

4. The *USDA Food Patterns* recommend a small amount of daily oil from *which of these sources*?
   a. olives b. nuts c. vegetable oil d. all of these

Quiz Bowl, Chapter 2: Group Competition

5. Which of the following is found on *food labels*?
   a. Daily Values (DV)
   b. Dietary Reference Intakes (DRI)
   c. Recommended Dietary Allowances (RDA)
   d. Estimated Average Requirements (EAR)

6. The *energy intake recommendation* is set at a level predicted *to maintain* body weight. T F

7. The *Dietary Reference Intakes* (DRI) are for *all people* regardless of their medical history. T F

8. People *who choose not to eat meat* or animal products need to find an *alternative to the USDA Food Patterns* when planning their diet.
   T F

9. By law, food labels must state as a *% of the Daily Values*, *vitamin A, vitamin C, niacin, and thiamin* present in food. T F

10. *Sugar-free* or *fat-free* means containing < ½ g per serving. T F

Group Work to Discuss Potential Superfoods!

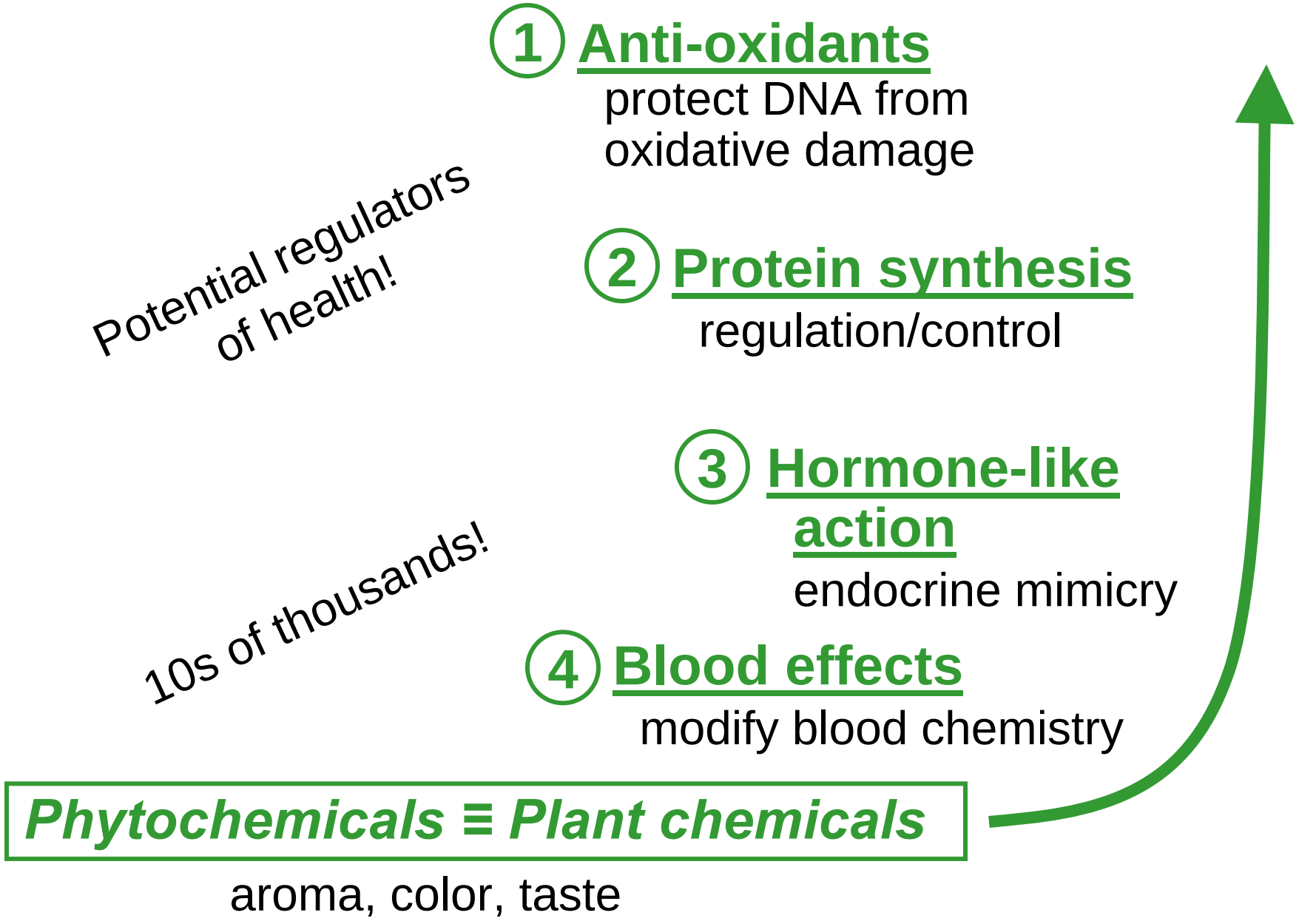
http://www.webmd.com/food-recipes/features/10-everyday-super-foods?page=2

Superfoods?

Forgetful? Blueberries sharpen brain function!

Worried about cancer? Eat tomatoes!

Too many colds? Try immune-boosting soybeans!


1 Anti-oxidants
protect DNA from oxidative damage
Potential regulators of health!
2 Protein synthesis
regulation/control
3 Hormone-like action
endocrine mimicry
10s of thousands!
4 Blood effects
modify blood chemistry
Phytochemicals ≡ Plant chemicals
aroma, color, taste

Broccoli sprouts may contain ~ 10,000 unique phytochemicals!

S&W 2014 p 68

A Wealth of Phytochemicals

All cruciferous vegetables contain powerful cancer-fighting phytochemicals, including:

diindolylmethane (DIM), one of many *indoles* found in these vegetables, has been shown to inhibit proteins associated with breast and ovarian cancers.

crambene, plentiful in Brussels sprouts, may offer the most preventive benefits when combined with *indole-3-carbinol (I3C)*.

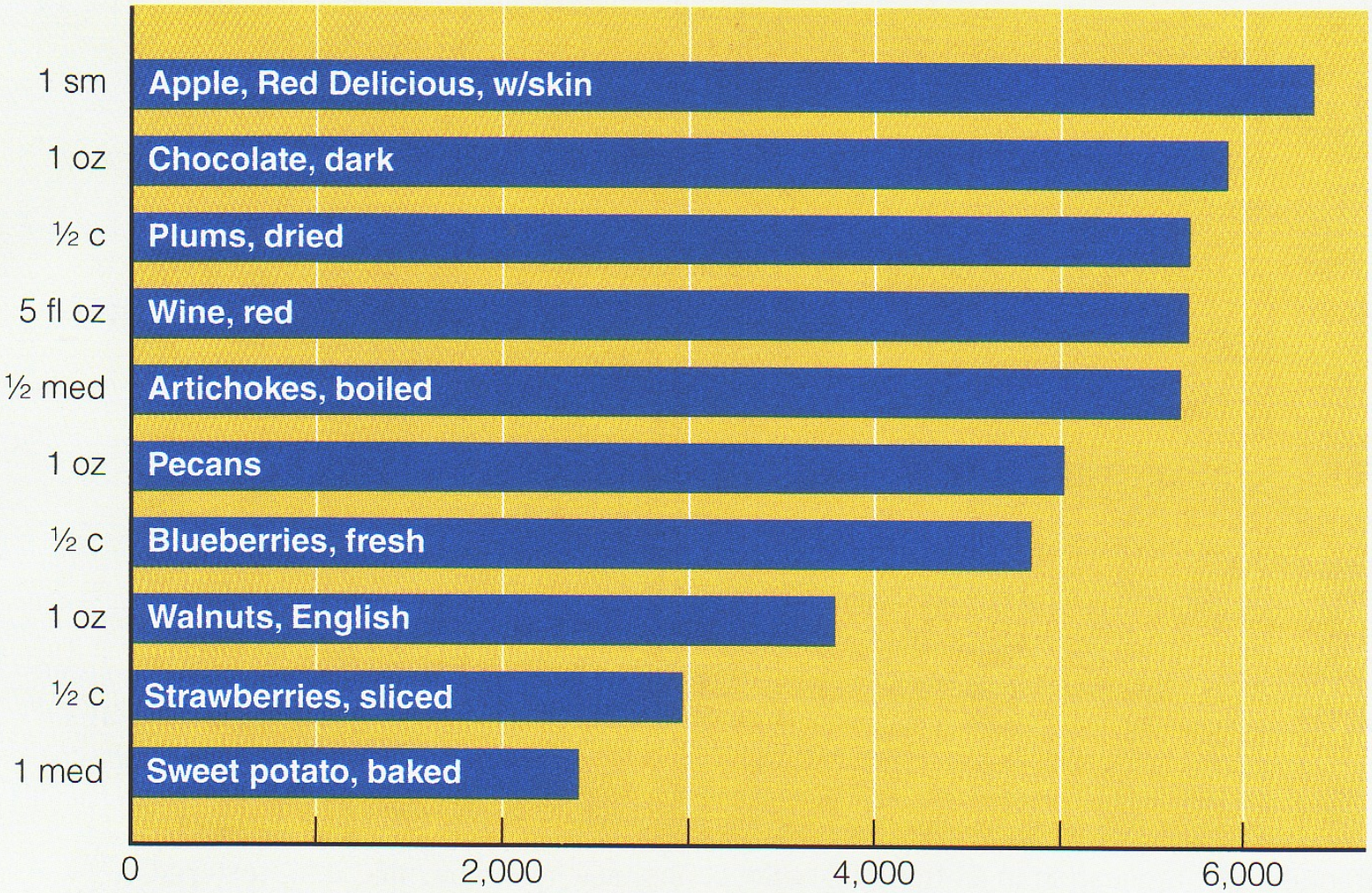
glucosinolates, which turn into powerful protective agents called *isothiocyanates* when a cruciferous vegetable is chewed or chopped. May reduce inflammation, a factor in cancer development.

TABLE C2-3 Common Foods Ranked by Antioxidant Content

1. Blackberries
2. Walnuts
3. Strawberries
4. Spinach
5. Artichokes, prepared
6. Cranberries
7. Coffee
8. Raspberries
9. Pecans
10. Blueberries
11. Cloves, ground
12. Grape juice, cranberry juice, pomegranate juice
13. Chocolate, dark, unsweetened
14. Cherries, sour
15. Wine, red

S&W 2011 tab C2-3 p 64

Antioxidant Capacity Depends Upon Seasons, Storage, Testing Methods, Variety…



[a]*Measured in micromole TE (Trolox equivalents), a laboratory-derived value used to measure the antioxidant activity of foods. Other laboratory methods yield other results.*

Source: R. M. Bliss, Data on Food Antioxidants Aid Research, November 2007, available at http://www.ars.usda.gov/is/pr/2007/071106.htm.

