

- I. Announcements** Anatomy & Physiology Lab today! Fun! Remember to complete p 3-7 dietary record in LM before Lab 3 next Thursday! Estimating serving sizes. Q?
- II. Adenosine Triphosphate (ATP)** ATP parts? Uses/functions?
- III. Anaerobic vs. Aerobic Metabolism** LS ch 2 pp 26-33, fig 2-15+
 - A. Cytosol vs. Mitochondria
 - B. Anaerobic: ATP-PC, Glycolysis
 - C. Aerobic: Mitochondrial matrix vs. cristae
Citric acid cycle vs. ETC purpose
- IV. Genetics Introduction** LS 2012 ch 2 pp 20-1 + Appendix C
 - A. What's a gene? Where located? p A-18, fig C-2, C-3
 - B. Why are genes important? p A-18
 - C. What's DNA & what does it look like? pp A-18 thru A-20
 - D. How does information flow in the cell? fig C-6
 - E. How does DNA differ from RNA? pp A-20 thru A-22
 - F. Code word, codon, anti-codon? pp A-22, A-23
 - G. How are proteins made? Class skit! LS Appendix C

4 oz → 3 oz



Deck of Cards



or

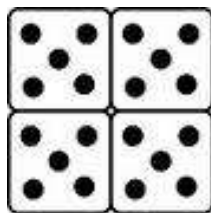


≡ 1 c

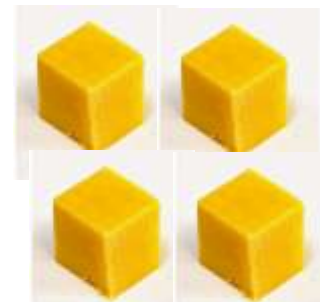
raw → cooked



≡ 1/3 c



