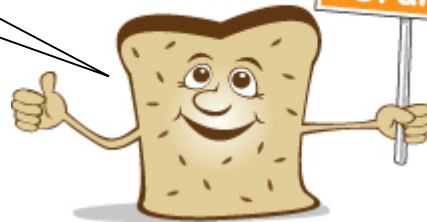
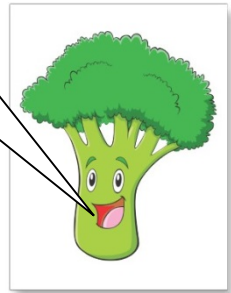


Hooray!



Fun! Fun!

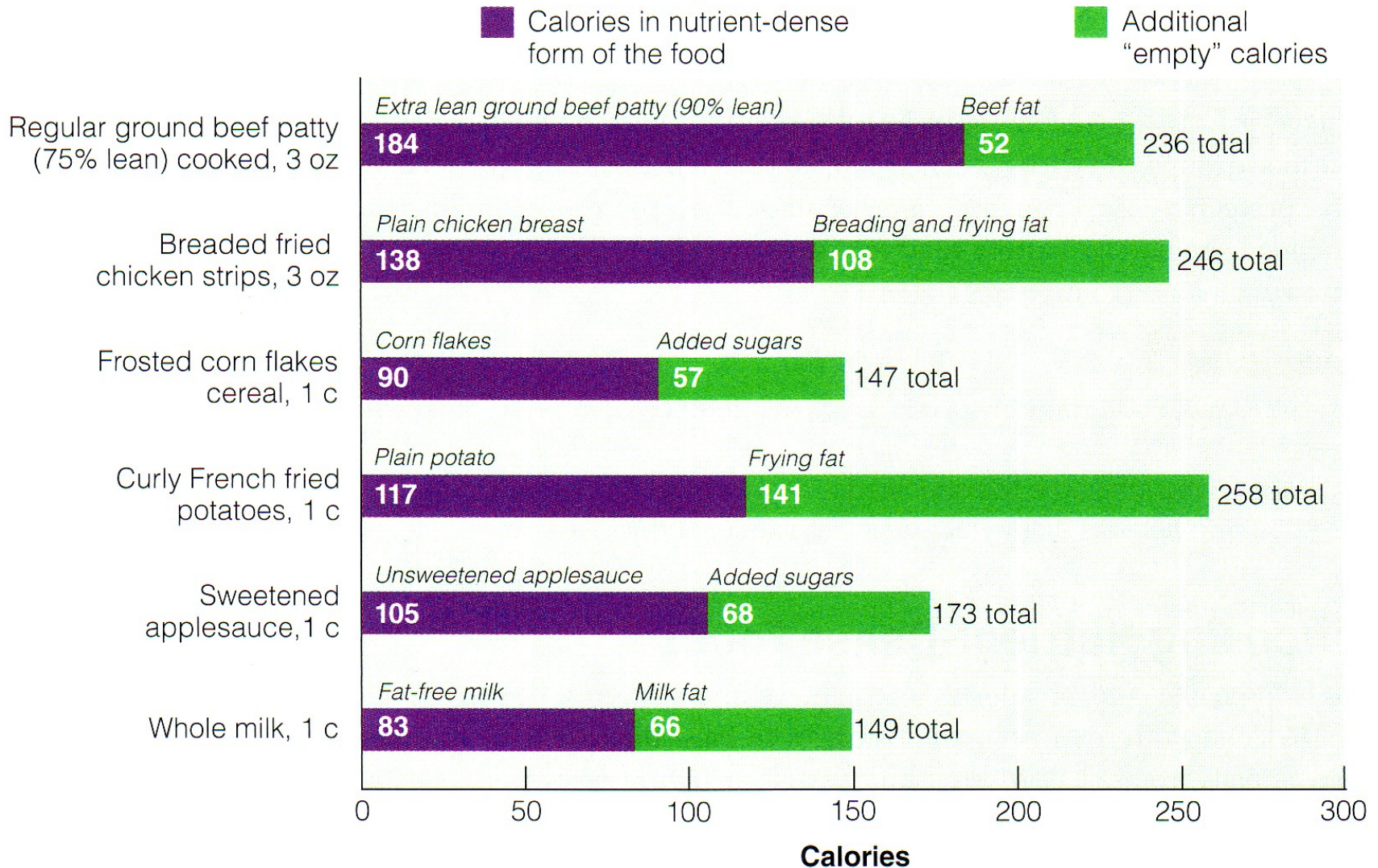


BI 199 Discussion 3

- I. **Announcements** Paper & presentation topics due by e-mail. Questions? Tonight *Market of Choice* activity. Next M 19th *Shopping Spree Analyses*; M 26th Paper outline due + Dietary analyses: DA+ & <https://www.supertracker.usda.gov>
- II. **Connections** Discretionary Calories? History + *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.

Figure 2-6

How Solid Fats and Added Sugars Add Calories to Nutrient-Dense Foods

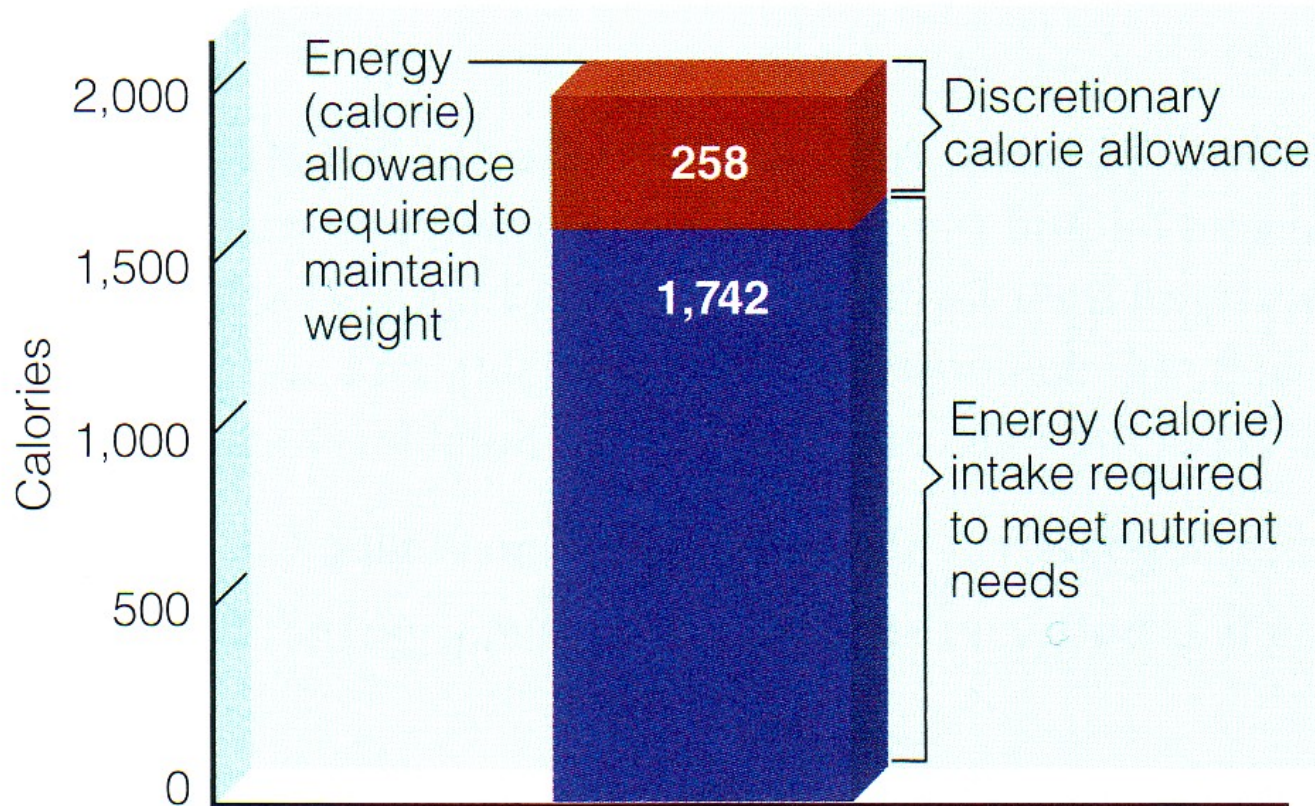


Source: U.S. Department of Agriculture and U.S. Department of Health and Human Services, Dietary Guidelines for Americans 2010, p. 47.

Figure 2-7

Discretionary Calorie Concept

The discretionary calorie allowance sets the upper limit for calories from added sugars and solid fats in USDA Food Patterns.