S&W 2014 fig C2-1 p 66

Blueberry anti-oxidant phytochemicals may reduce age-related mental declines!

S&W 2014 p 64

Dark chocolate contains an anti-oxidant flavonoid that may help the cardiovascular system

NB: Watch out for kcal, 400 in 3 oz!

S&W 2014 p 64

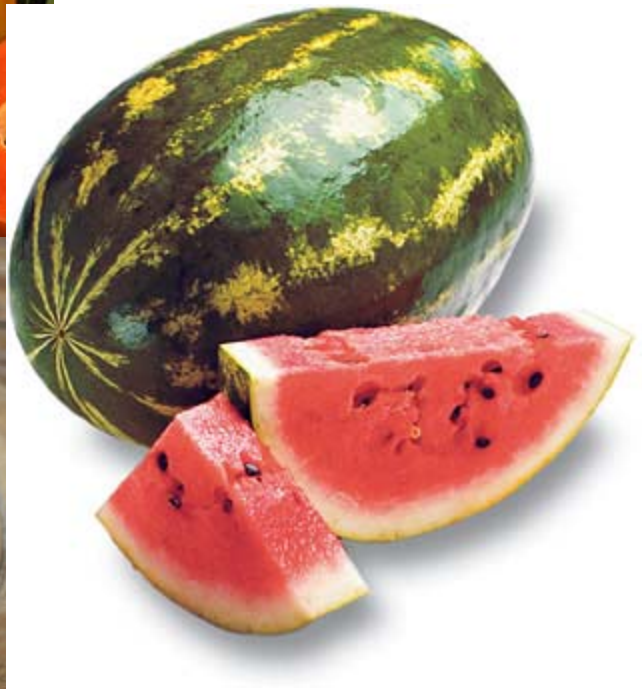
Flaxseed contains lignans converted to phytoestrogens, potential anti-cancer agents

S&W 2014 p 66

≥ 5 tomato-containing meals per week may protect from cancers of the esophagus, stomach & prostate !

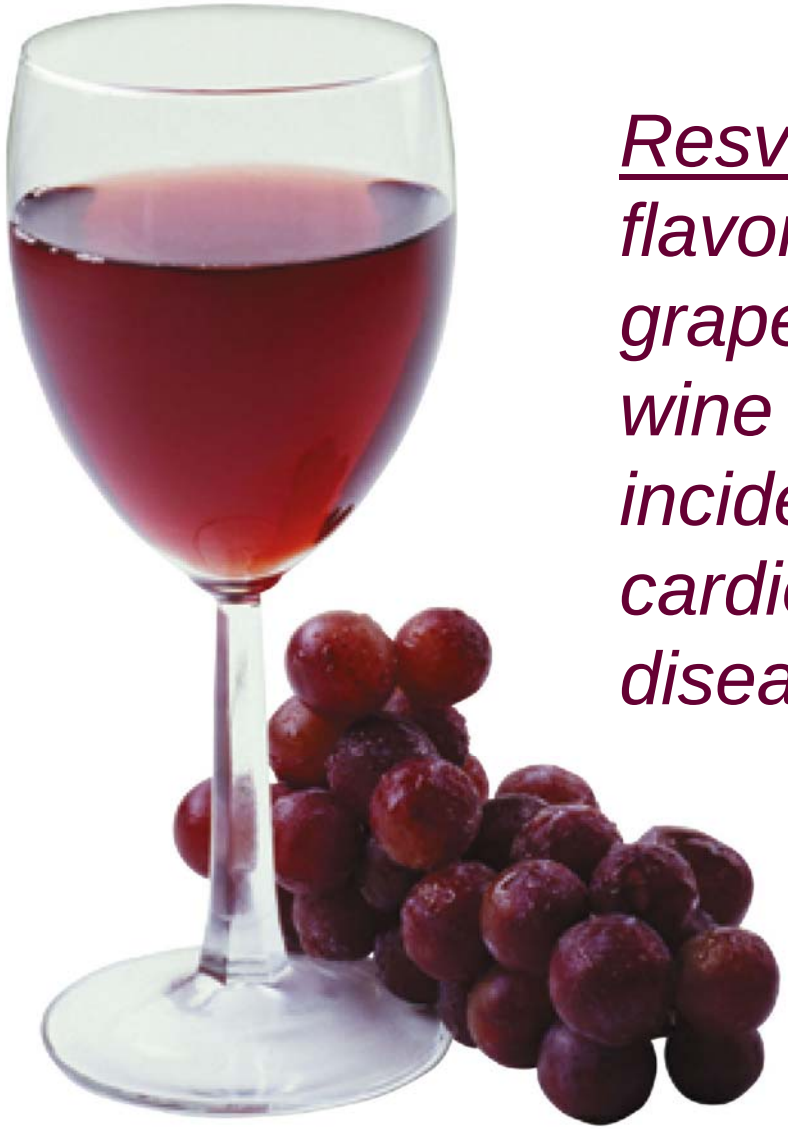
S&W 2014 p 67

...but, the phytochemical candidate, lycopene with anti-oxidant activity is also in guava, papaya, pink grapefruit & watermelon!



Garlic organosulphurs may inhibit cancer!

S&W 2014 p 66

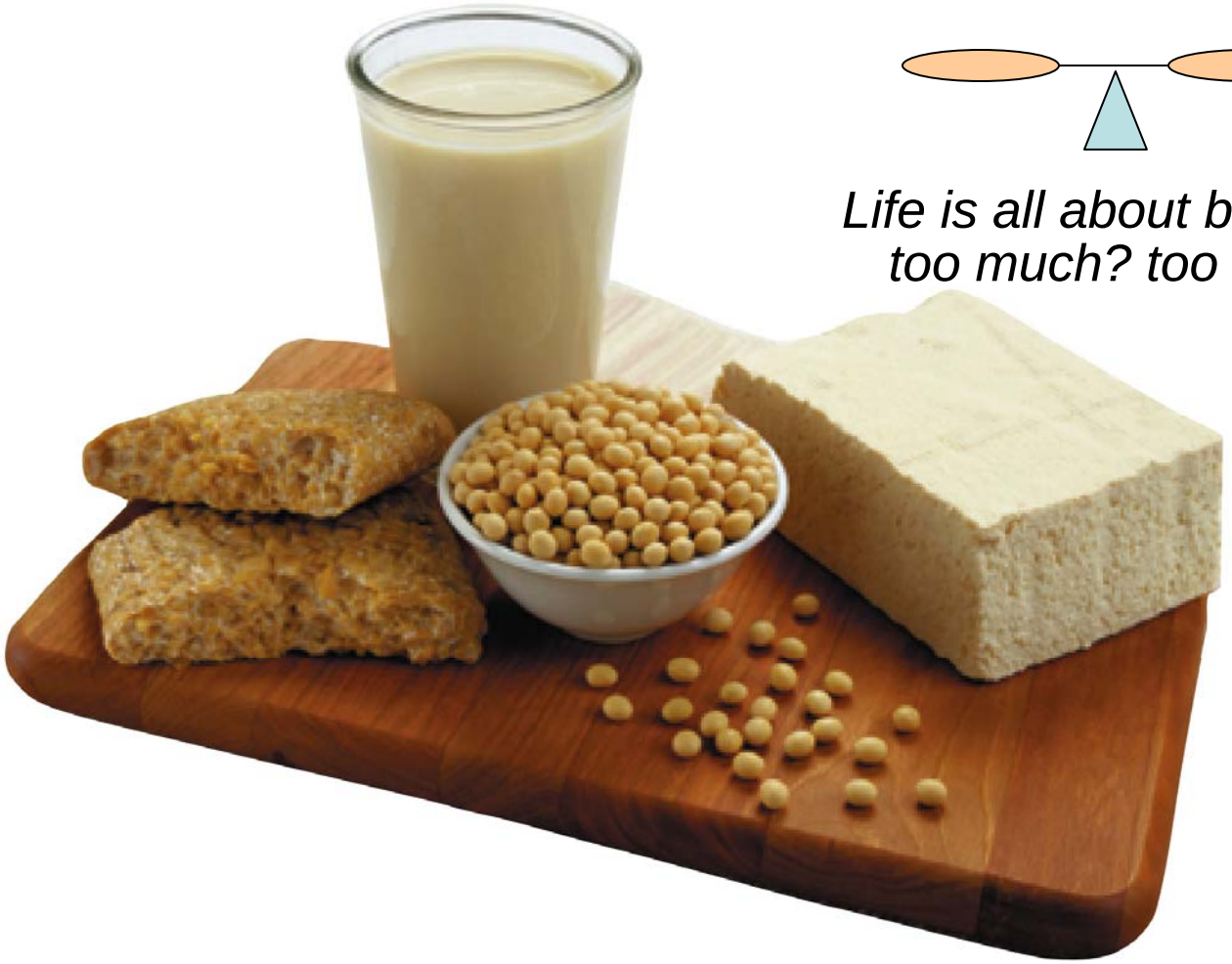


<u>Resveratrol</u>, a flavonoid in purple grape juice & red wine may lower incidence of cardiovascular diseases.

<u>NB</u>: ...but typical serving amounts may be too small to benefit human health!...Alcoholism?