≡ 1 oz



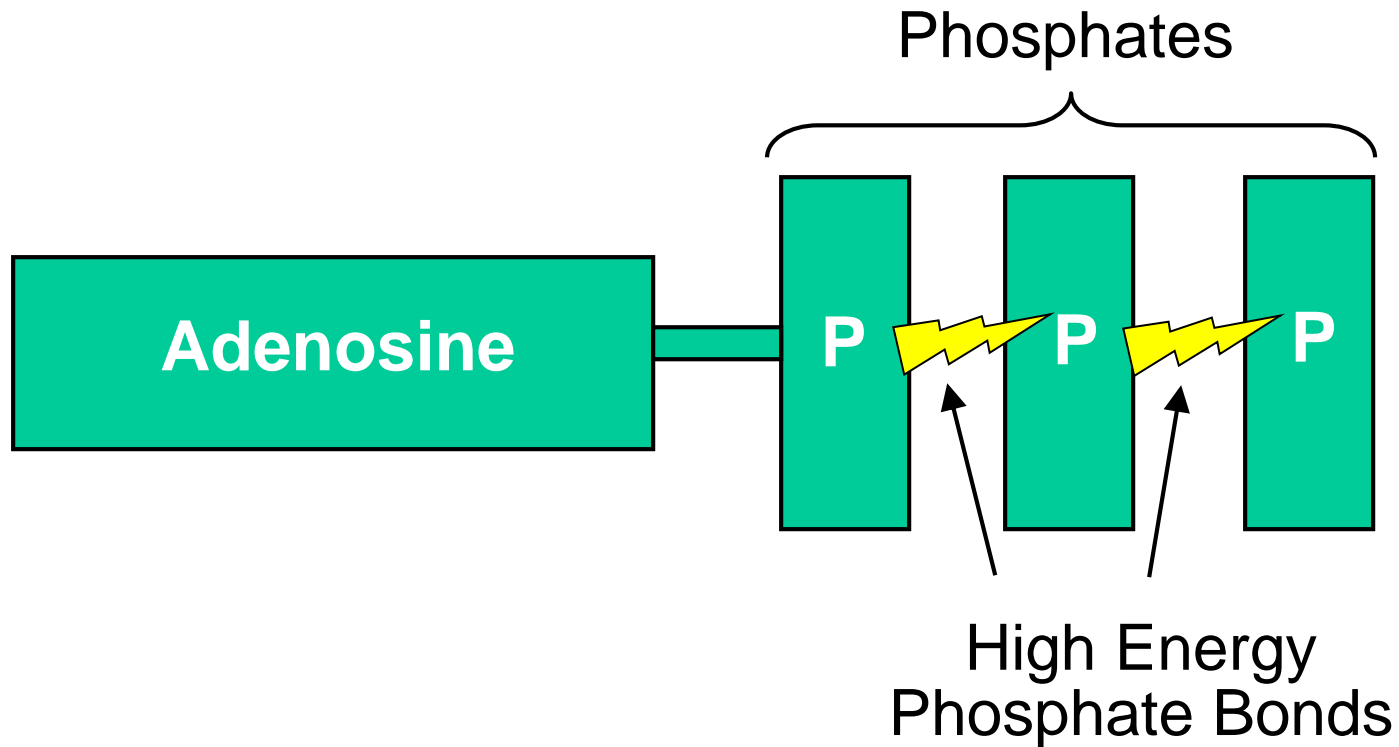
≡ 1/4 c



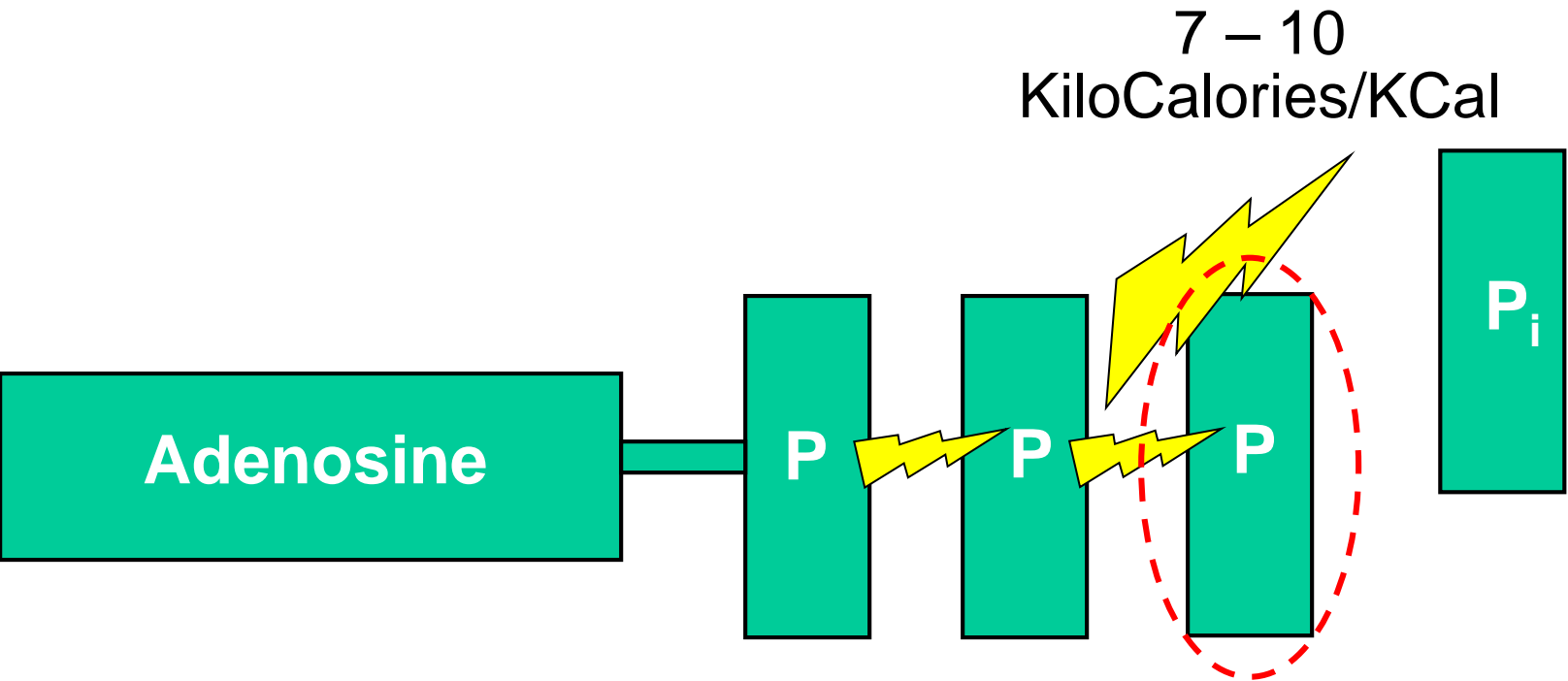
≡ 1.5 oz



**ATP = Adenosine Tri Phosphate
The Common Energy Currency
or the Cash Cells Understand!!**



Cleave One High Energy Phosphate Bond To Do Work!!



① *Synthesis of Macromolecules*

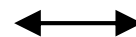
Make big things from little things!

② *Membrane Transport*

Move things!
Microscopic!

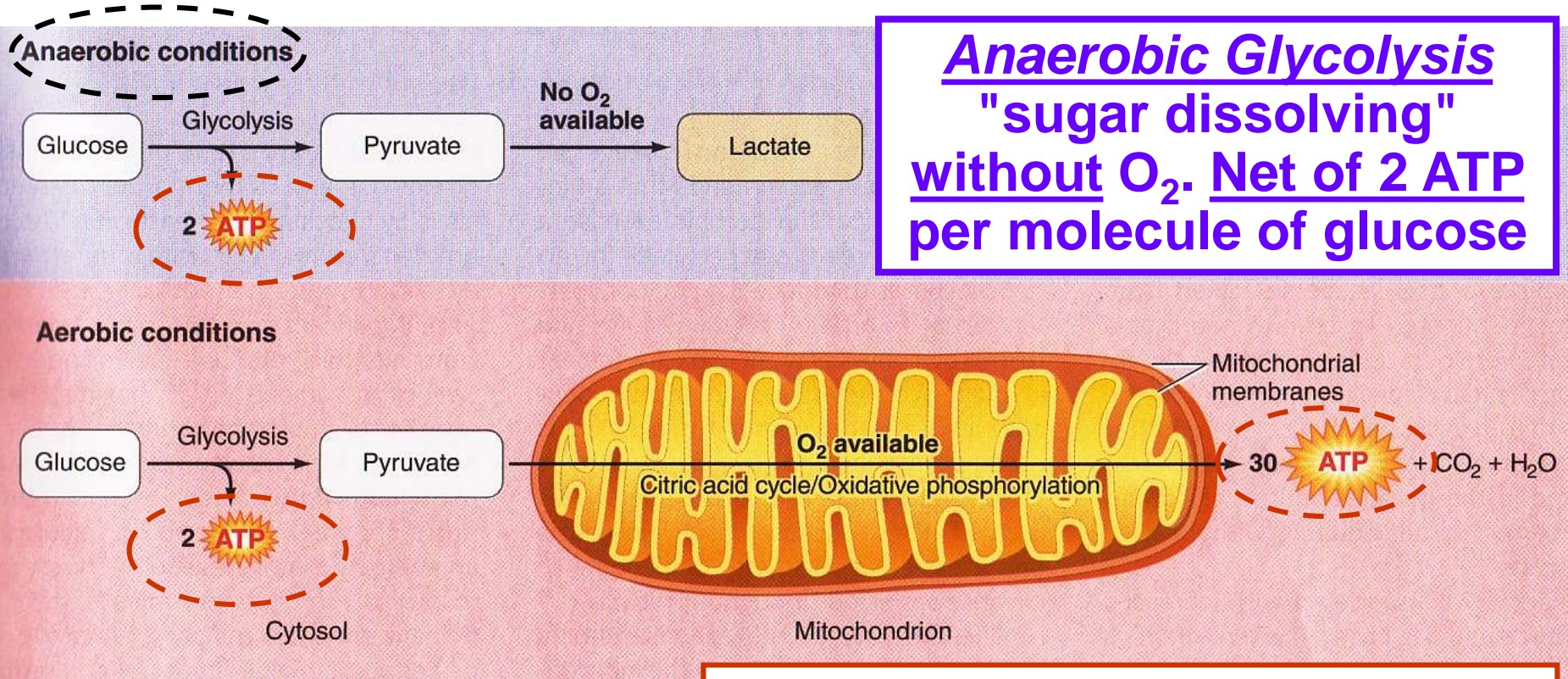
③ *Mechanical Work*

Move things!
Macroscopic!