***History of
Establishing
Guidelines for
Americans***

USDA Food Pyramid 1992

Fats, oils, and sweets
Use Sparingly

Milk, yogurt, and
cheese group
2-3 Servings

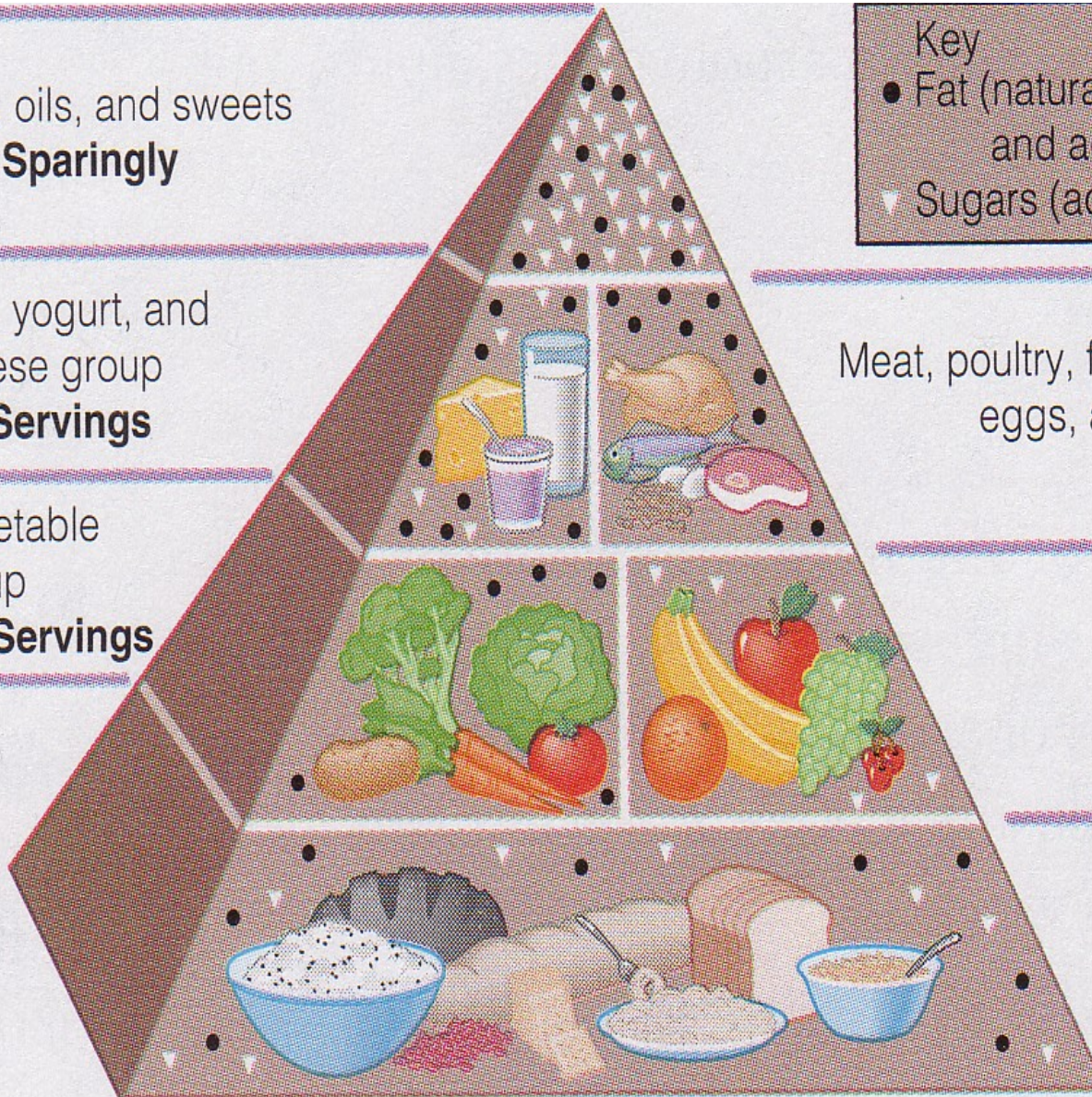
Vegetable
group
3-5 Servings

Fruit group
2-4 Servings

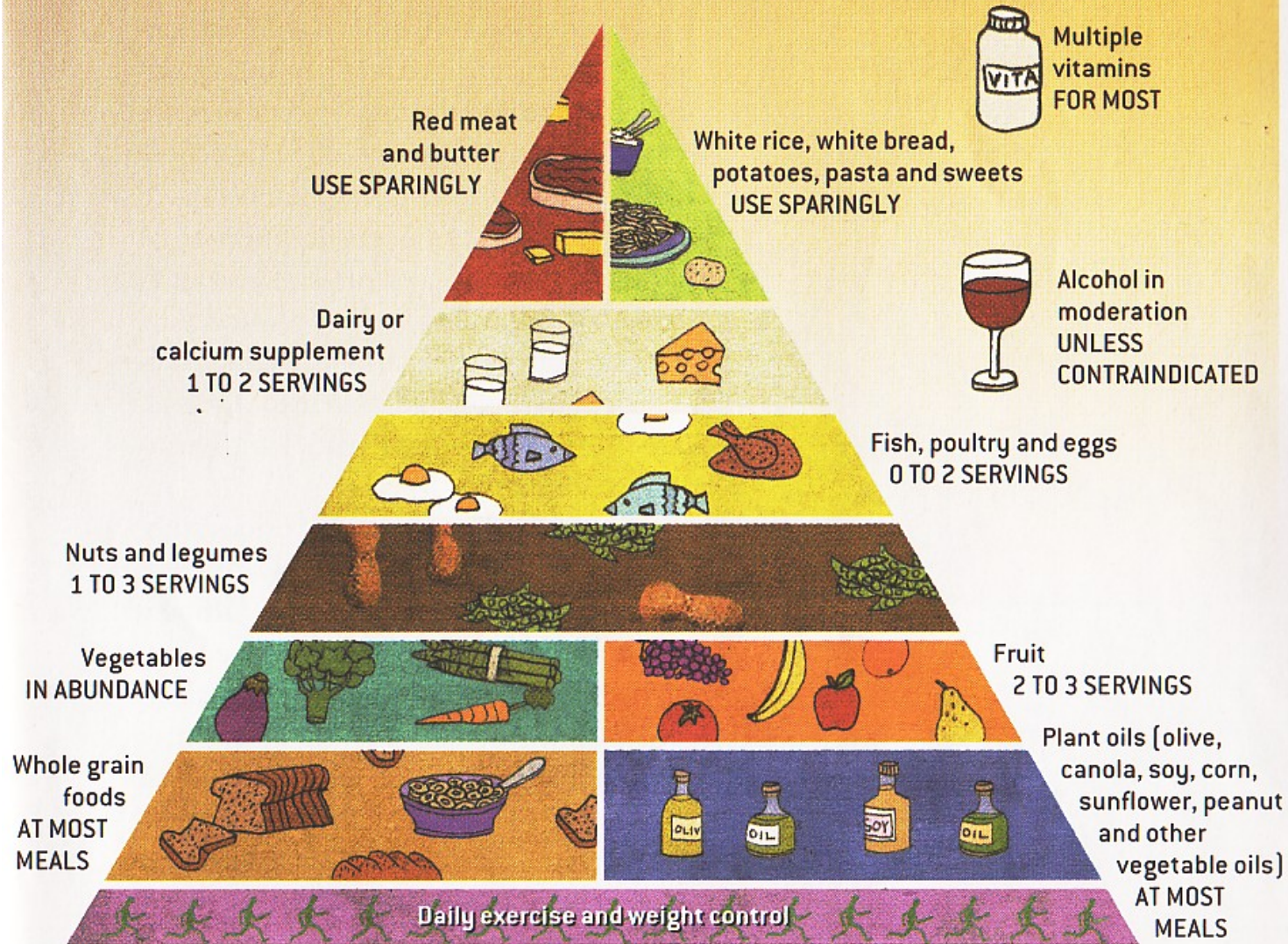
Bread, cereal,
rice, and
pasta group
6-11 Servings

Key

- Fat (naturally occurring and added)
- ▼ Sugars (added)



Willett & Stampfer Suggestions 2003



NEW FOOD PYRAMID

US Modifications to 1992 Food Pyramid 2005

Fats, oils, and sweets

Use sparingly

↑ "good" fats!

↓ saturated & trans fats!

KEY

● Fat (naturally occurring and added)

▼ Sugars (added)

Milk, yogurt,
and cheese
group

2-3 servings

3 or more!

Meat, poultry, fish,
dry beans, eggs,
and nuts group

2-3 servings

eg, fish, nuts

Vegetable
group

3-5
servings

5 or more!

Fruit group
2-4 servings

4 or more!

Bread,
rice, and pasta
group
6-11
servings

1/2 whole grain

Regular Physical Activity: Exercise! Exercise!!

Dietary Guidelines for Americans 2005

Food Guidance System

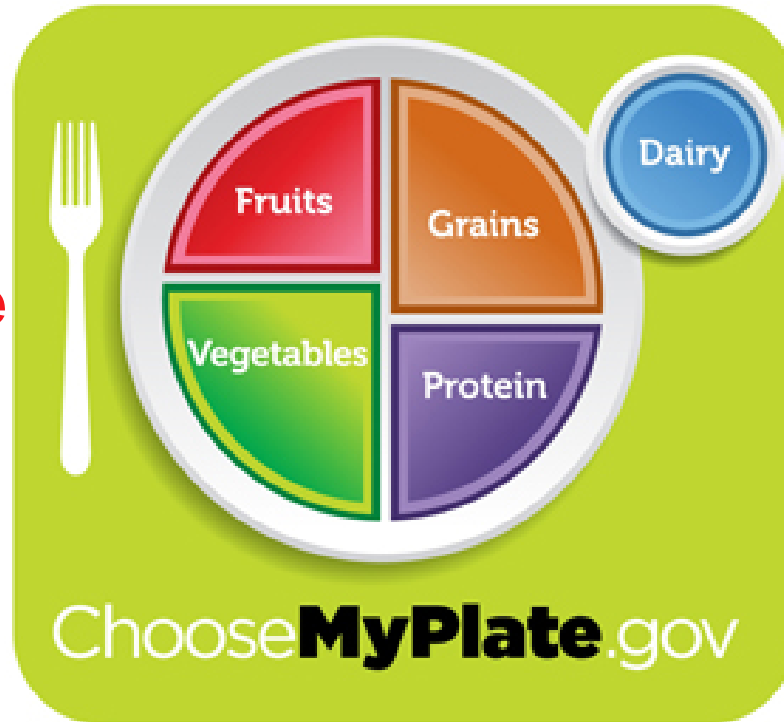
Hooray!



1. ↑ emphasis on ↓ kcal + ↑ exercise.
2. 9-A-Day! 4 fruit + 5 vegetable servings.
3. ≥ 3 of 6 whole grains \longrightarrow $\frac{1}{2}$ whole grains!
4. 3 servings of dairy, eg 3 c fat-free milk.
5. ↓ saturated + trans fats + ↑ unsaturated/
“good” fats, eg Ω -3 fish, walnuts.
6. Drink in moderation if at all.
7. Practice food safety.

MyPlate launched June 2, 2011!

2. Focus on fruits.
Whole fruit preferable to juice, but any fruit counts!
Fill $\frac{1}{2}$ your plate with fruits & vegetables!



3. Make at least $\frac{1}{2}$ 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 $\frac{1}{2}$ your plate with fruits & vegetables!

4. Go lean with protein. Keep protein to $< \frac{1}{4}$ plate! Nuts, beans, peas, seeds, poultry, lean meat, seafood,...

Diet & Health Guidelines for Cancer Prevention

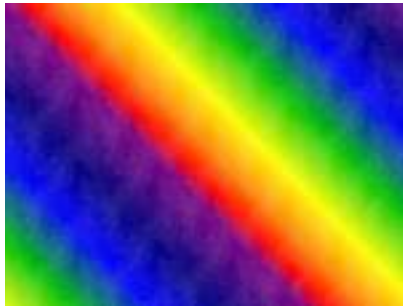
- 1. Choose a diet rich in variety of plant-based foods.**
- 2. Eat plenty of vegetables & fruits.**
- 3. Maintain a healthy weight & be physically active.**
- 4. Drink alcohol only in moderation, if at all.**
- 5. Select foods low in fat & salt.**
- 6. Prepare & store food safely.**

And always, remember...

Do not smoke or use tobacco in any form.

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.



The multiple colors of the pyramid illustrate variety: each color represents one of the five food groups, plus one for oils. Different widths of colors suggest the proportional contribution of each food group to a healthy diet.

The name, slogan, and website present a personalized approach.

MyPyramid

STEPS TO A HEALTHIER YOU

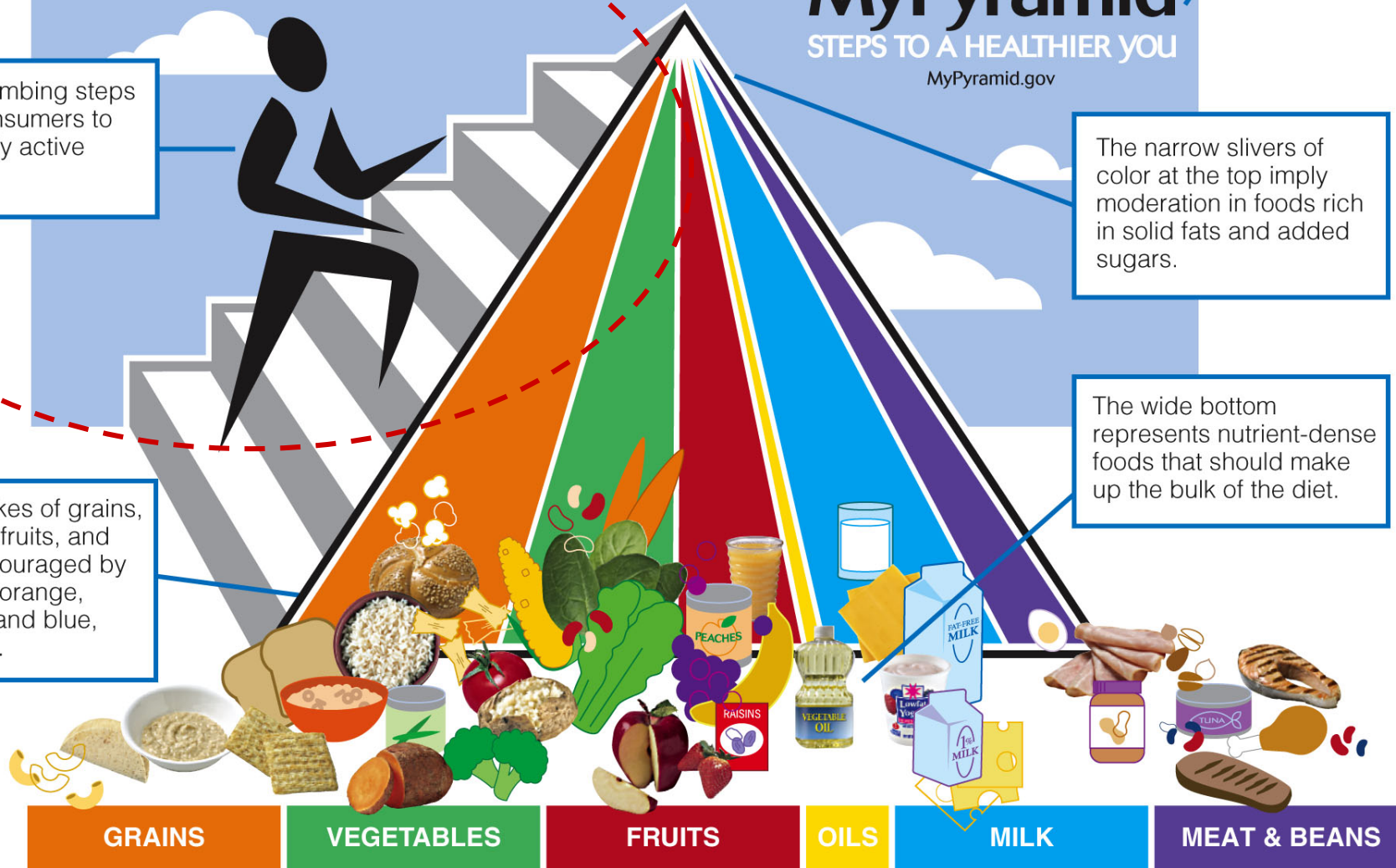
MyPyramid.gov

A person climbing steps reminds consumers to be physically active each day.

The narrow slivers of color at the top imply moderation in foods rich in solid fats and added sugars.

Greater intakes of grains, vegetables, fruits, and milk are encouraged by the width of orange, green, red, and blue, respectively.

The wide bottom represents nutrient-dense foods that should make up the bulk of the diet.



How much aerobic?

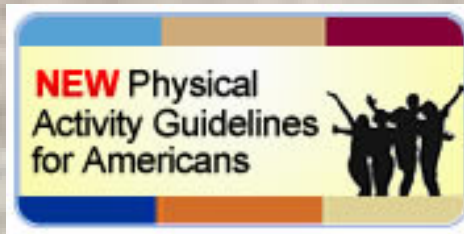


Continuous exercise
≥ 50% muscle mass
≥ Conversational pace
20-60 min/session
3-5 days/wk



<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>



Adults: Moderate to Vigorous Exercise \geq 30 min, 5 d/wk

Children: Moderate to Vigorous Exercise \geq 60 min, 5 d/wk

Diet vs.
Exercise?