S&W 2014 p 67

High doses of soy phytoestrogens may lower blood cholesterol

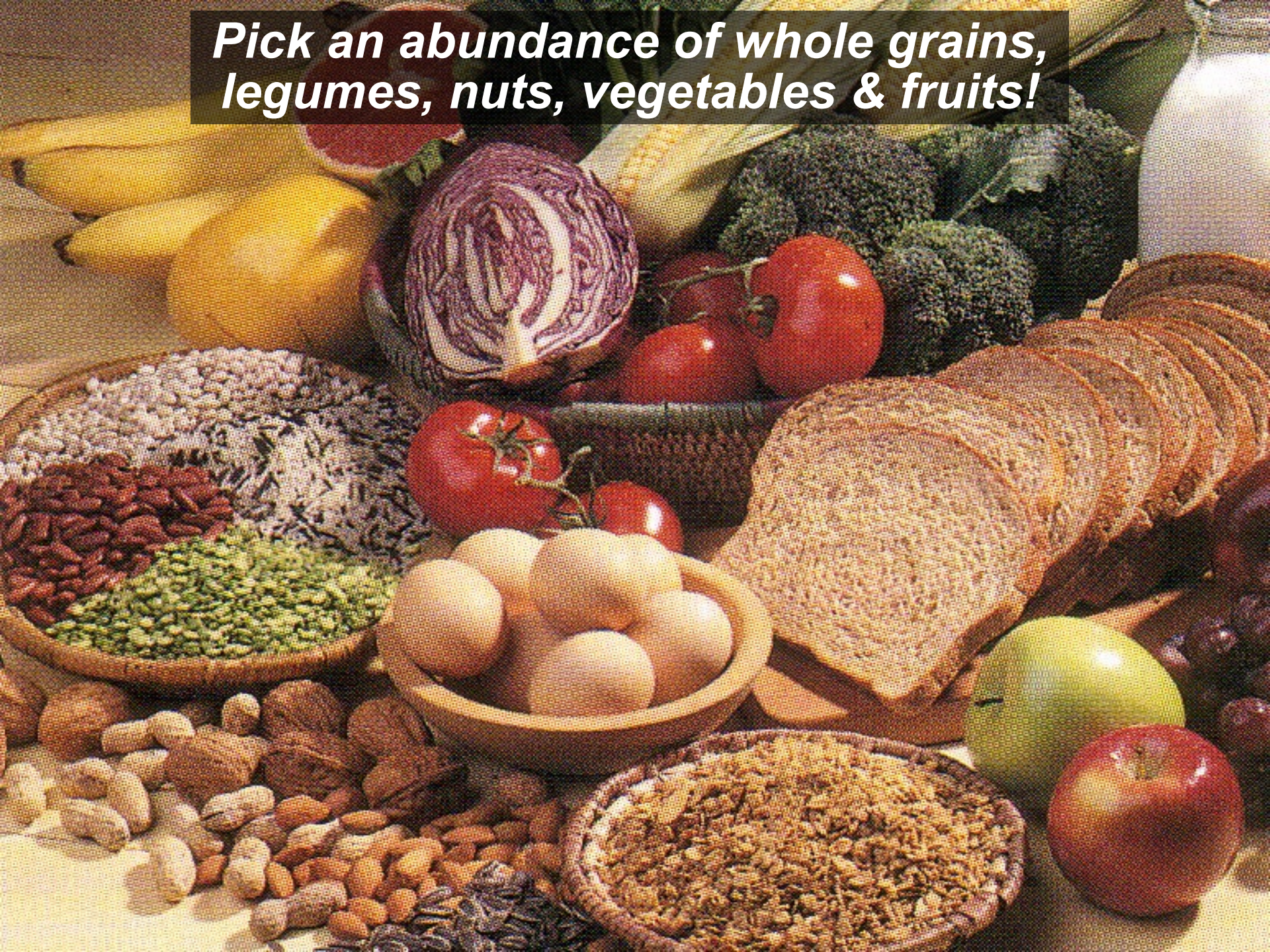


Life is all about balance: too much? too little?

NB: ...but low doses of the phytoestrogen, *genistein* promotes breast cancer cell division (in lab cultures & mice).

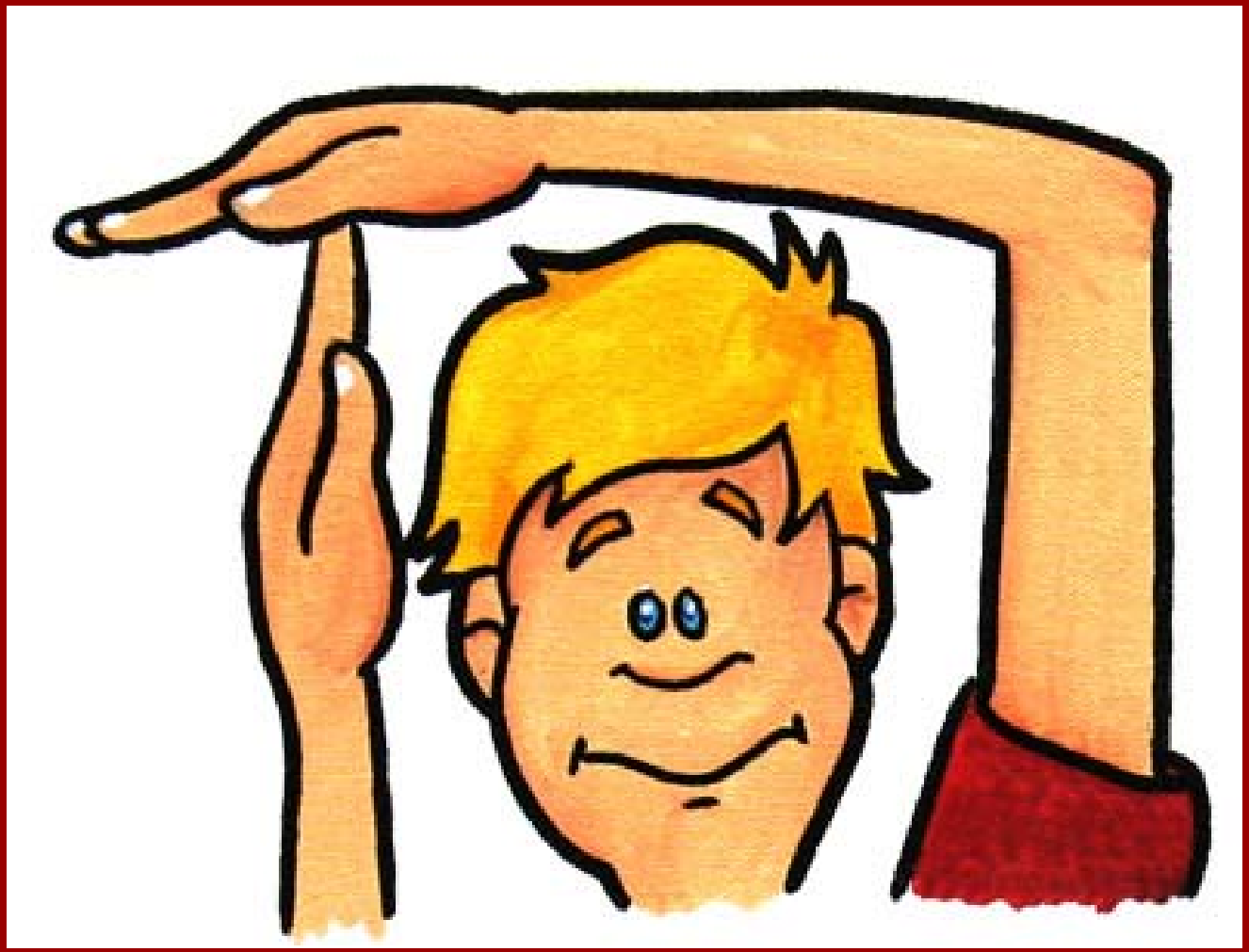
S&W 2014 p 66

Functional Foods or Drugs?

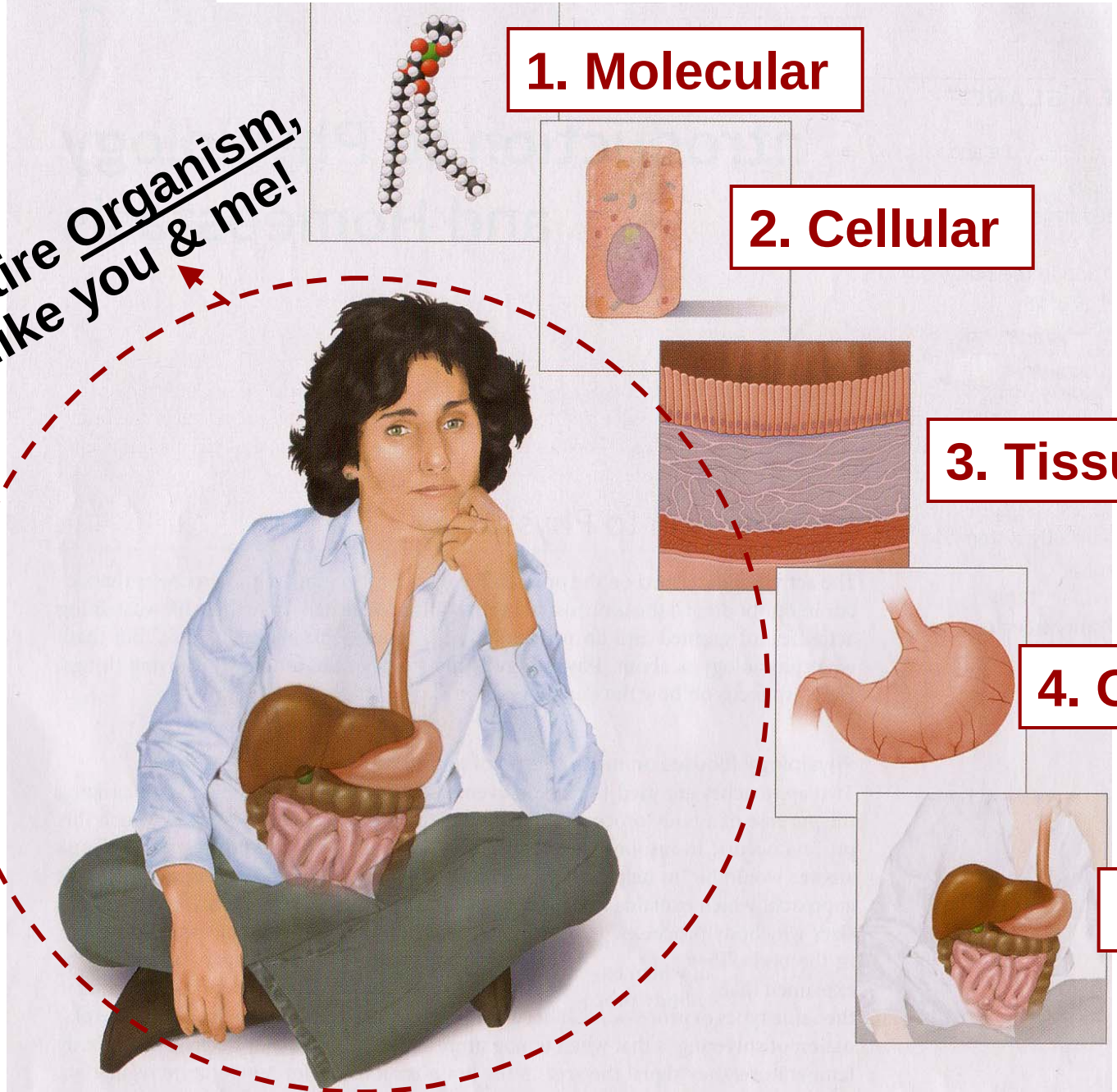

Pick an abundance of whole grains,
legumes, nuts, vegetables & fruits!

Don't bank on a single magical food's phytochemicals or marketed "functional foods," rather choose a wide variety of whole grains, legumes, nuts, vegetables & fruits...!

Time-out for discussion!