Anaerobic vs. Aerobic Metabolism

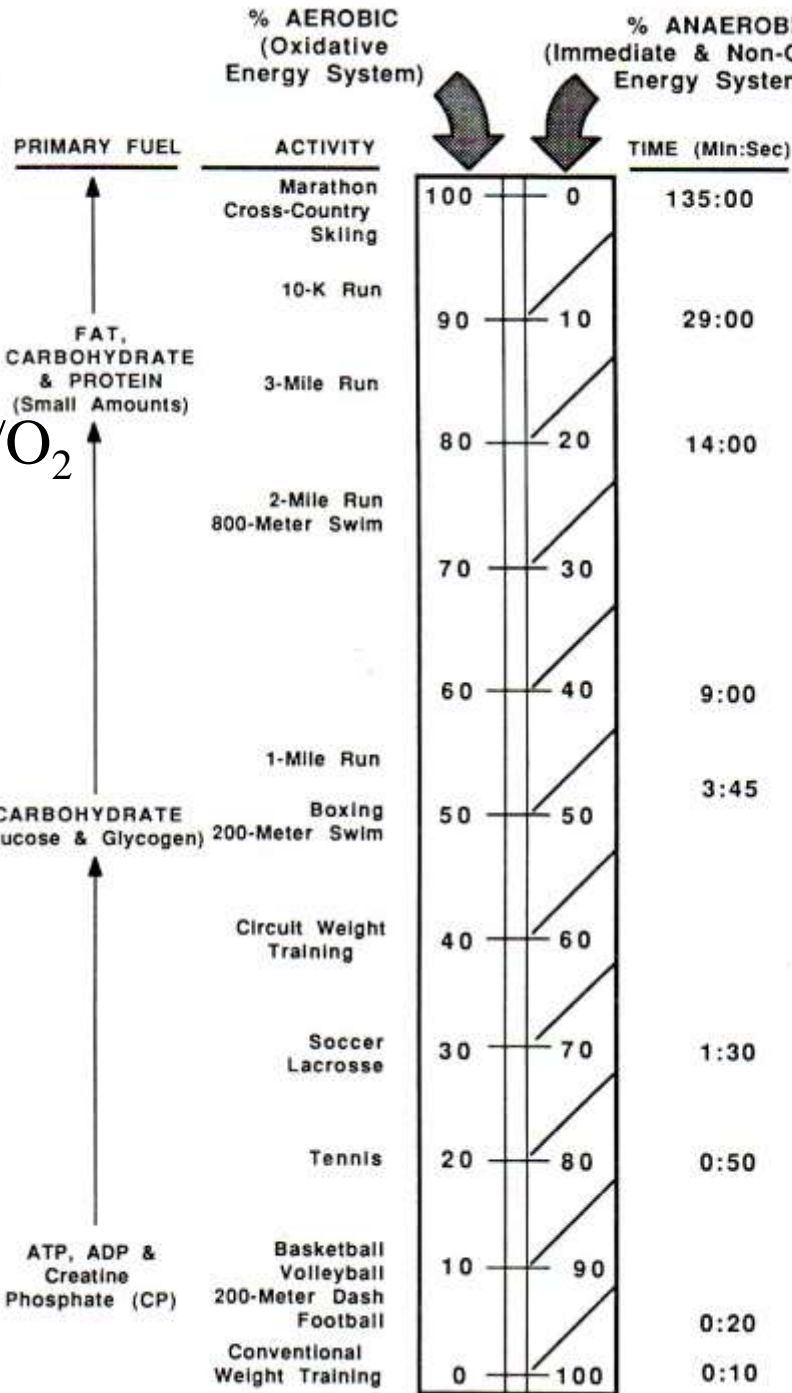
NB: ATP-PC also anaerobic, also in cytosol!