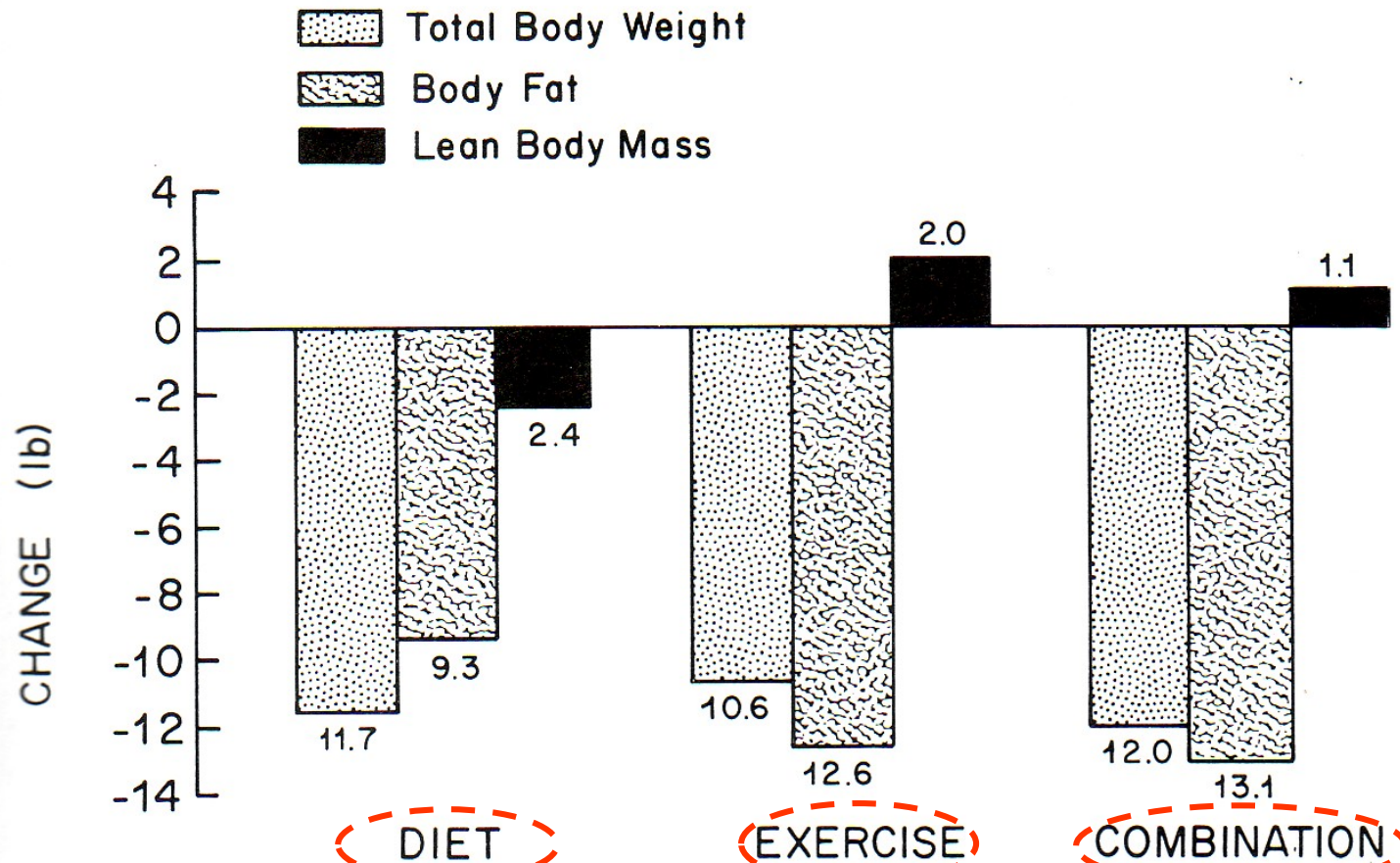
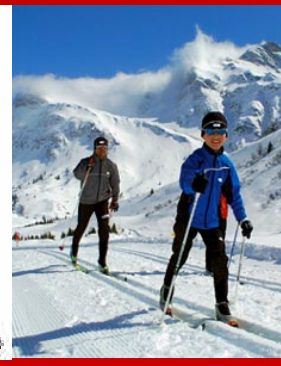


Figure 4-9. Changes in body weight, body fat, and lean body weight for diet, exercise, and combination groups. (From Zuti W. B., and Golding, L. A.: Comparing diet and exercise as weight reduction tools. *Phys. Sportsmed.* 4:49-53, 1976.)

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



**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 $< \frac{1}{2}$ g per serving. T F

Group Work to Discuss Potential Superfoods!



SUPERFOODS



AMERICAN
PISTACHIO GROWERS



<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!



Potential regulators
of health!

10s of thousands!

① Anti-oxidants
protect DNA from
oxidative damage

② Protein synthesis
regulation/control

③ Hormone-like
action
endocrine mimicry

④ Blood effects
modify blood chemistry

Phytochemicals ≡ Plant chemicals

aroma, color, taste



*Broccoli sprouts may contain
~ 10,000 unique phytochemicals!*





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.



American Institute for Cancer Research

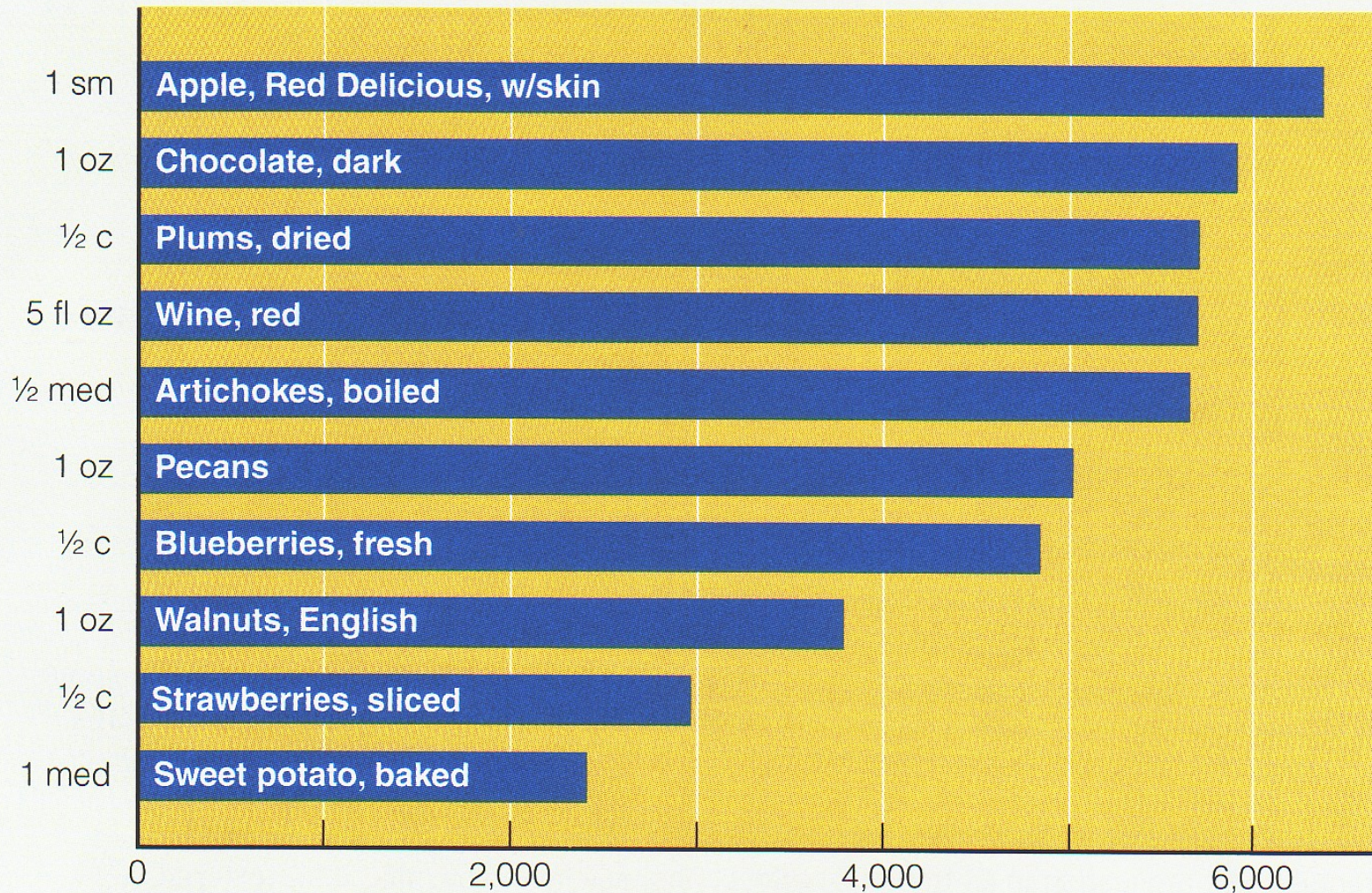
TABLE
C2-3

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



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



^aMeasured 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>.

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



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



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

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



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



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



Garlic organosulphurs may inhibit cancer!

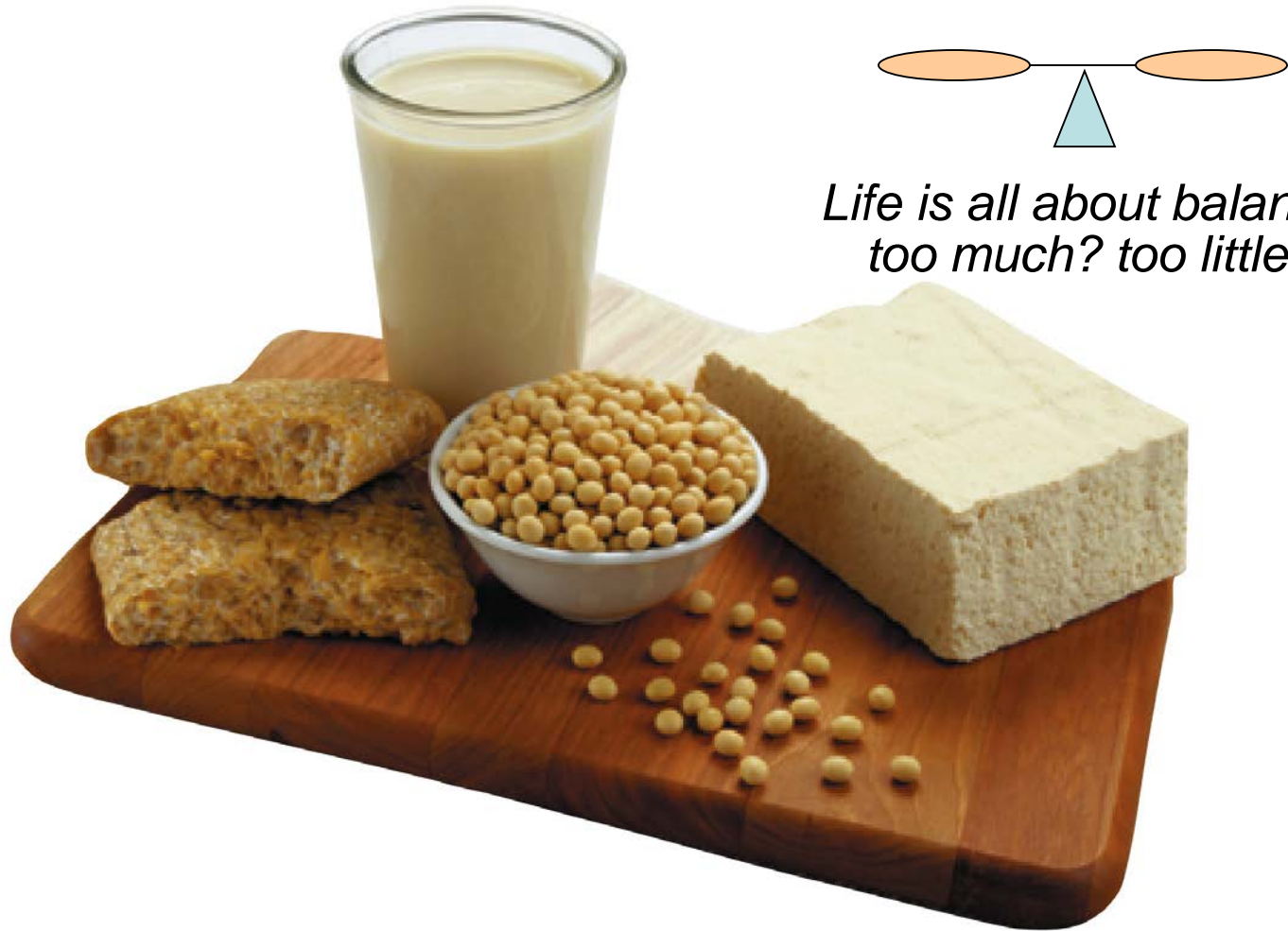




Resveratrol, a flavonoid in purple grape juice & red wine may lower incidence of cardiovascular diseases.

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

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).