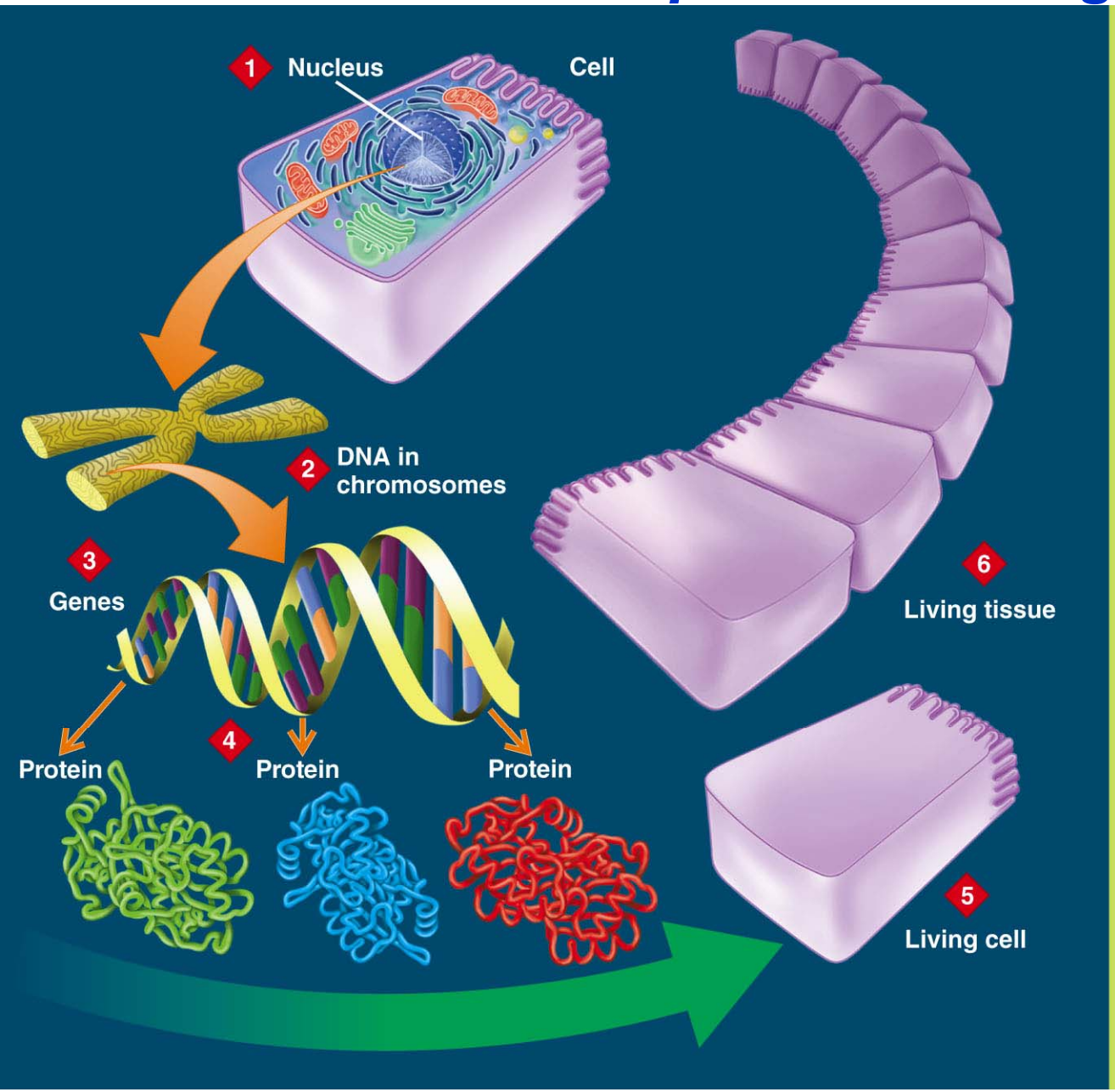


Body Levels of Organization



LS 2012 fig 1-1 p 2

Genes are Recipes for Making Proteins!

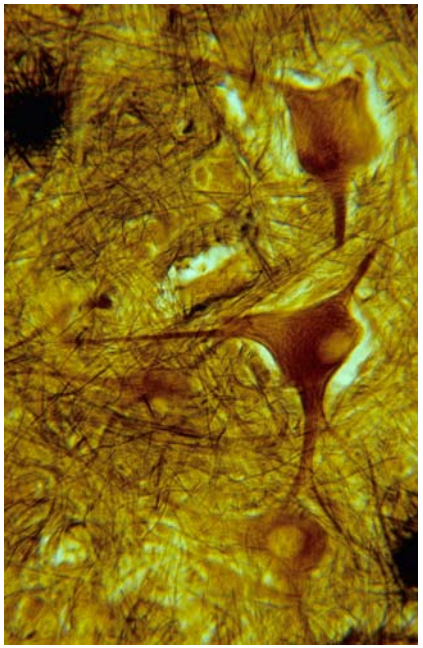


1. Each cell's nucleus contains DNA — the material of heredity in all living things.
2. Long strands of human DNA coil into 23 pairs of chromosomes. If the strands of DNA in all the body's cells were uncoiled and laid end to end, they would stretch to the sun and back four hundred times. Yet DNA strands are so tiny that about 5 million of them could be threaded at once through the eye of a needle.
3. Genes contain instructions for making proteins. Genes are sections along the strands of DNA that serve as templates for the building of proteins. Some genes are involved in building just one protein; others are involved in building more than one.
4. Many other steps are required to make a protein. See Figure 6-6 of Chapter 6.
5. Proteins do the work of living cells. Cells employ proteins to perform essential functions and provide structures.
6. Communities of functioning cells make up the living tissue.

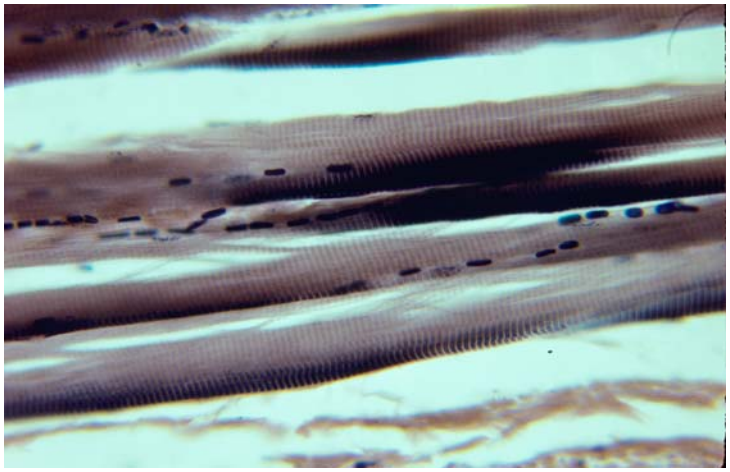
S&W 2014 fig 3-2 p 73

What are DNA's major functions?
Heredity + Day-to-Day Cell Function

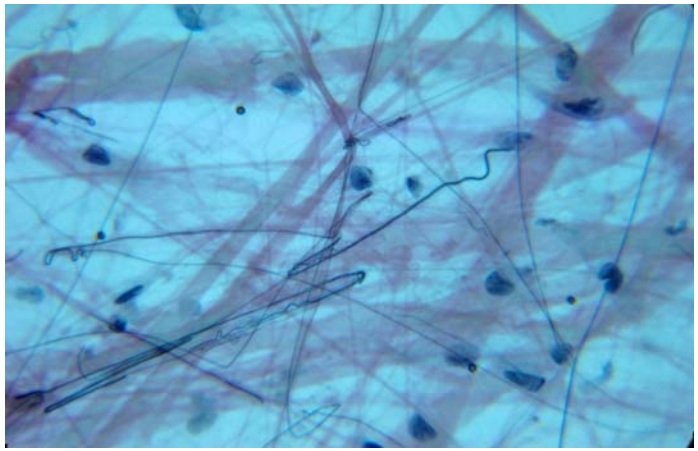
4 Cs for Tissue/Cell Type Functions!



Nerve conducts



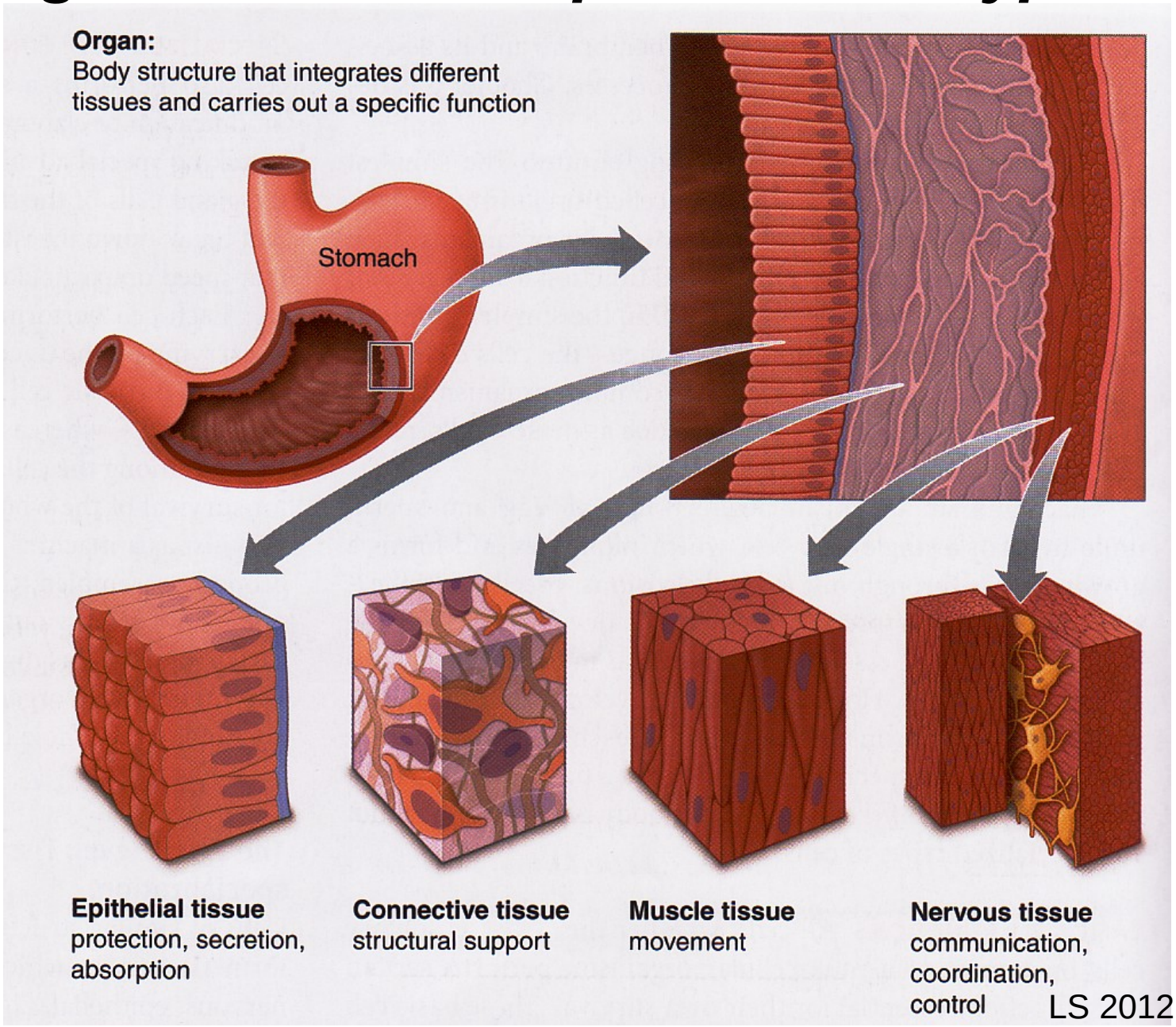
Muscle contracts



Connective connects!!