AEROBIC

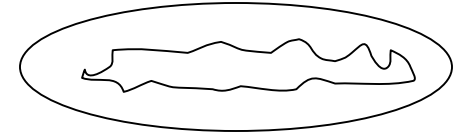
w/O₂



FAT,
CARBOHYDRATE
& PROTEIN
(Small Amounts)

CARBOHYDRATE
(Glucose & Glycogen)

ATP, ADP &
Creatine
Phosphate (CP)



MITOCHONDRIA

CYTOSOL

Glycolysis



Immediate/ATP-PC

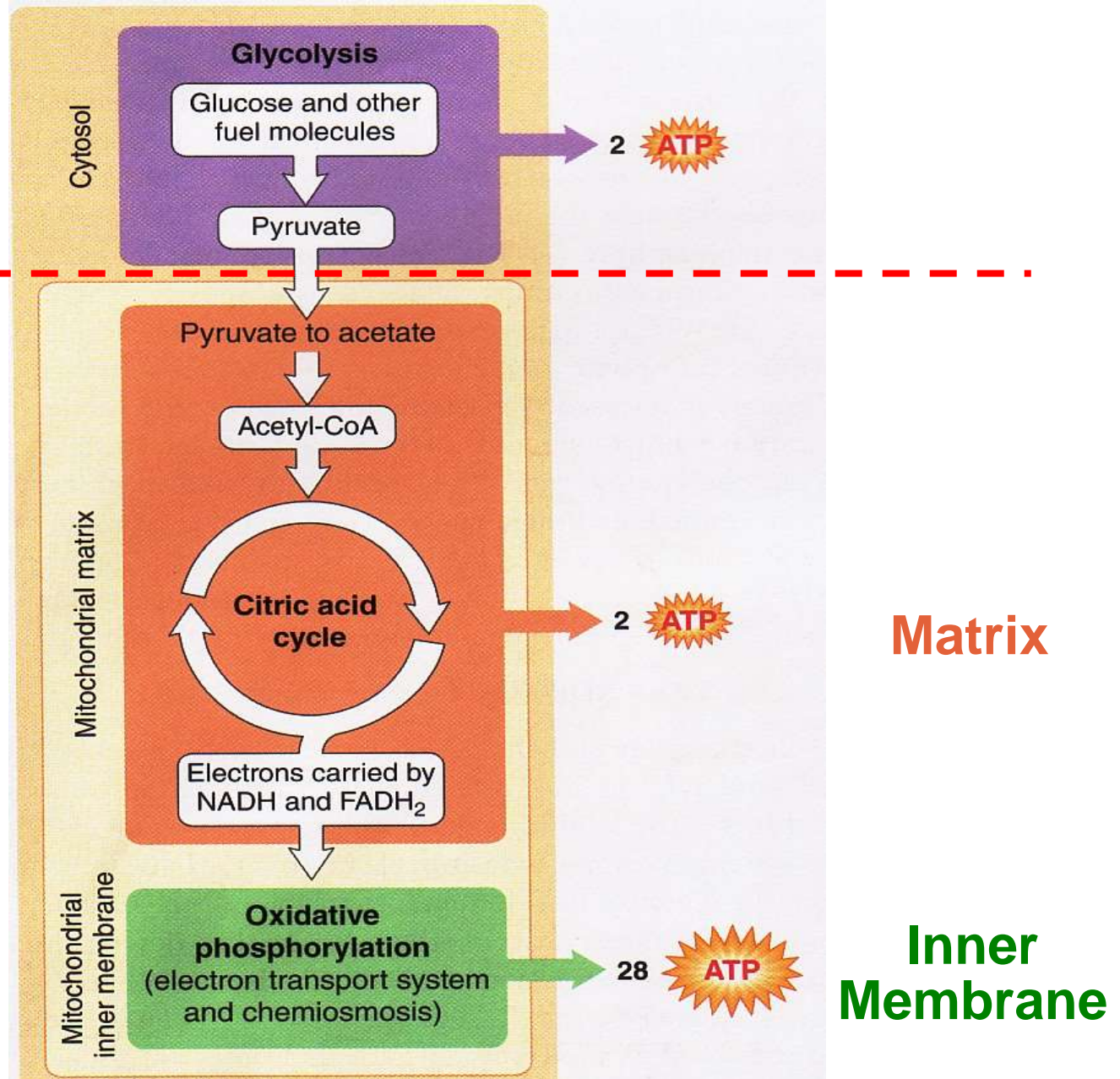


ANAEROBIC

Stages of Cellular Metabolism/Respiration