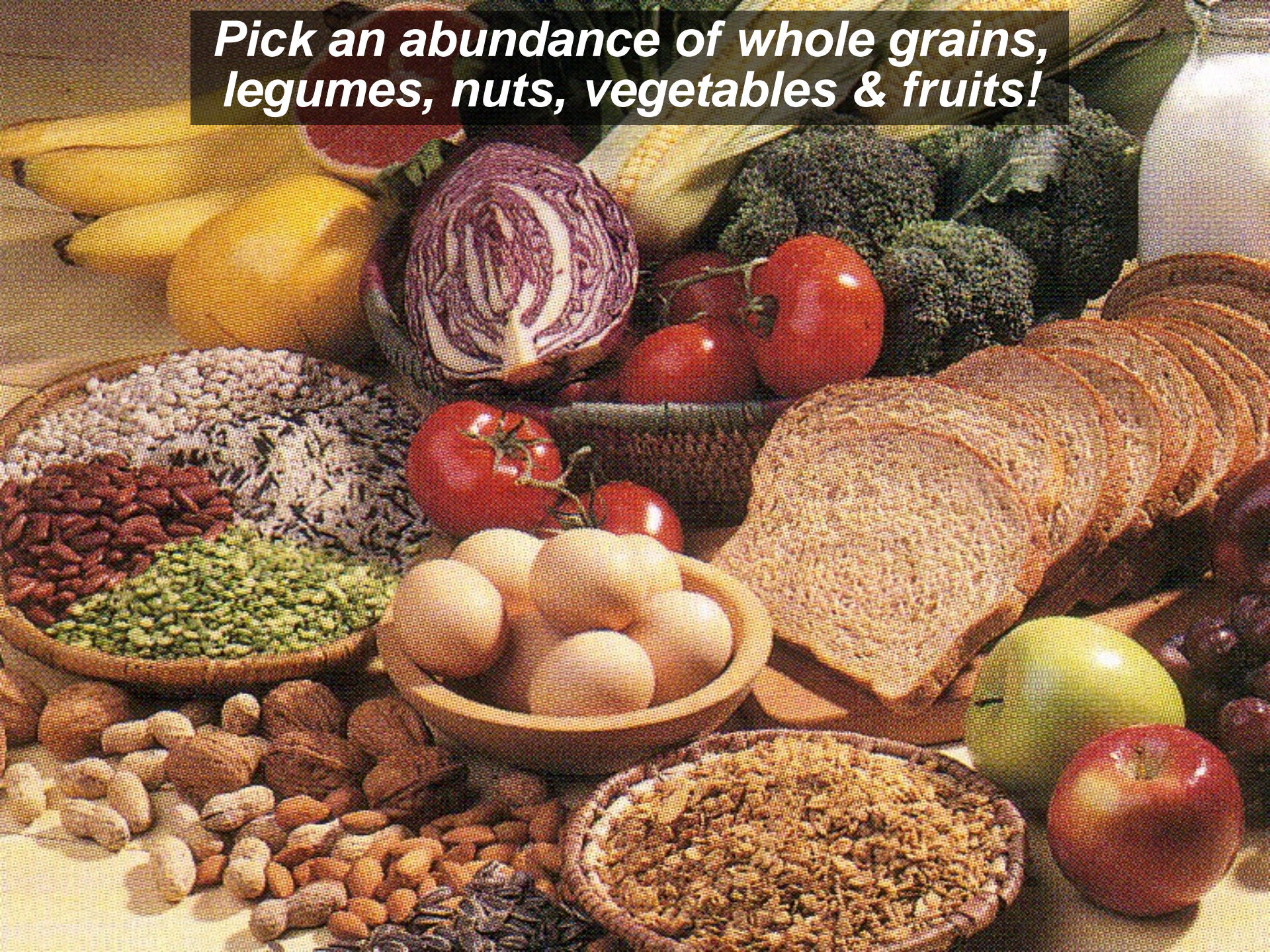
Functional Foods or Drugs?



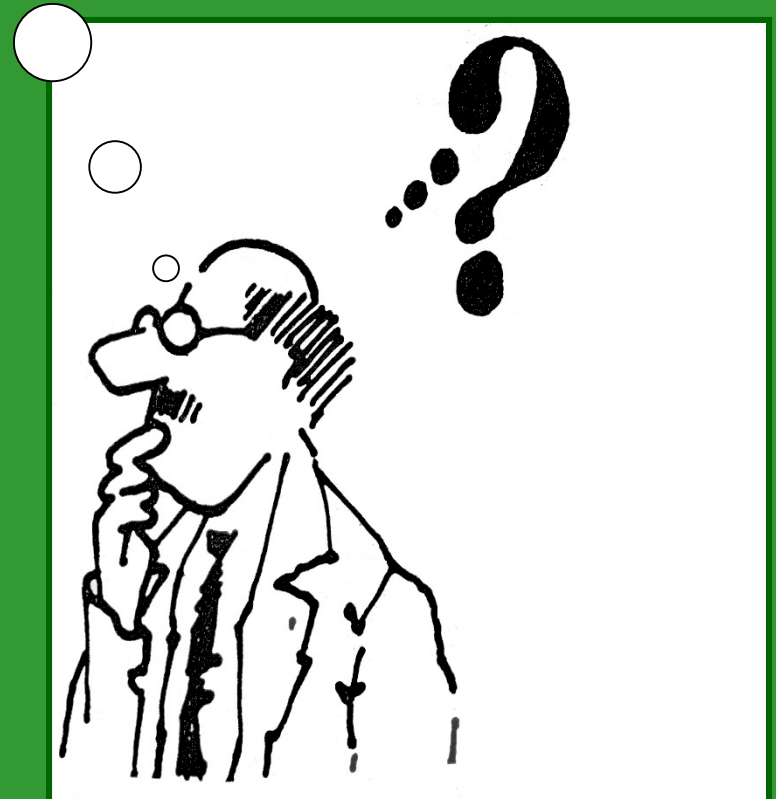
Stay closest to the earth!!



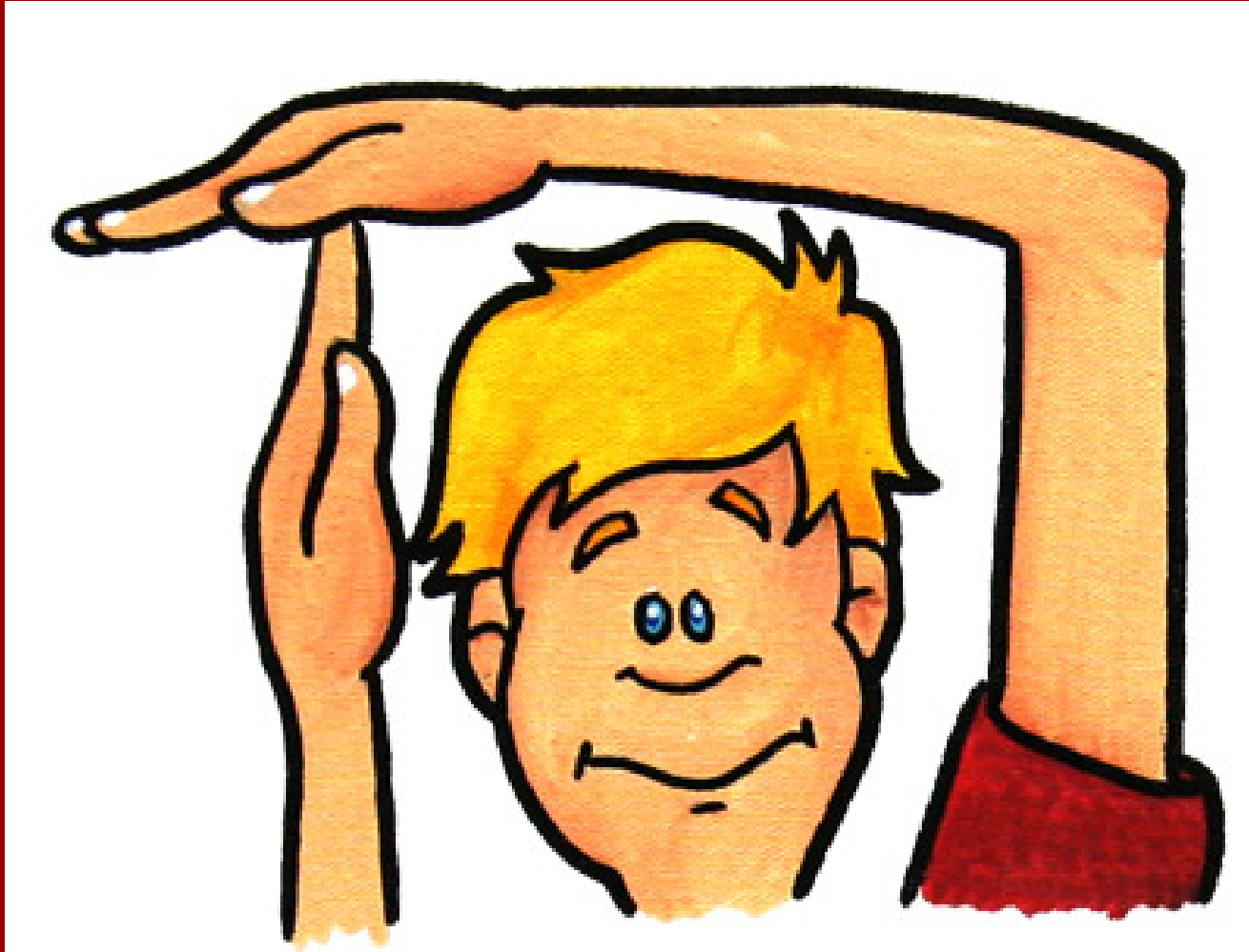
Pick an abundance of whole grains, legumes, nuts, vegetables & fruits!