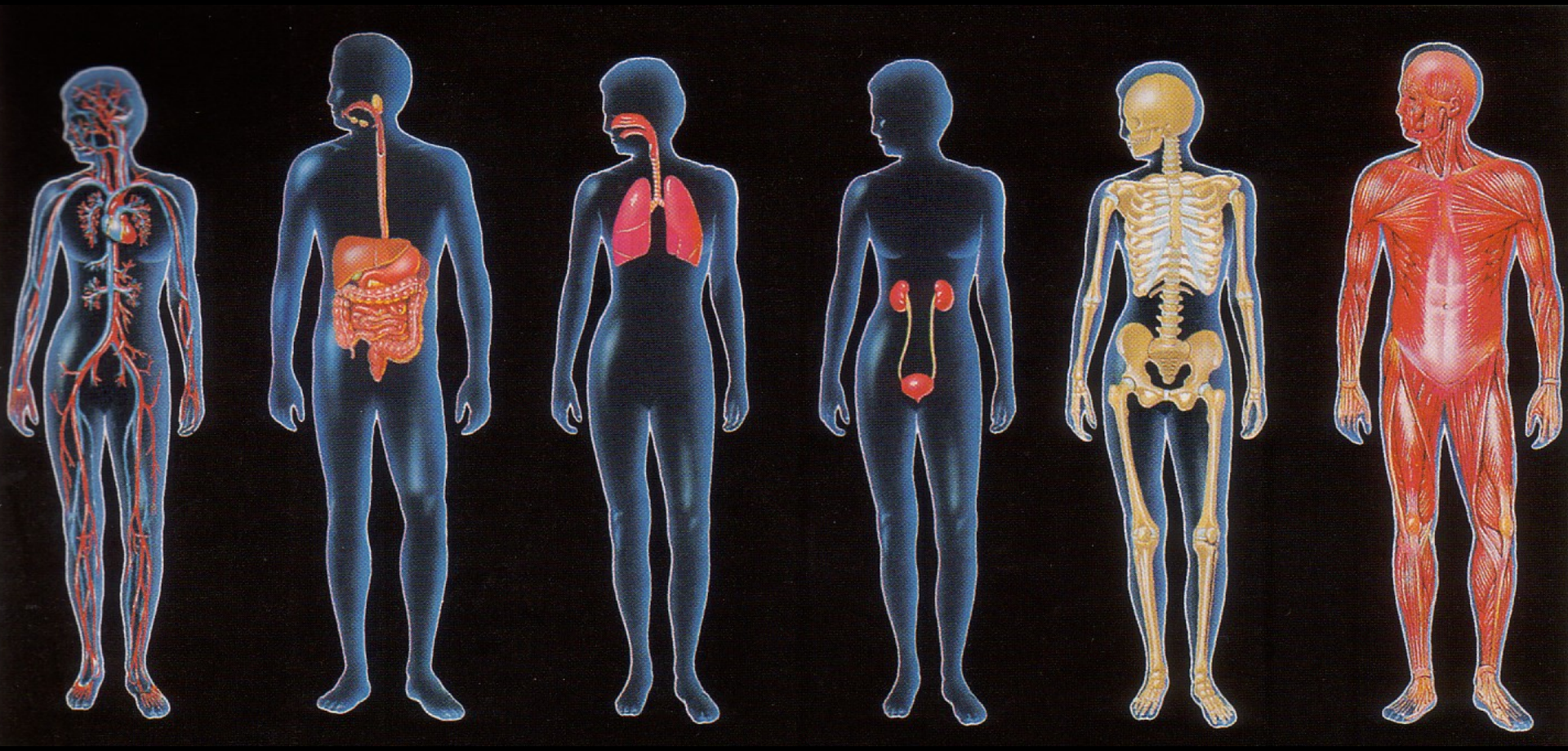
Epithelial covers

Organs are made up ≥ 2 tissue types



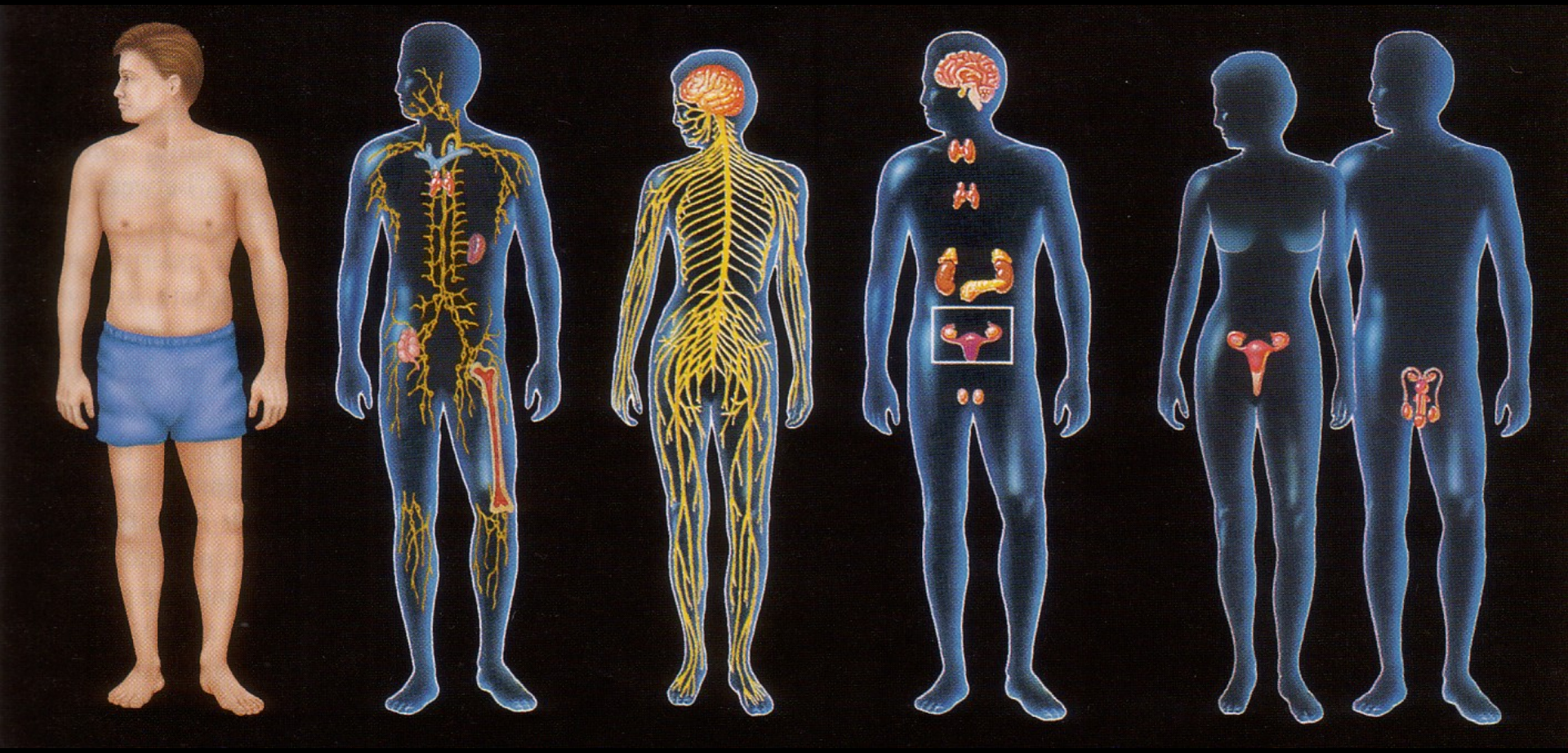
LS 2012 fig 1-2 p 4

Which body systems?