**Anaerobic
Glycolysis
Cytosol**

**Aerobic
Metabolism
Mitochondria**



Glycolysis "sugar dissolving/splitting" produces small amounts of ATP

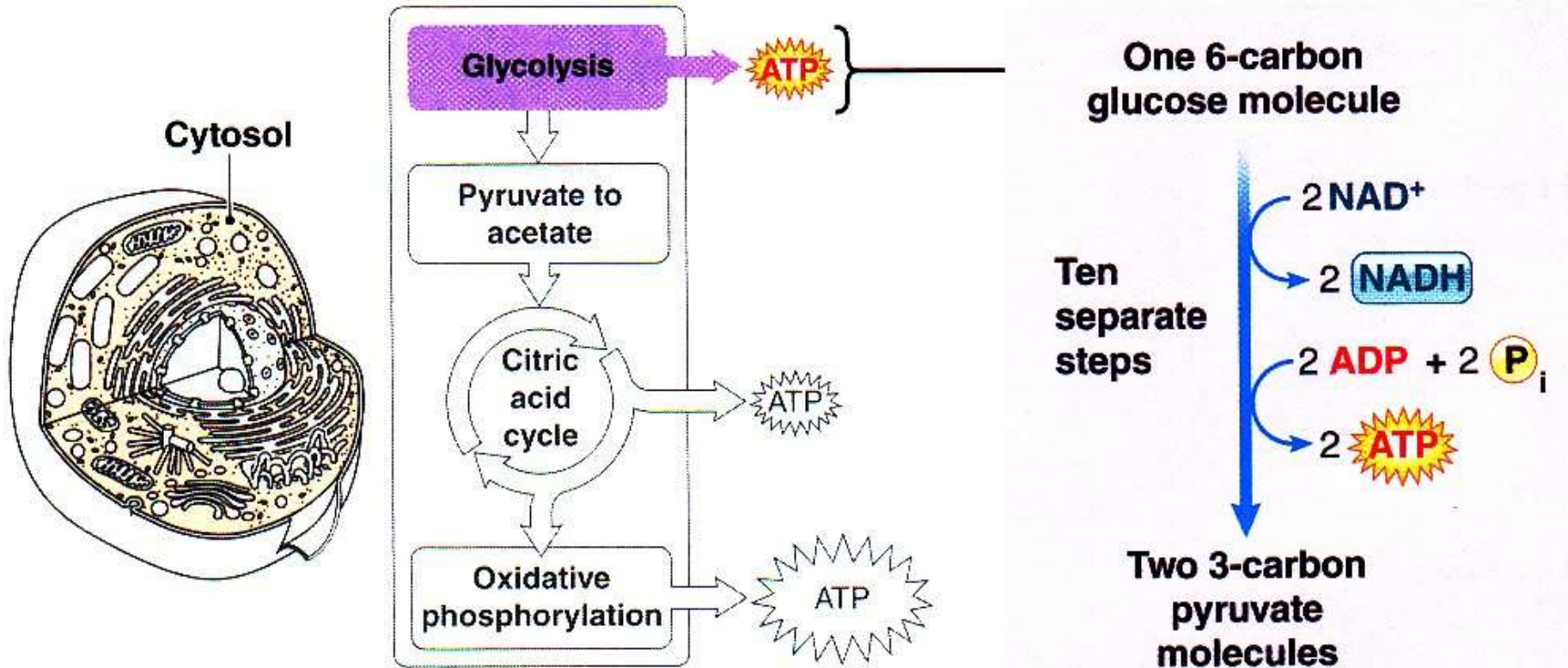


fig 2-10 LS 2012

Citric Acid Cycle
produces pairs of
electrons for cashing in
at the nearby electron
transport chain (ETC)