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

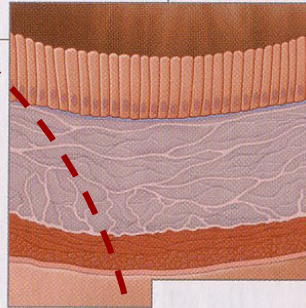
1. Molecular



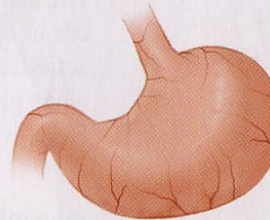
2. Cellular



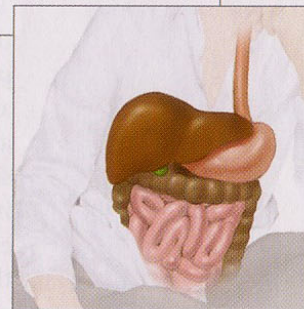
3. Tissue



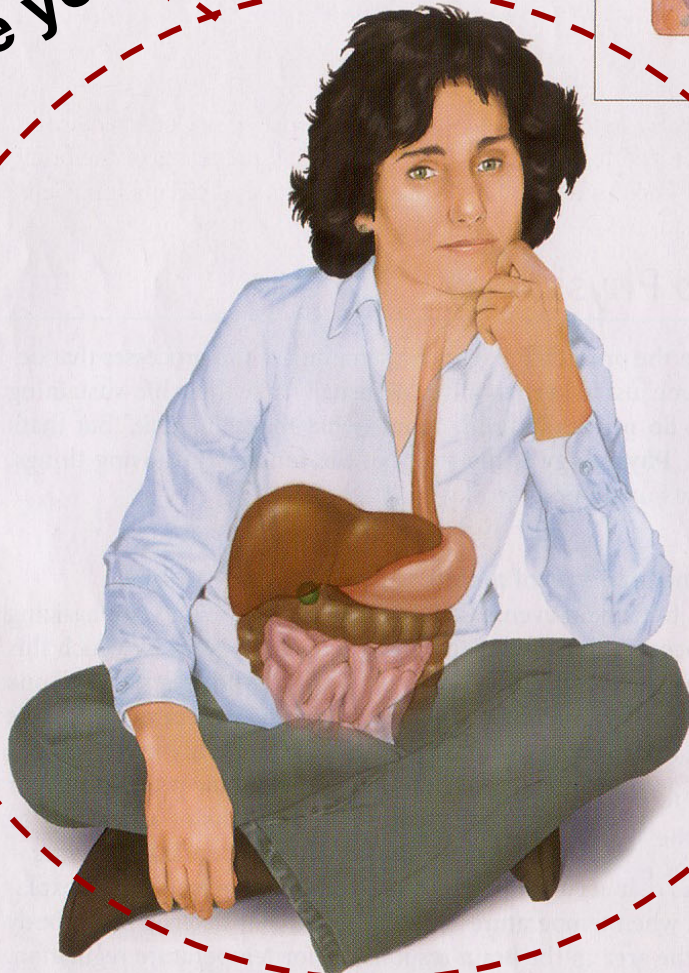
4. Organ



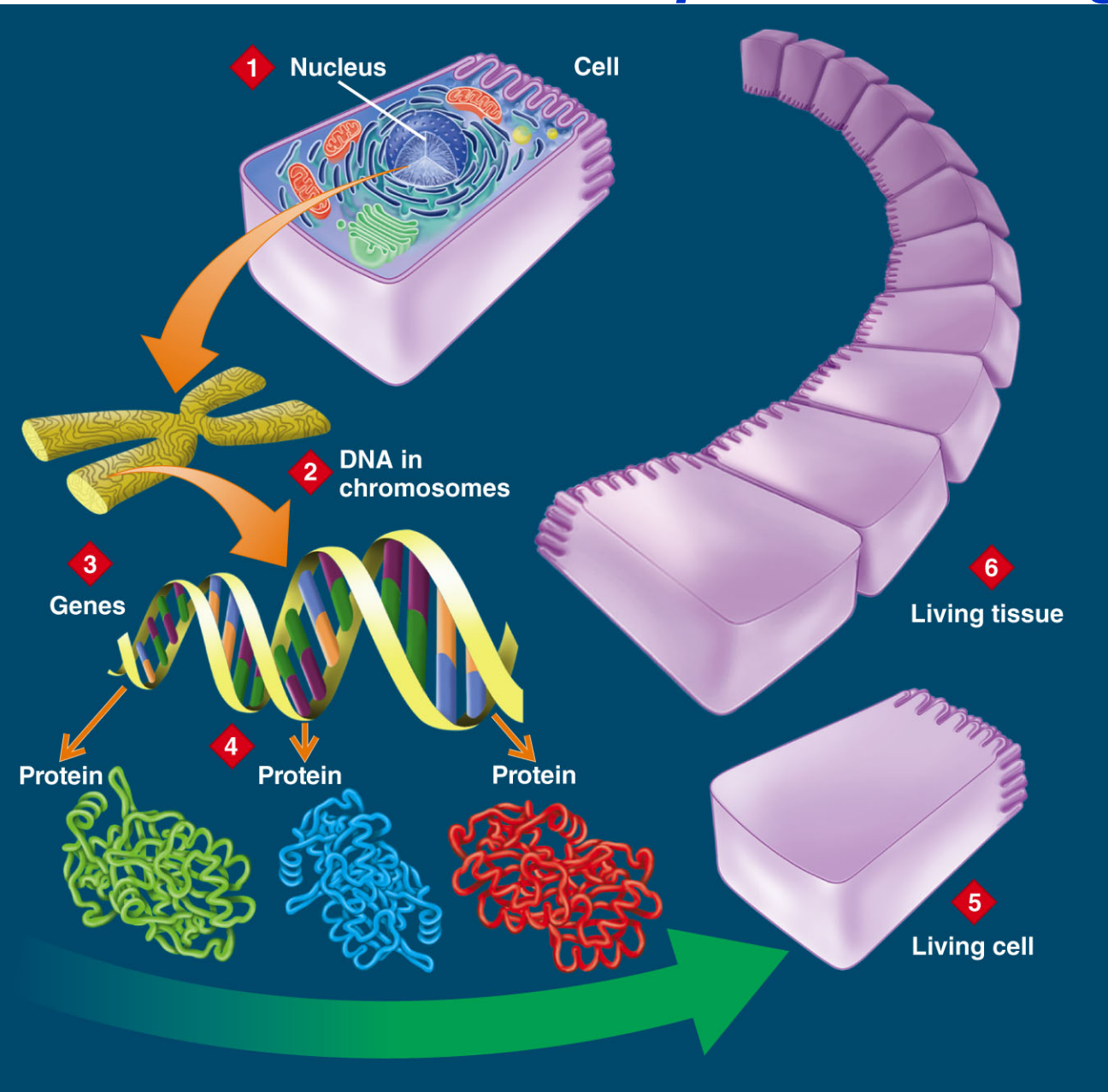
5. System



Entire Organism,
like you & me!



Genes are Recipes for Making Proteins!

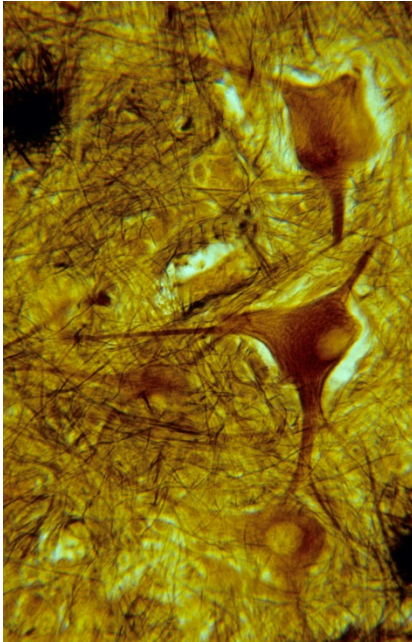


- 1** Each cell's nucleus contains DNA — the material of heredity in all living things.
- 2** Long strands of human DNA coil into 23 pairs of chromosomes. If the strands of DNA in all the body's cells were uncoiled and laid end to end, they would stretch to the sun and back four hundred times. Yet DNA 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.

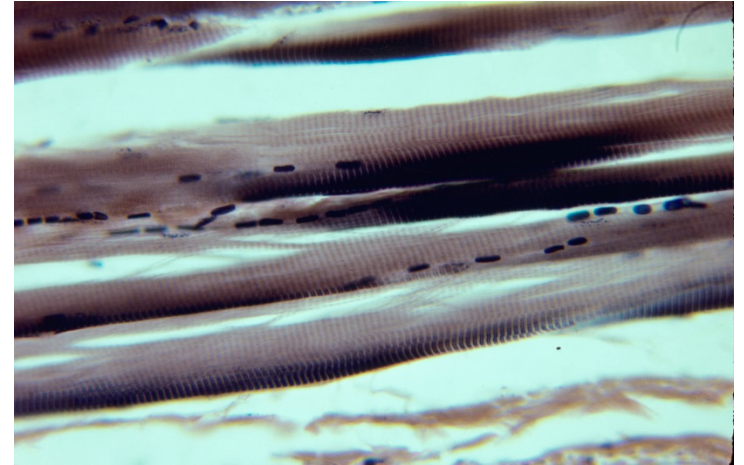
What are DNA's major functions? Heredity + Day-to-Day Cell Function



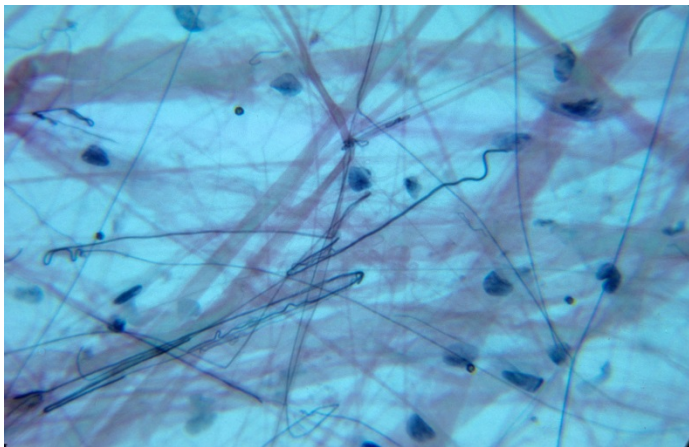
4 Cs for Tissue/Cell Type Functions!



Nerve conducts



Muscle contracts



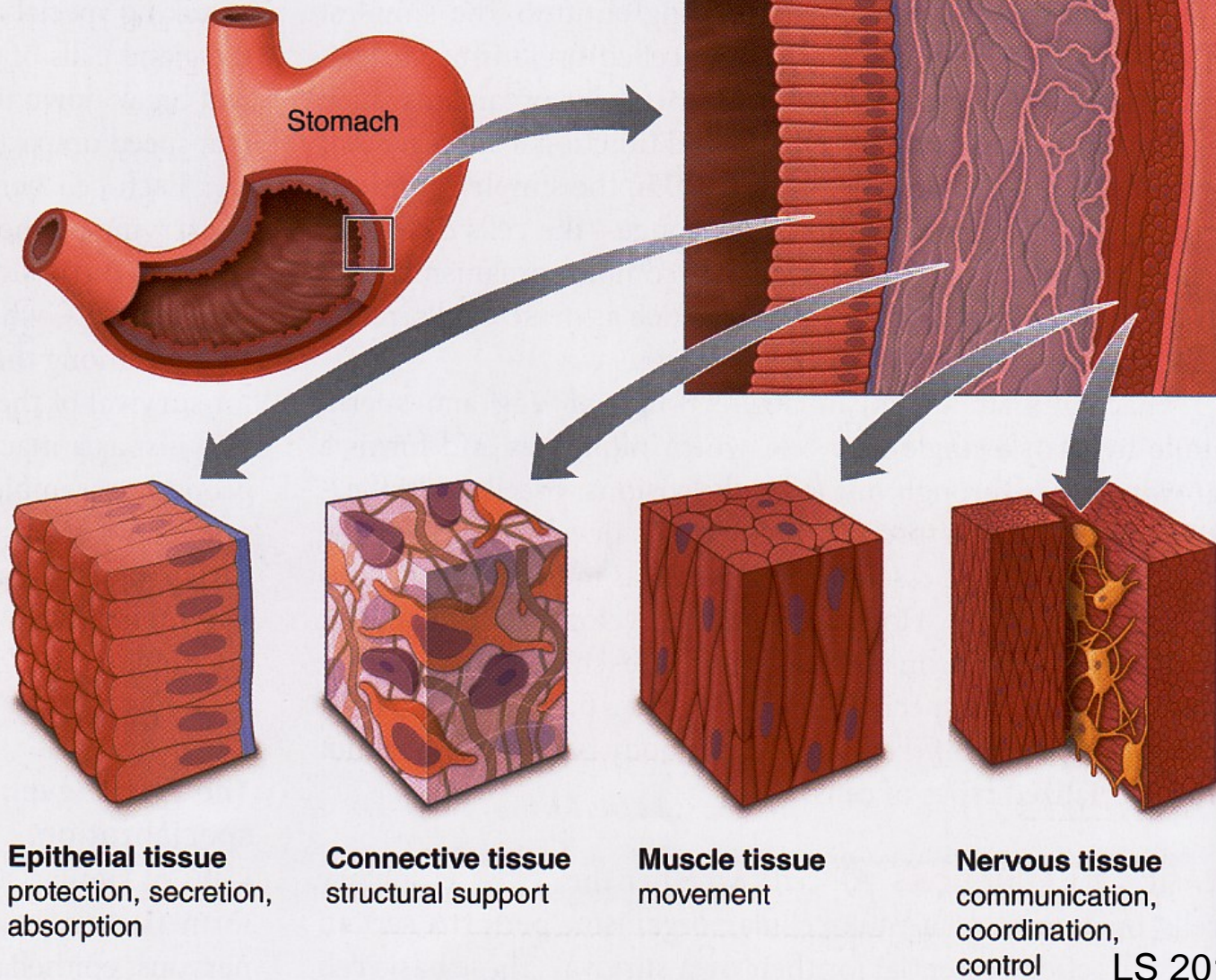
Connective connects!!