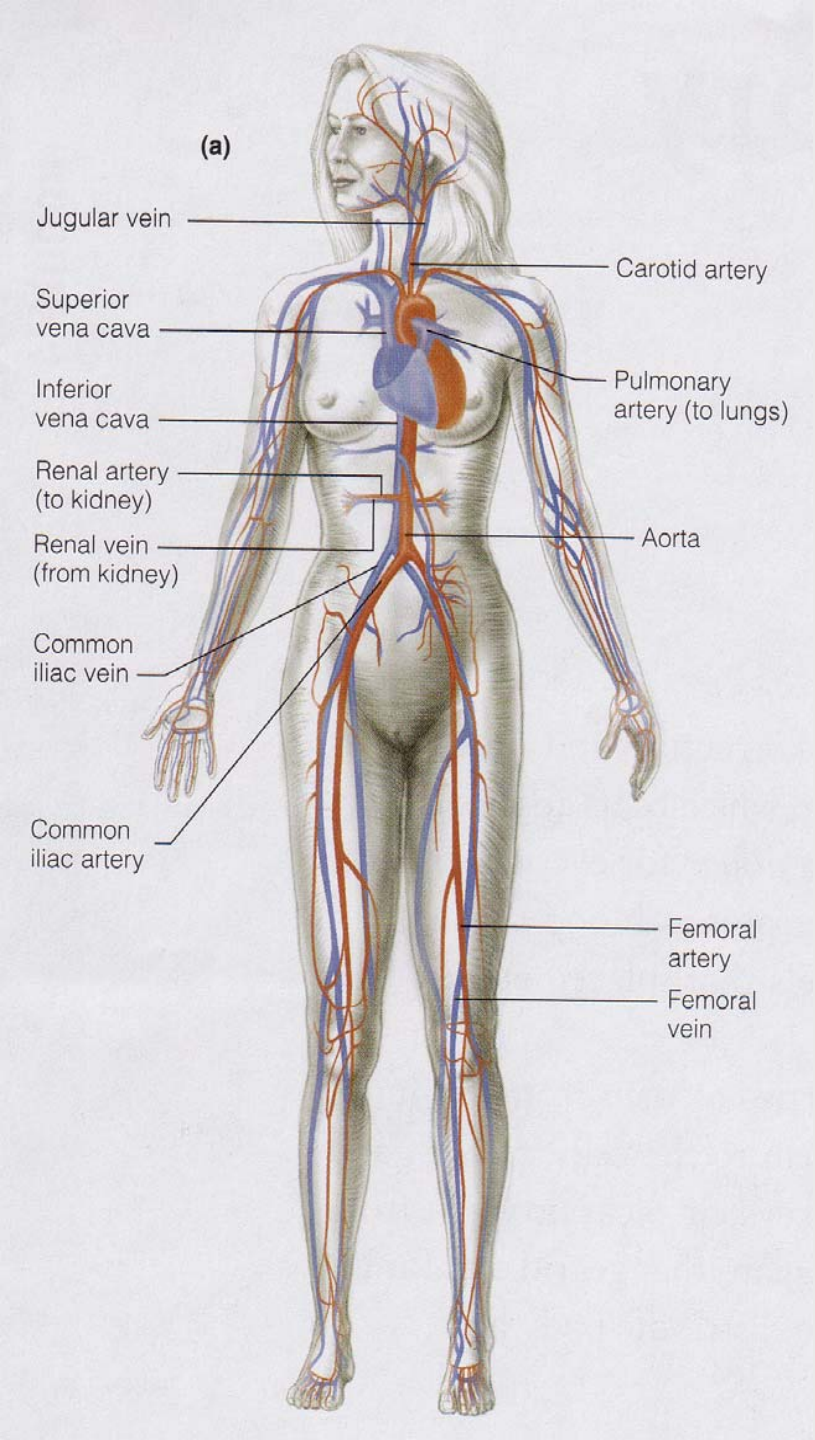


LS 2012 fig 1-4 p 6

Which body systems?

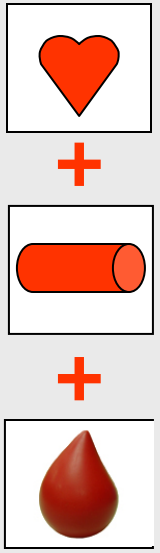


LS 2012 fig 1-4 p 6



Cardiovascular or CV System

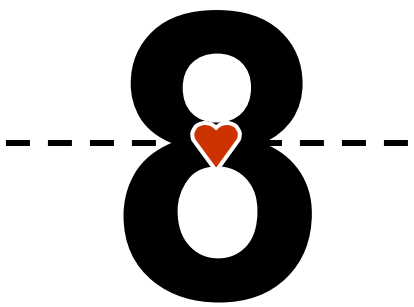
1. **Heart**
2. **Vessels**
3. **Blood**



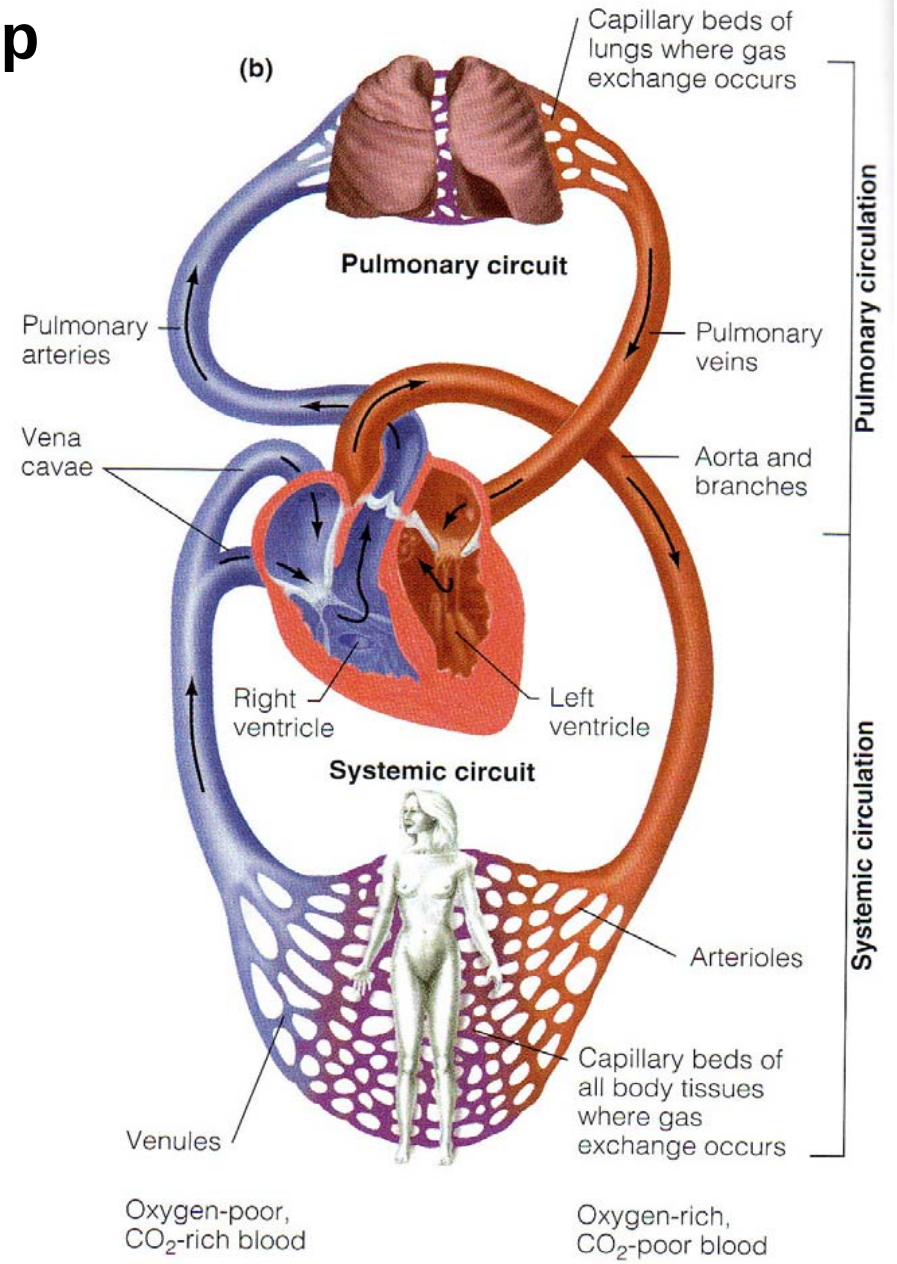
DC 2003

NB: Figure-8 loop

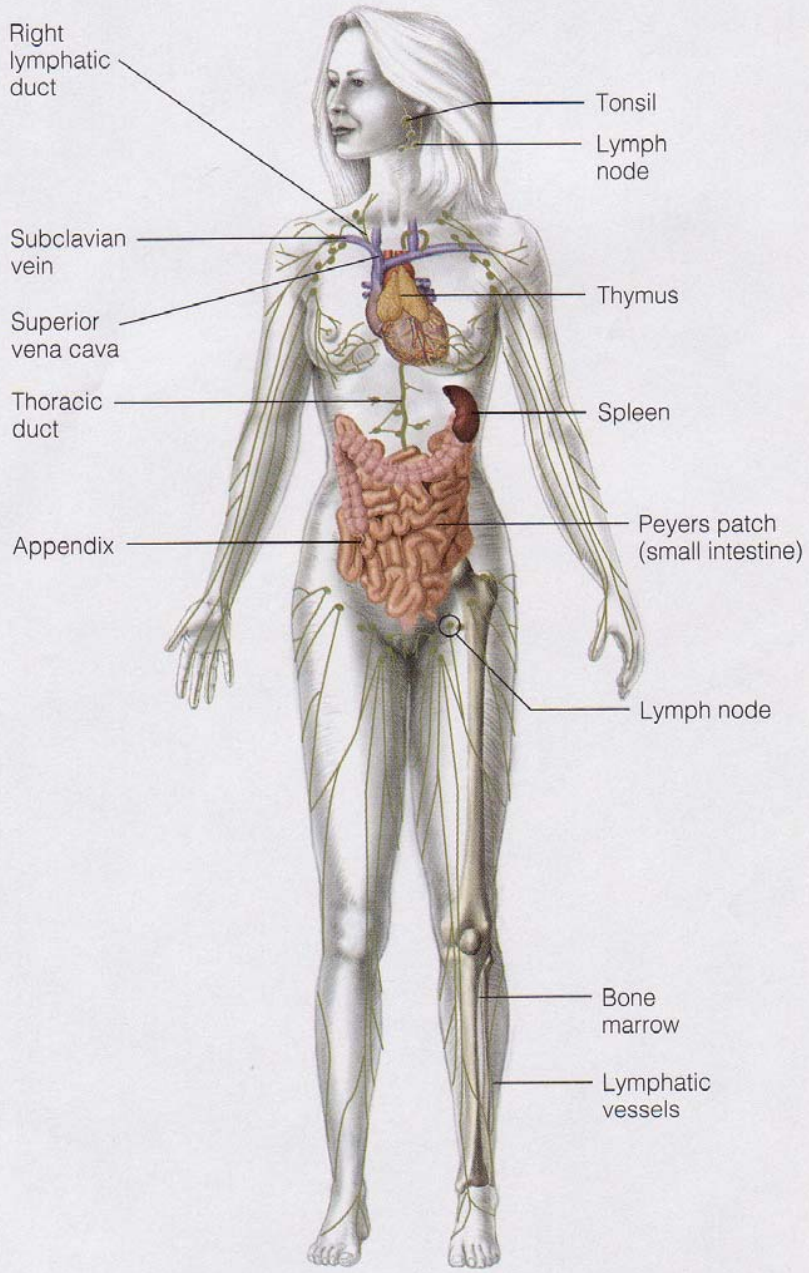
Pulmonary



Systemic

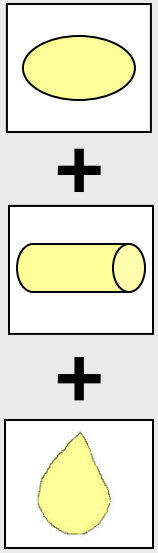


DC 2003



Lymphatic System

1. **Lymph Nodes**
2. **Vessels**
3. **Lymph**



No pump!