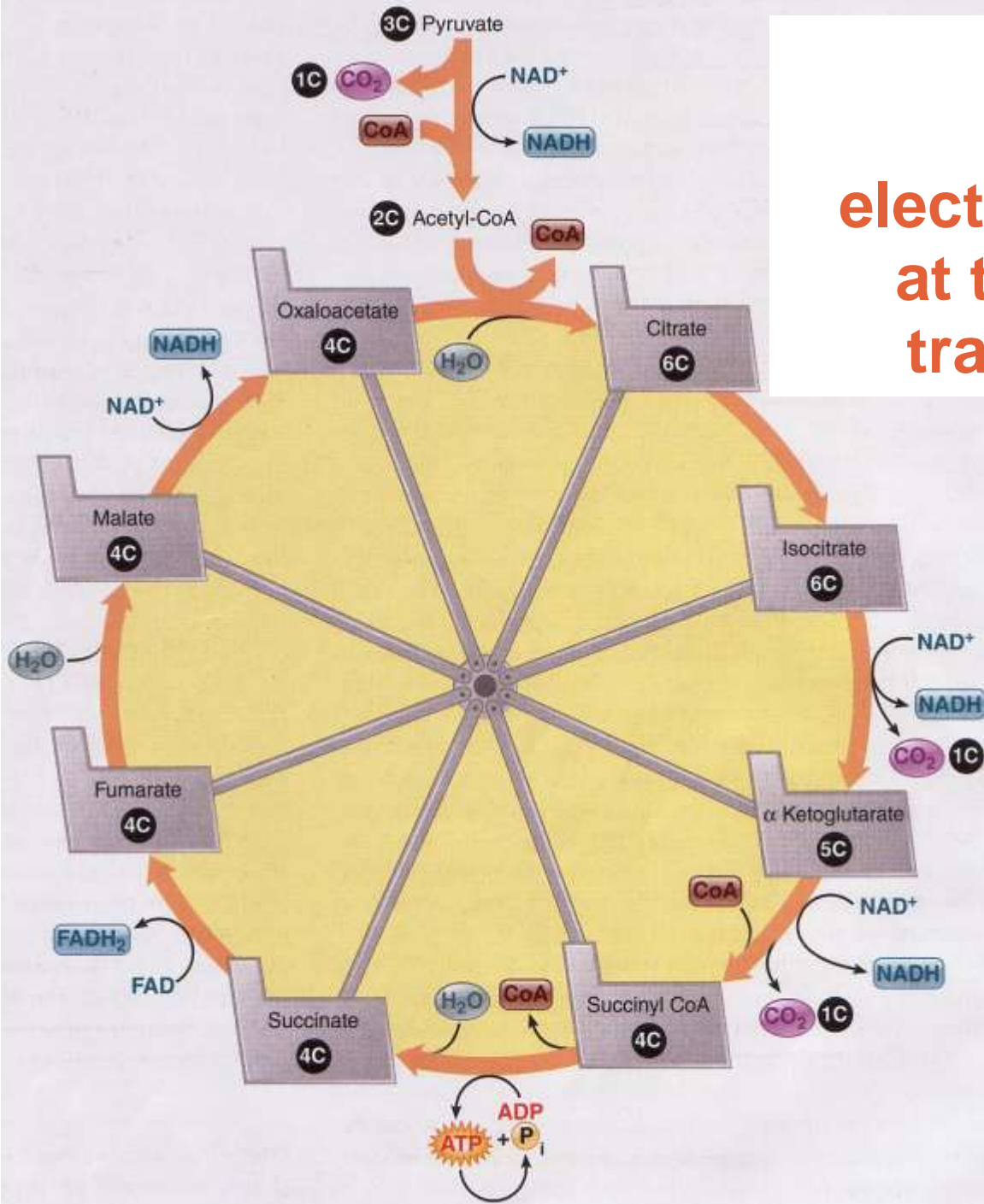


fig 2-11 LS 2012
+ David Oganessian
<http://pixdaus.com>

Cashing in electrons at the Electron Transport Chain (ETC) produces an abundance of ATP energy molecules!