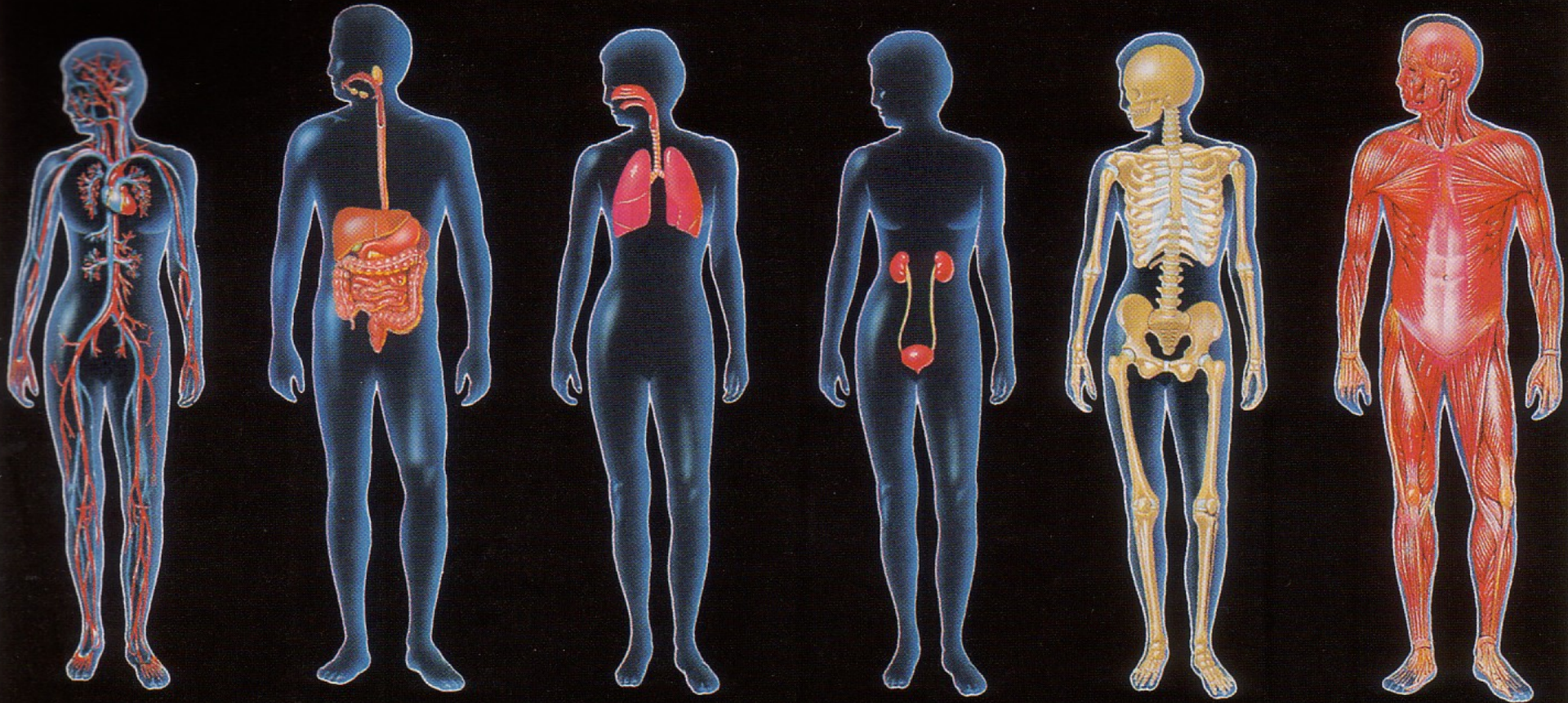
Epithelial covers

Organs are made up ≥ 2 tissue types

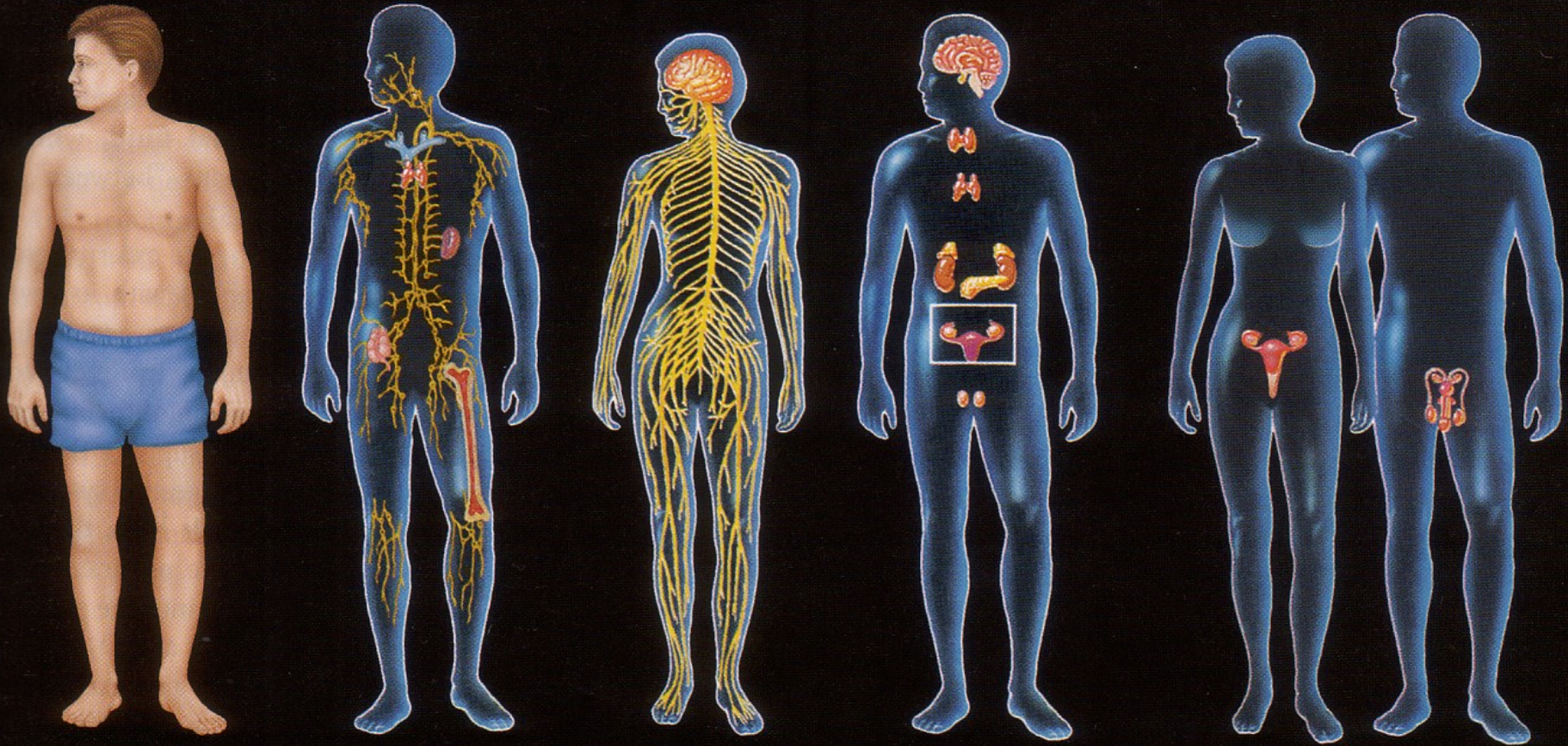
Organ:
Body structure that integrates different tissues and carries out a specific function

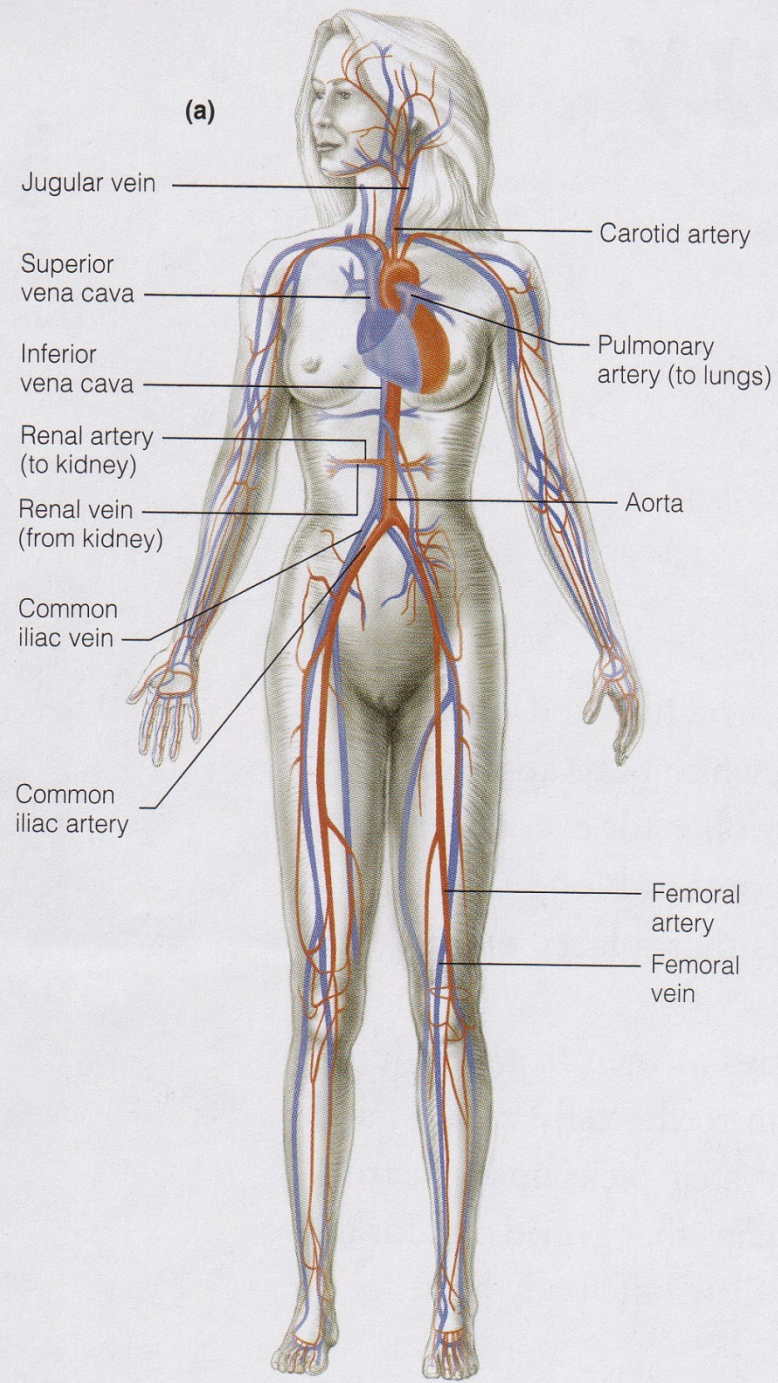


Which body systems?



Which body systems?