DC 2003

Lymphatic System

Alternative System of Circulation

or

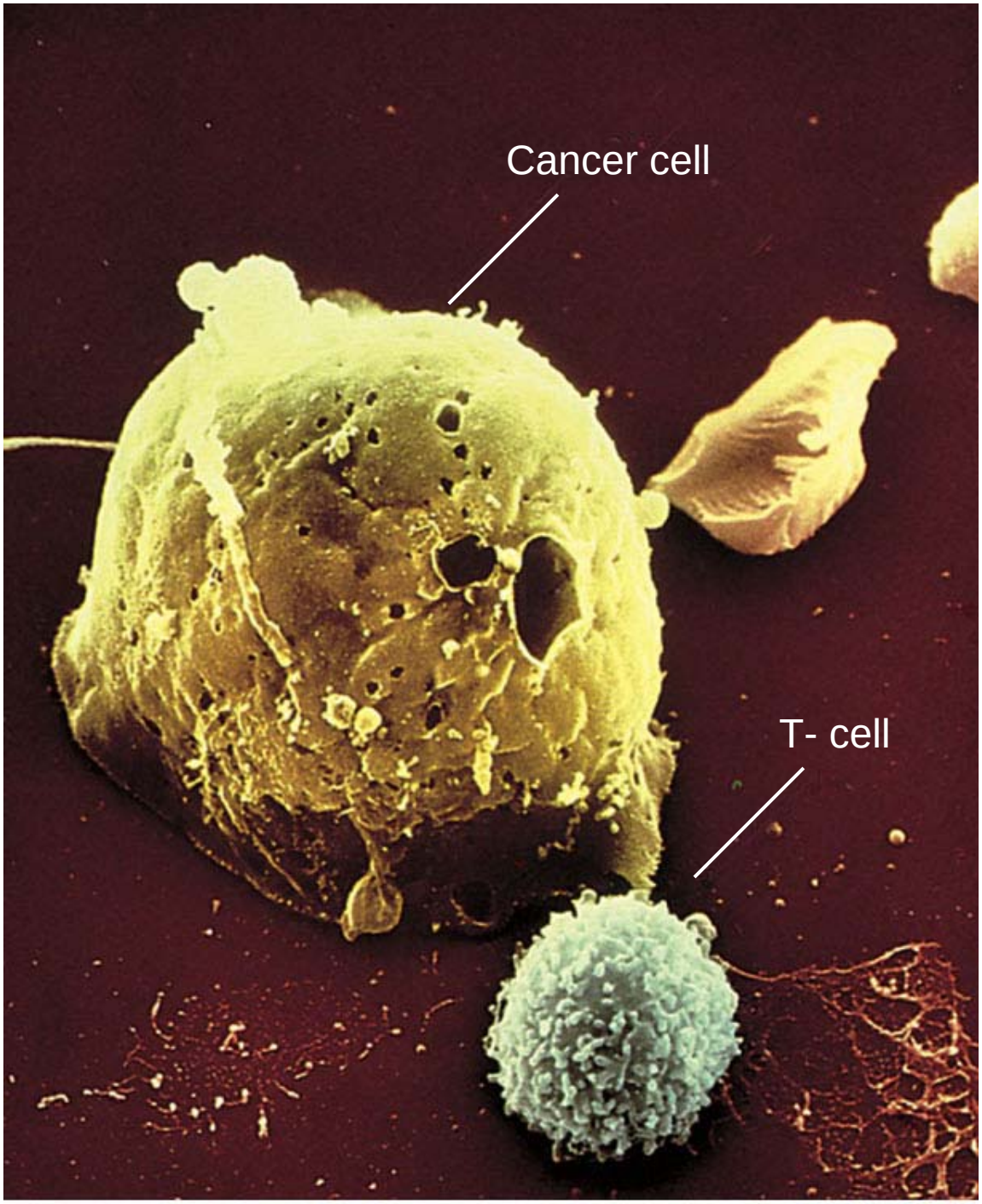
Drainage System

Lymph Vessels || Veins

Lymphatic System Blockage in Elephantiasis from Mosquito-borne Parasitic Filaria Worm

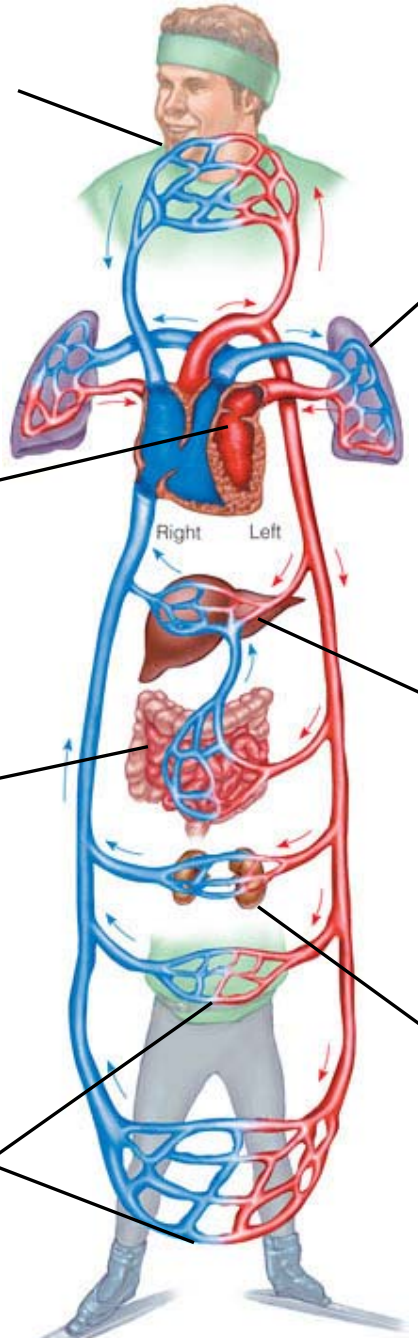
Source: L Sherwood 2006 fig 10-22 p 298

White Blood Cells = Body Defenders & Surveillance System!



S&W 2011 p 77

Capillaries, Where Exchange Takes Place, Are Everywhere!



Upper Body Capillaries

Heart
Right side pumps blood to lungs
Left side pumps oxygenated blood to body

Intestines
Absorb nutrients

Lower Body Capillaries

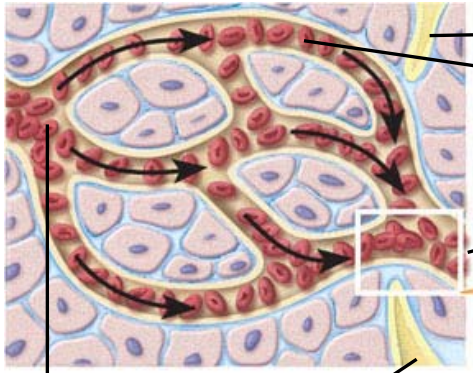
Lungs
Oxygenate blood
Remove carbon dioxide from blood
Return blood to heart

Liver
Filters toxins from blood
Stores, transforms, and mobilizes nutrients

Kidneys
Filter wastes from blood
Form urine

Modified after S&W 2014 fig 3-3 p 75

Body Fluids Mingle @ Capillary Level



Lymph vessel.

Blood circulates among cells by way of capillaries.

Blood collects into veins for return to heart.

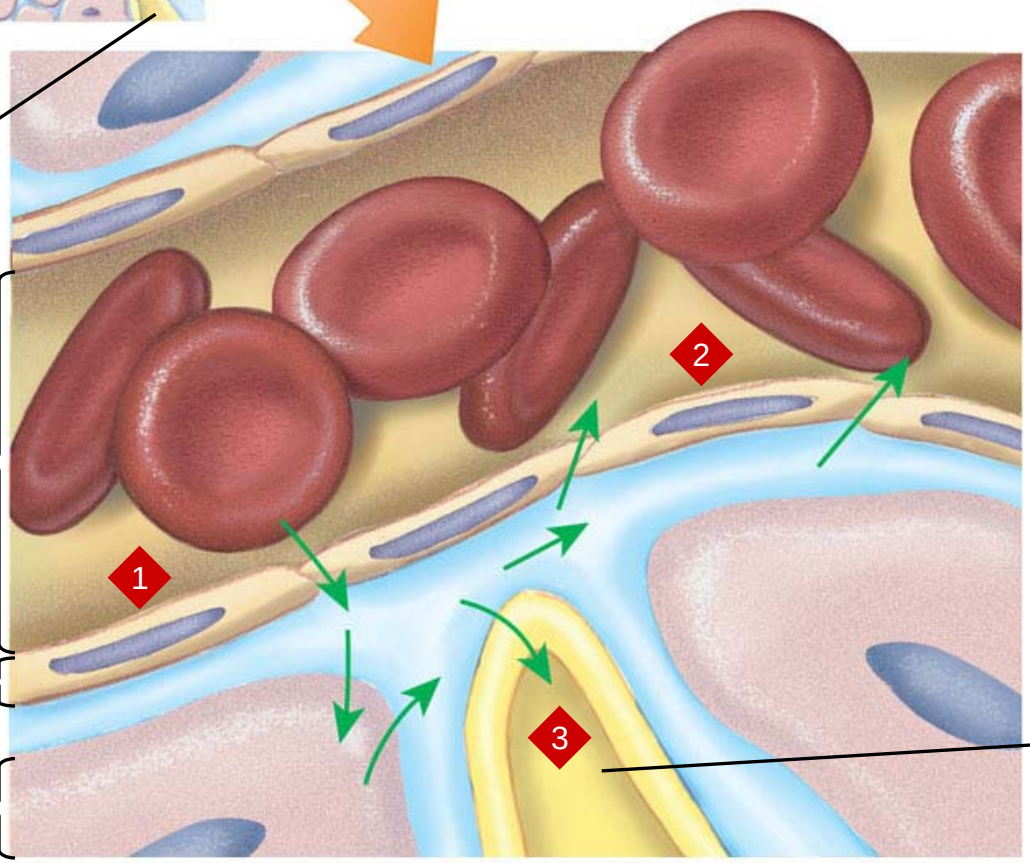
Blood enters tissues by way of artery.

Lymph vessel.

Inside capillary.

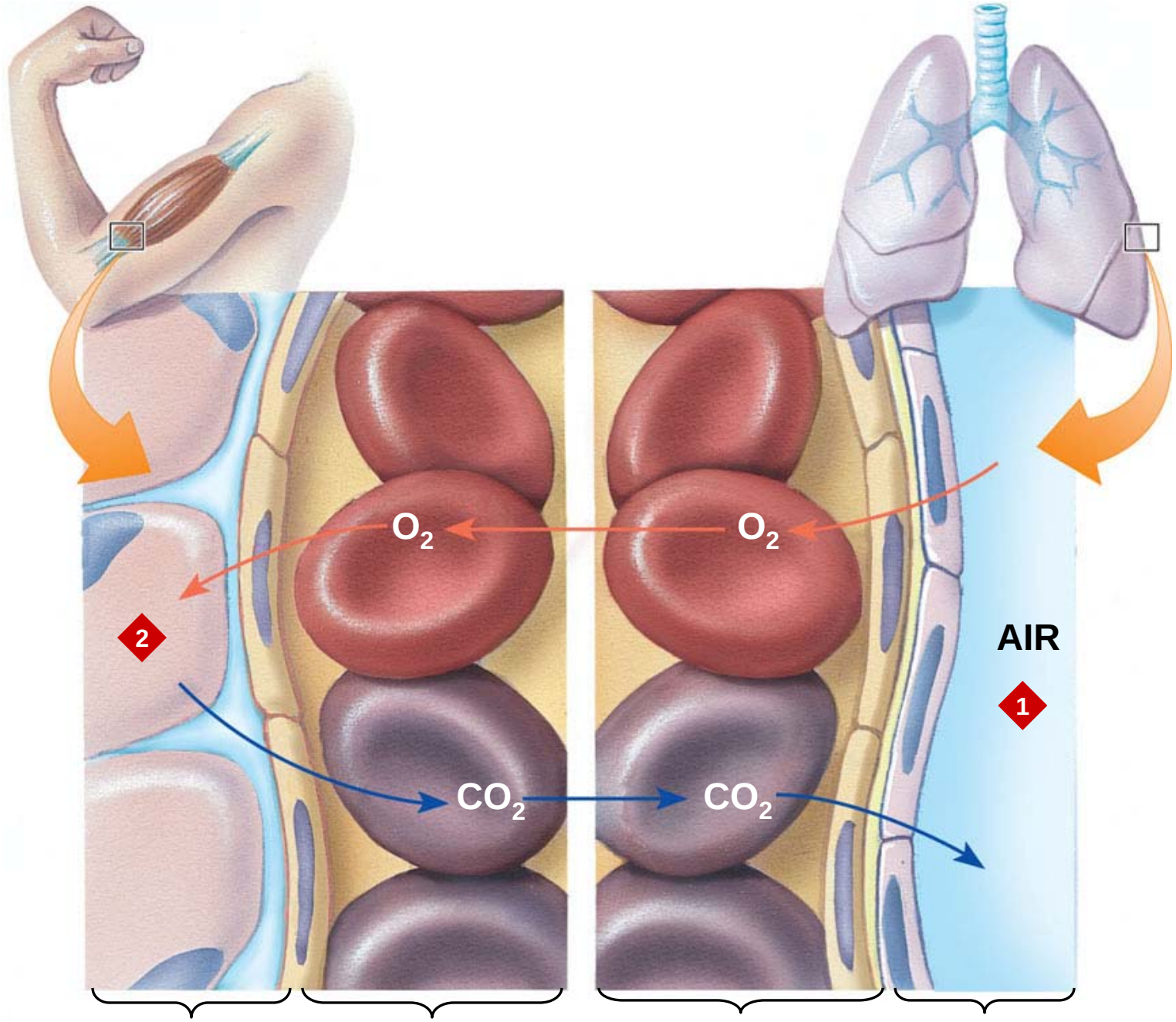
Capillary wall has spaces between its flat cells.

Cells of surrounding tissue.



Lymph vessel.

S&W 2014 fig 3-4 p 76



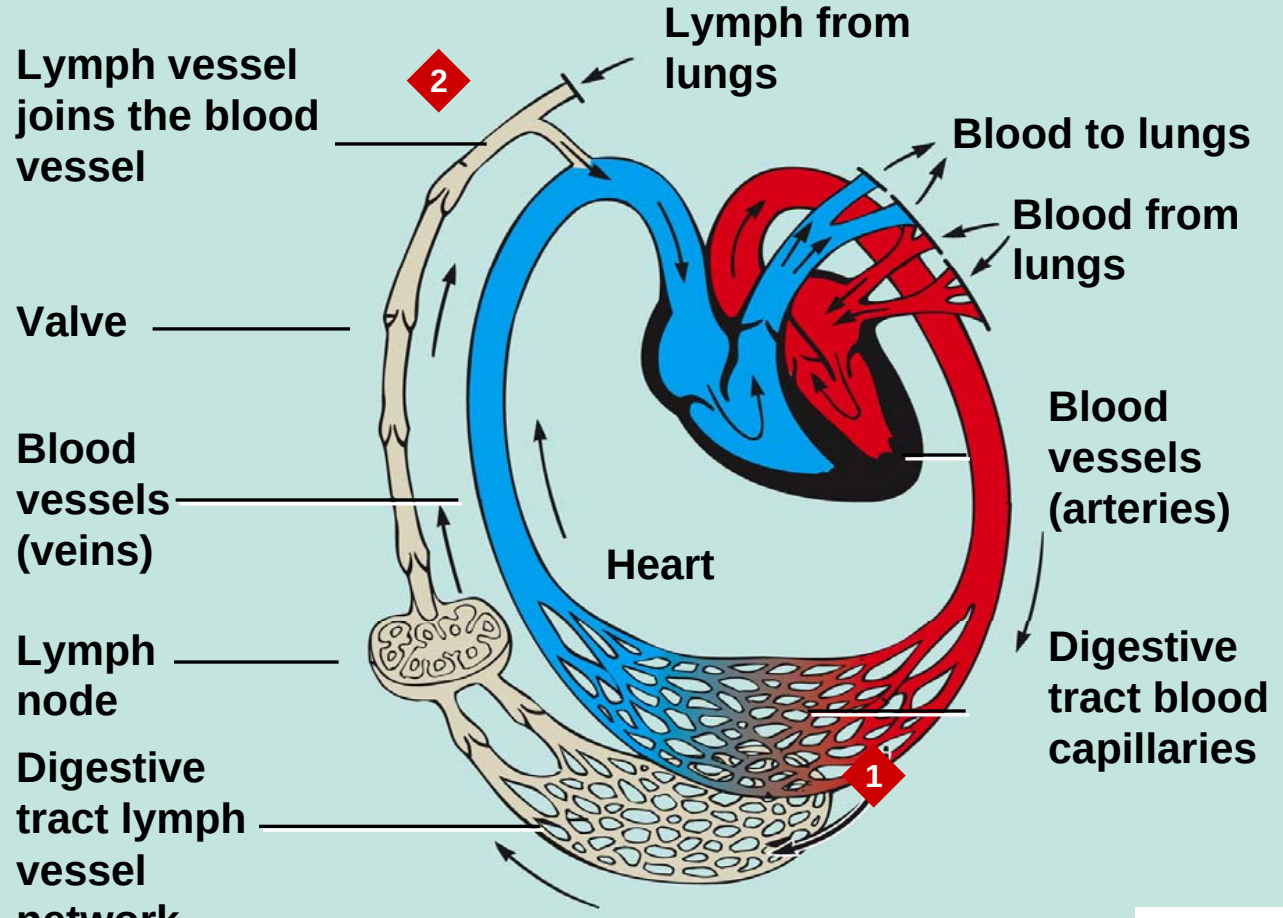
1 ***RBCs*** **pick up O_2 in lungs & deliver to tissues in periphery.**

2 ***RBCs*** **pick up CO_2 in periphery & dump off at lungs!**

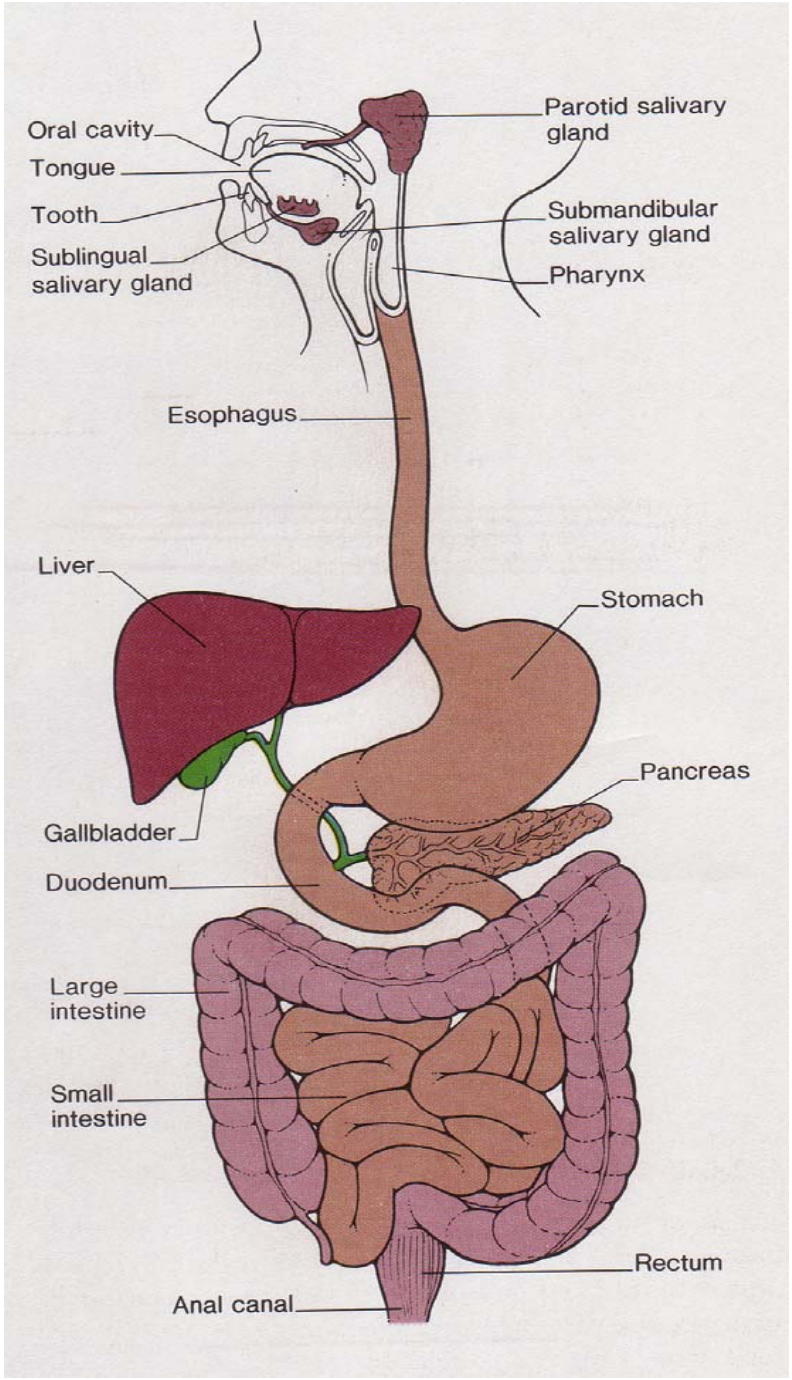
S&W 2014 fig 3-5 p 77

1. Fluid filtrate with nutrients & gases flows *from blood* to *tissue spaces* to *lymphatic capillaries*.

2. *Lymphatic vessels* return run-off like sewer system to large vein in neck.



S&W 2014 fig 3-6 p 77



Next time, the Digestive (GI) System!