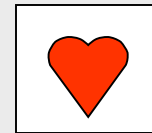


Cardiovascular or CV System

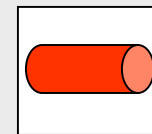
1. Heart

2. Vessels

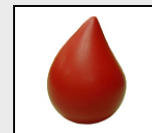
3. Blood



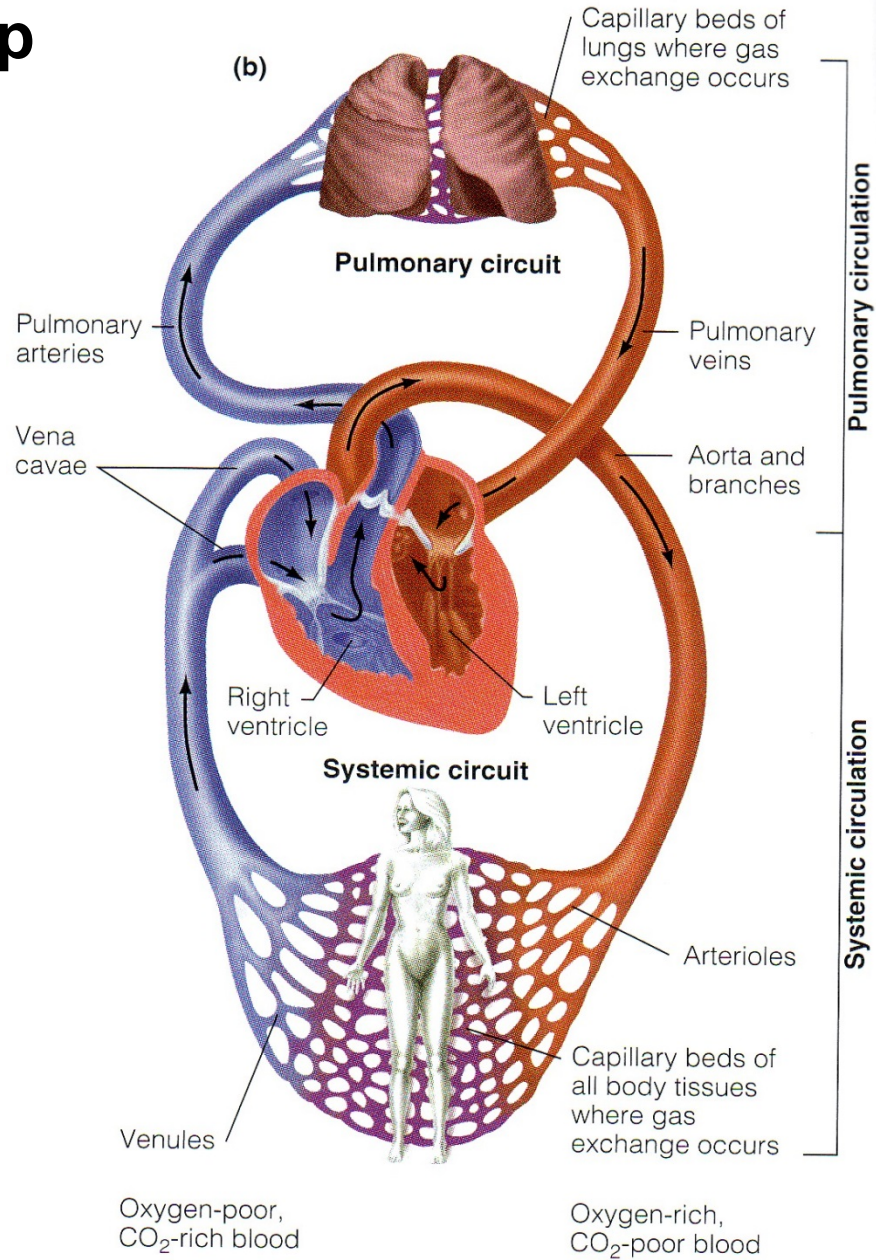
+

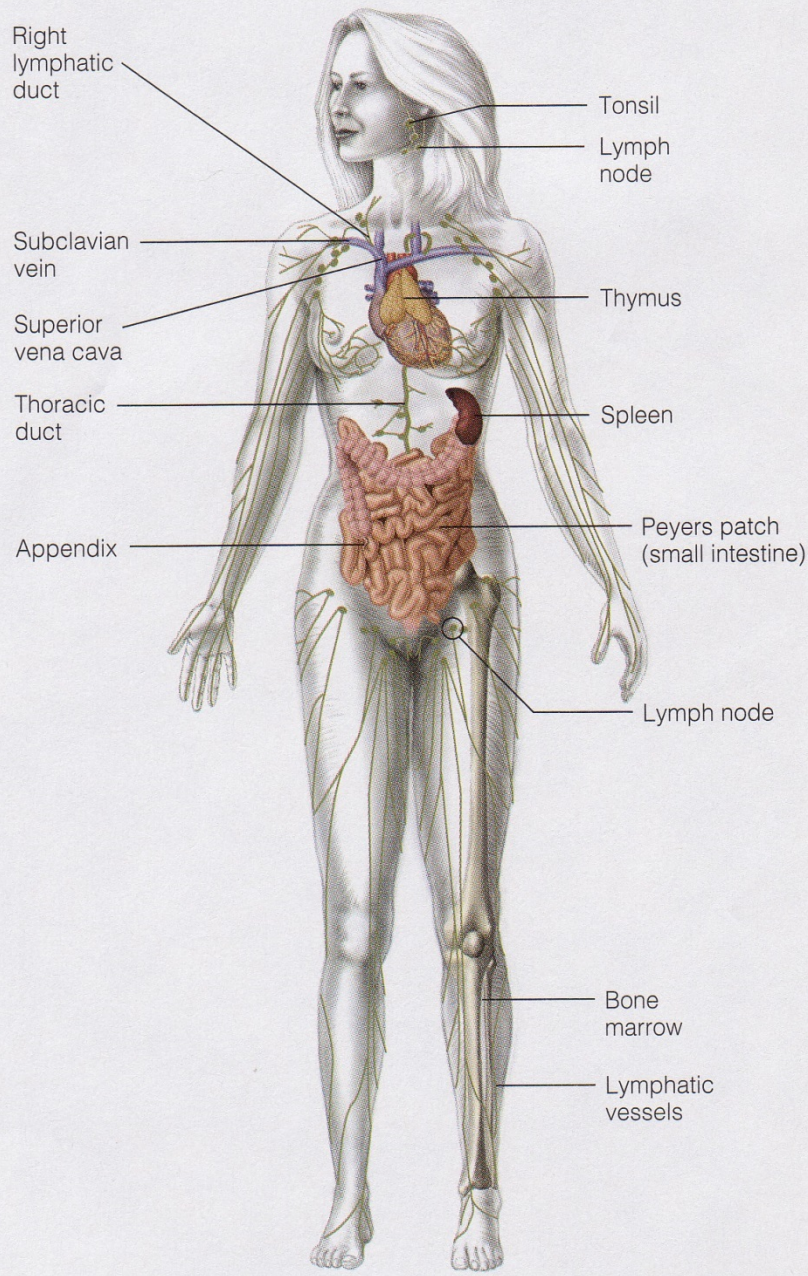


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NB: Figure-8 loop



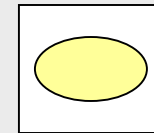


Lymphatic System

1. Lymph Nodes

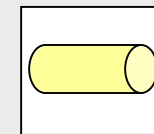
2. Vessels

3. Lymph

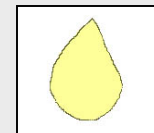


No pump!

+



+



Lymphatic System

**Alternative System of
Circulation
or
Drainage System**

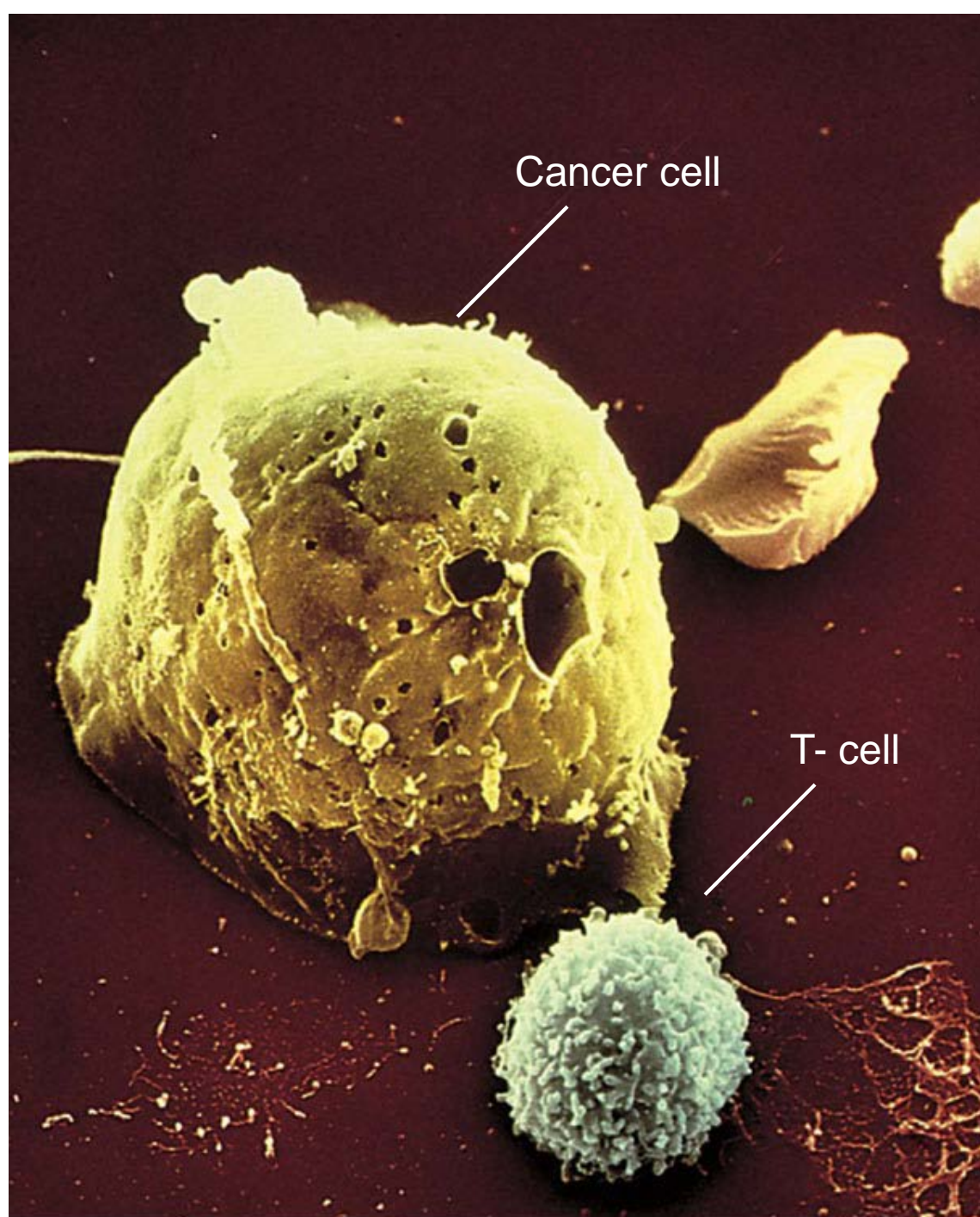
Lymph Vessels || Veins

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

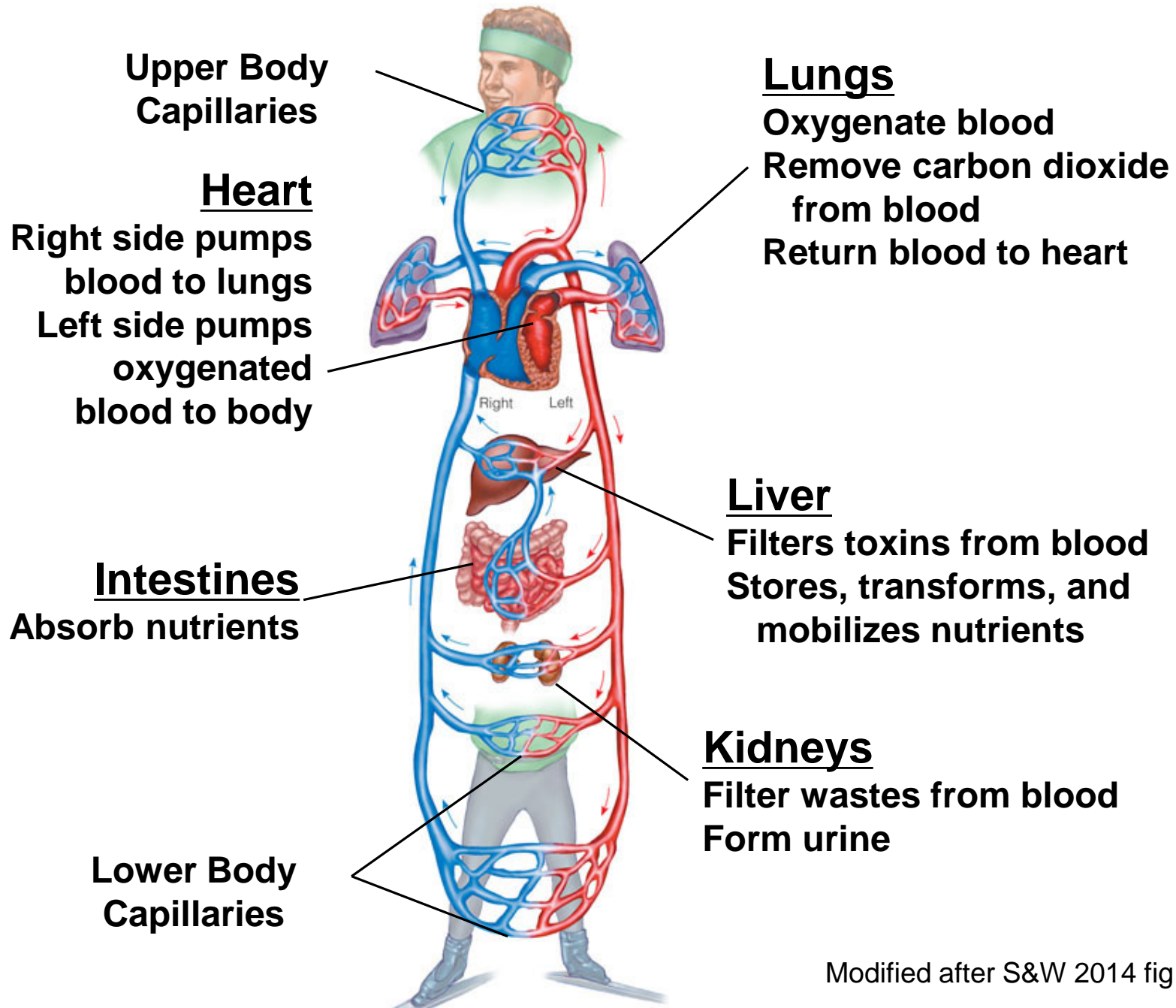


Source: L Sherwood 2006 fig 10-22 p 298

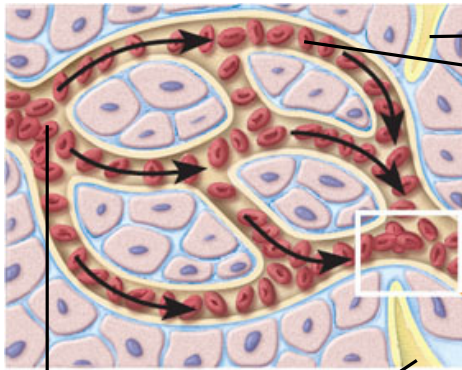
White
Blood
Cells =
Body
Defenders &
Surveillance
System!



Capillaries, Where Exchange Takes Place, Are Everywhere!



Body Fluids Mingle @ Capillary Level



Lymph vessel.

Blood circulates among cells by way of capillaries.

Blood collects into veins for return to heart.

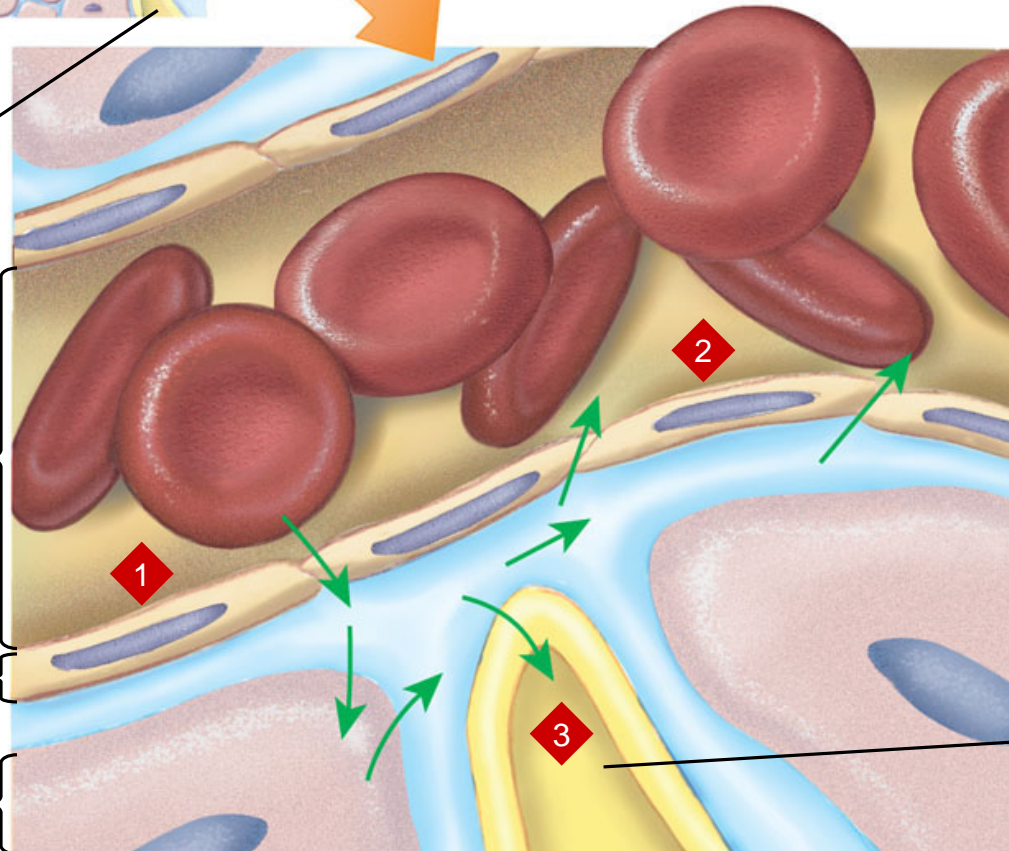
Blood enters tissues by way of artery.

Lymph vessel.

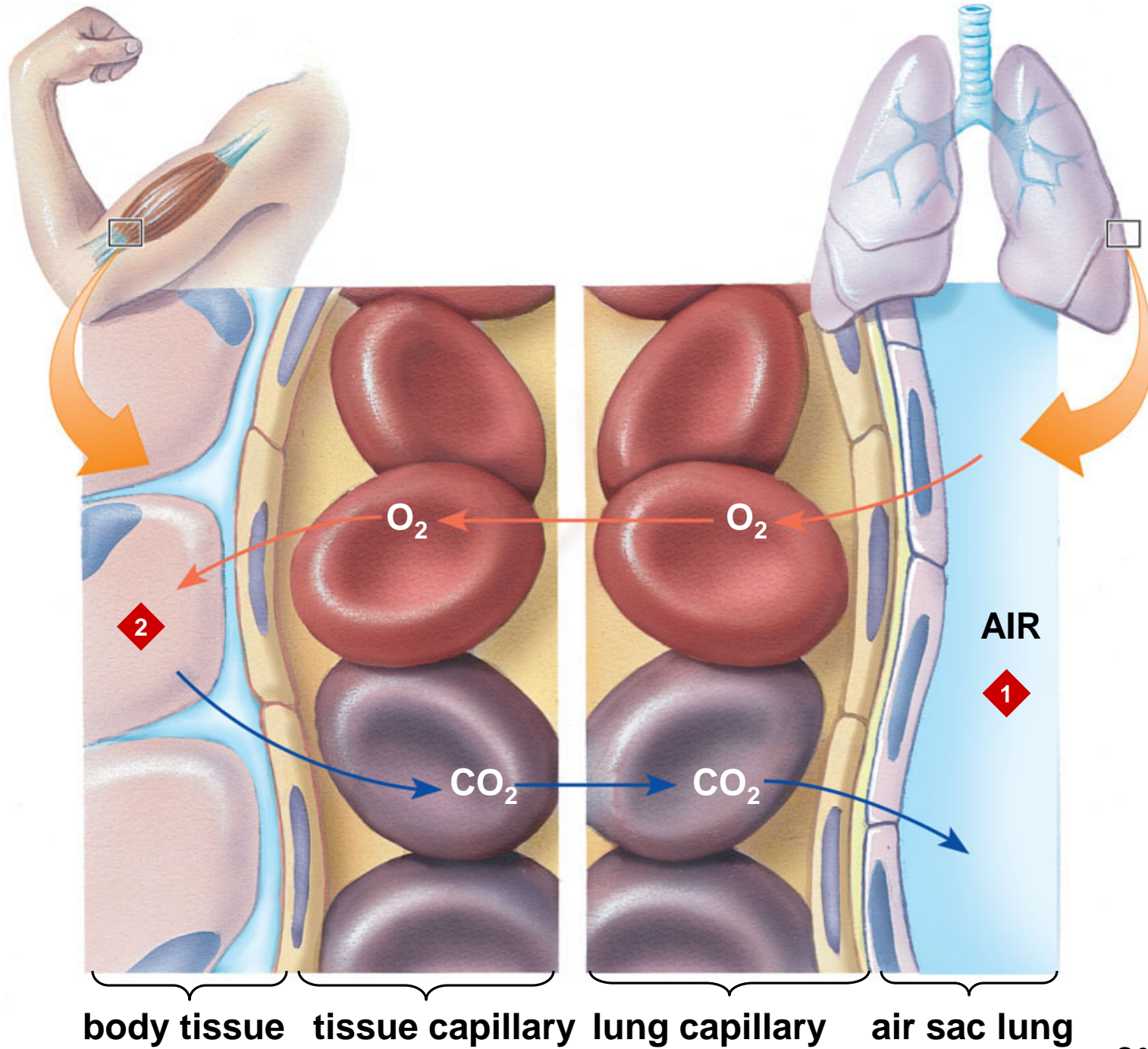
Inside capillary.

Capillary wall has spaces between its flat cells.

Cells of surrounding tissue.



Lymph vessel.



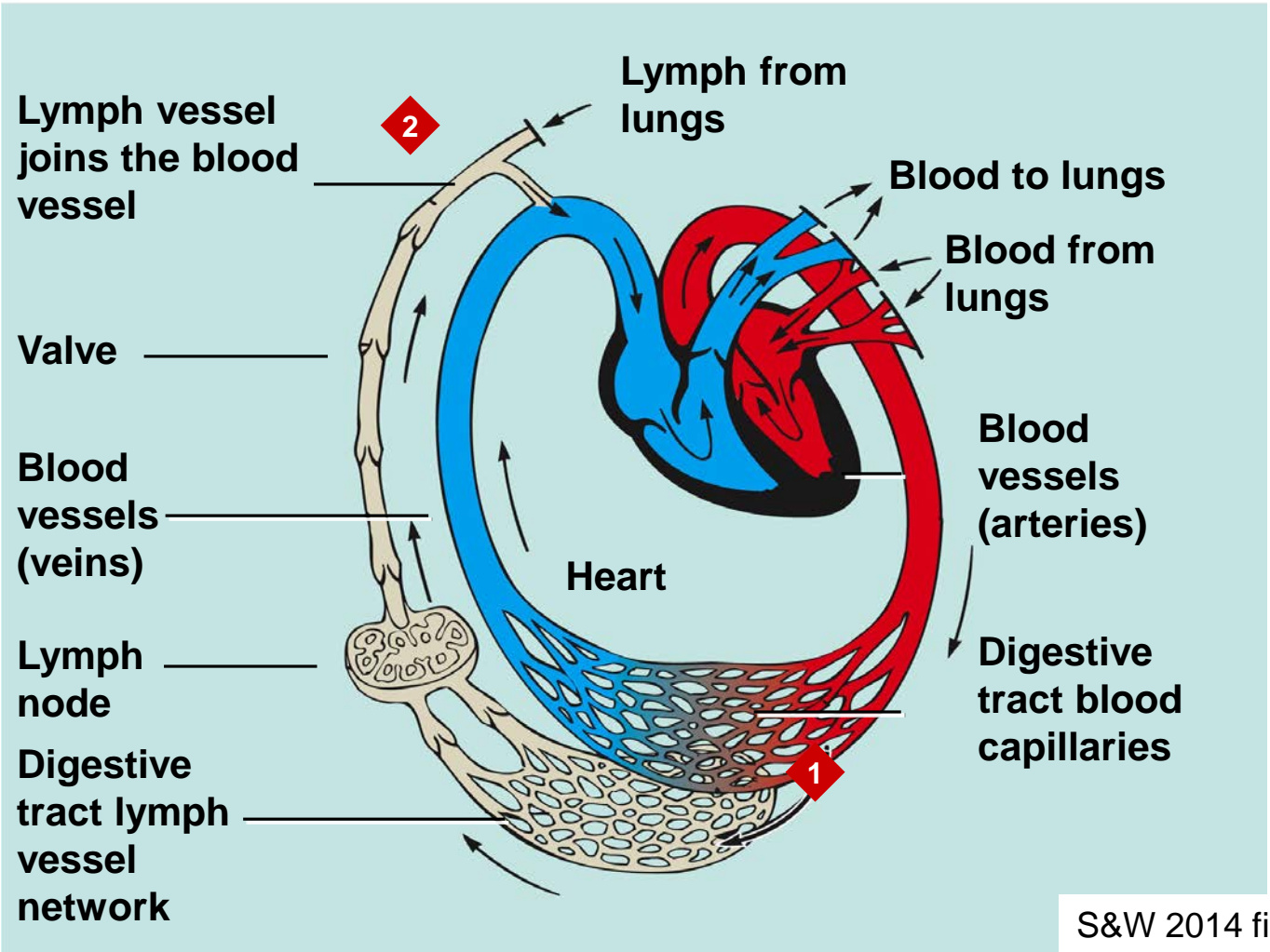
body tissue tissue capillary lung capillary air sac lung

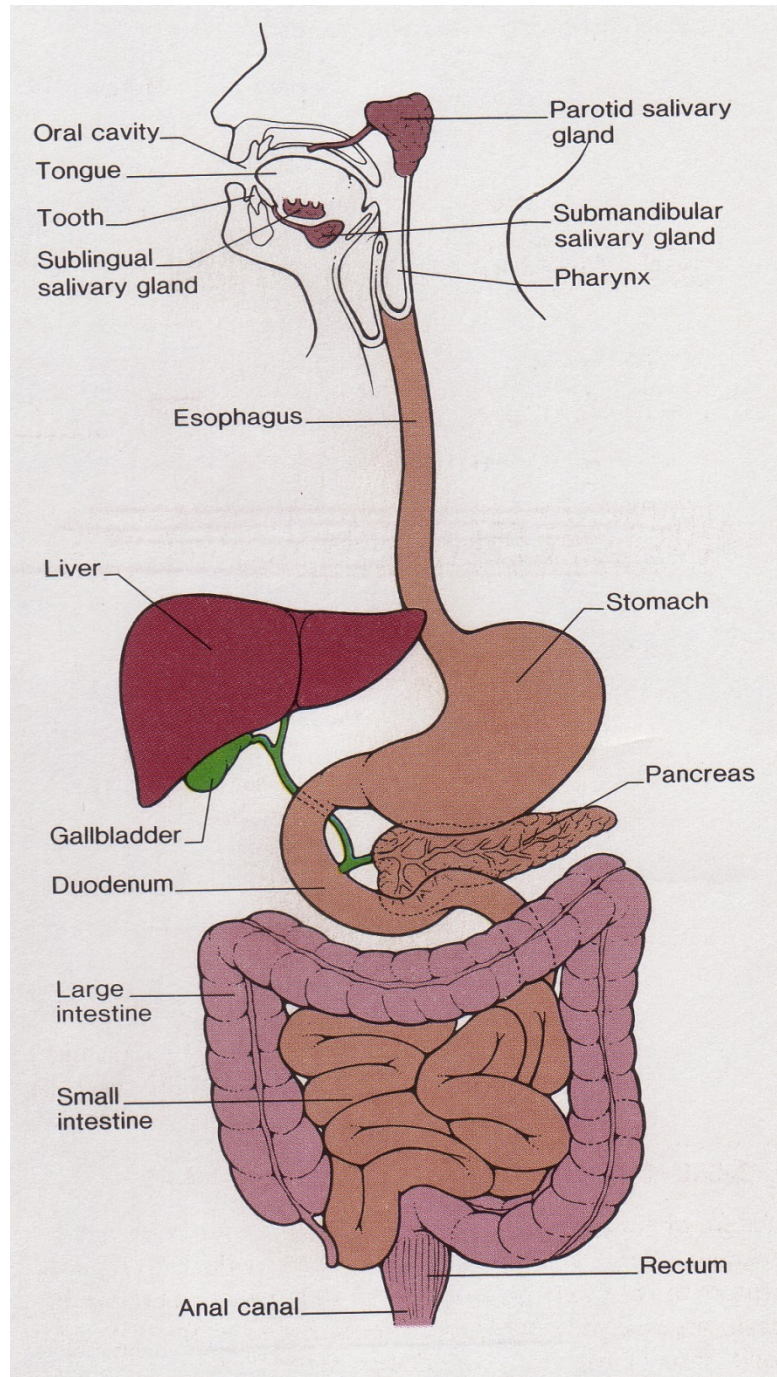
1 *RBCs* pick up O_2 in lungs & deliver to tissues in periphery.

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

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.





*Next time,
the Digestive
(GI) System!*