Cytosol

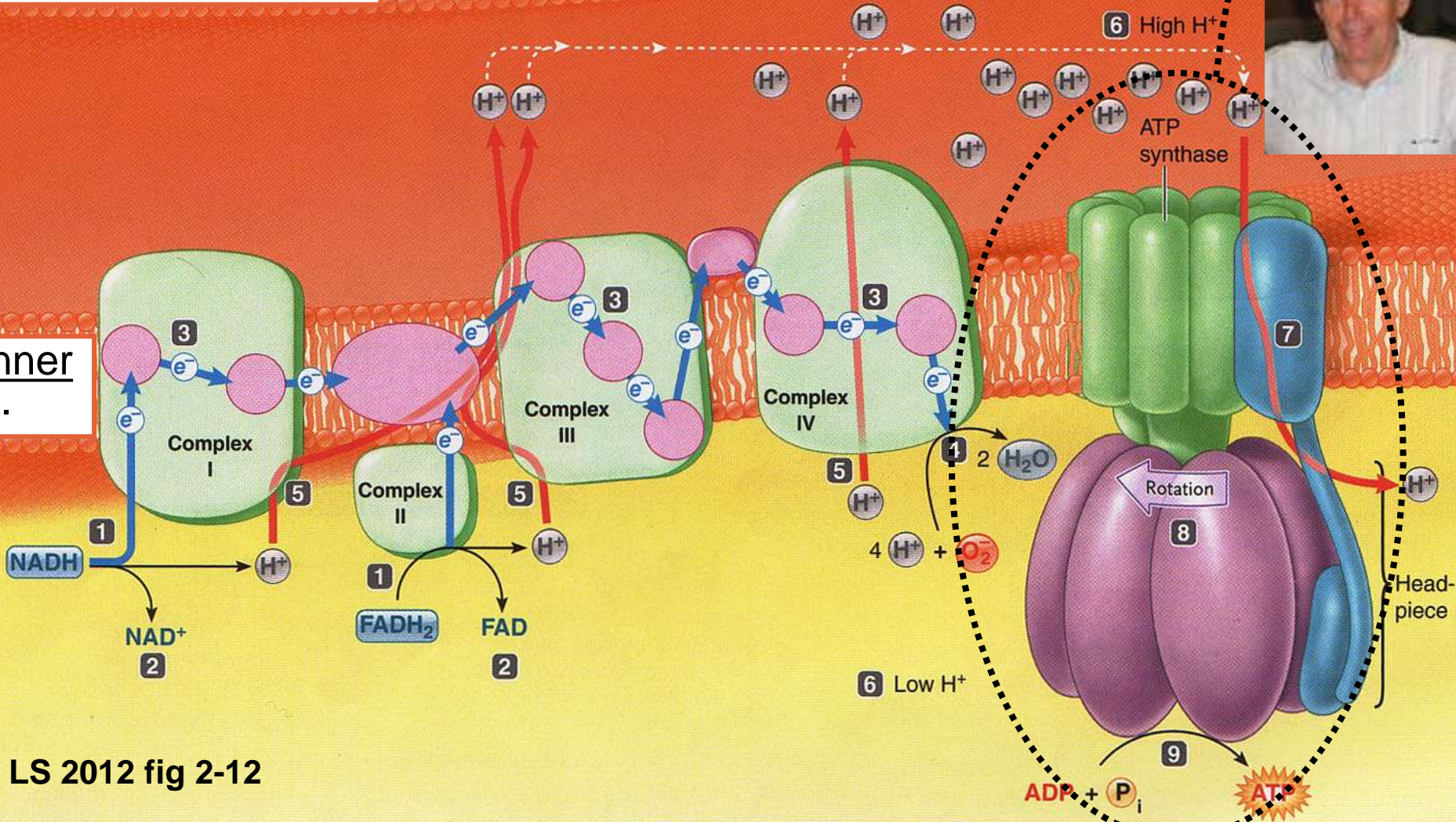
Outer mitochondrial membrane

MitoSciences®

Rod Capaldi
U of O Biology



Inner ...



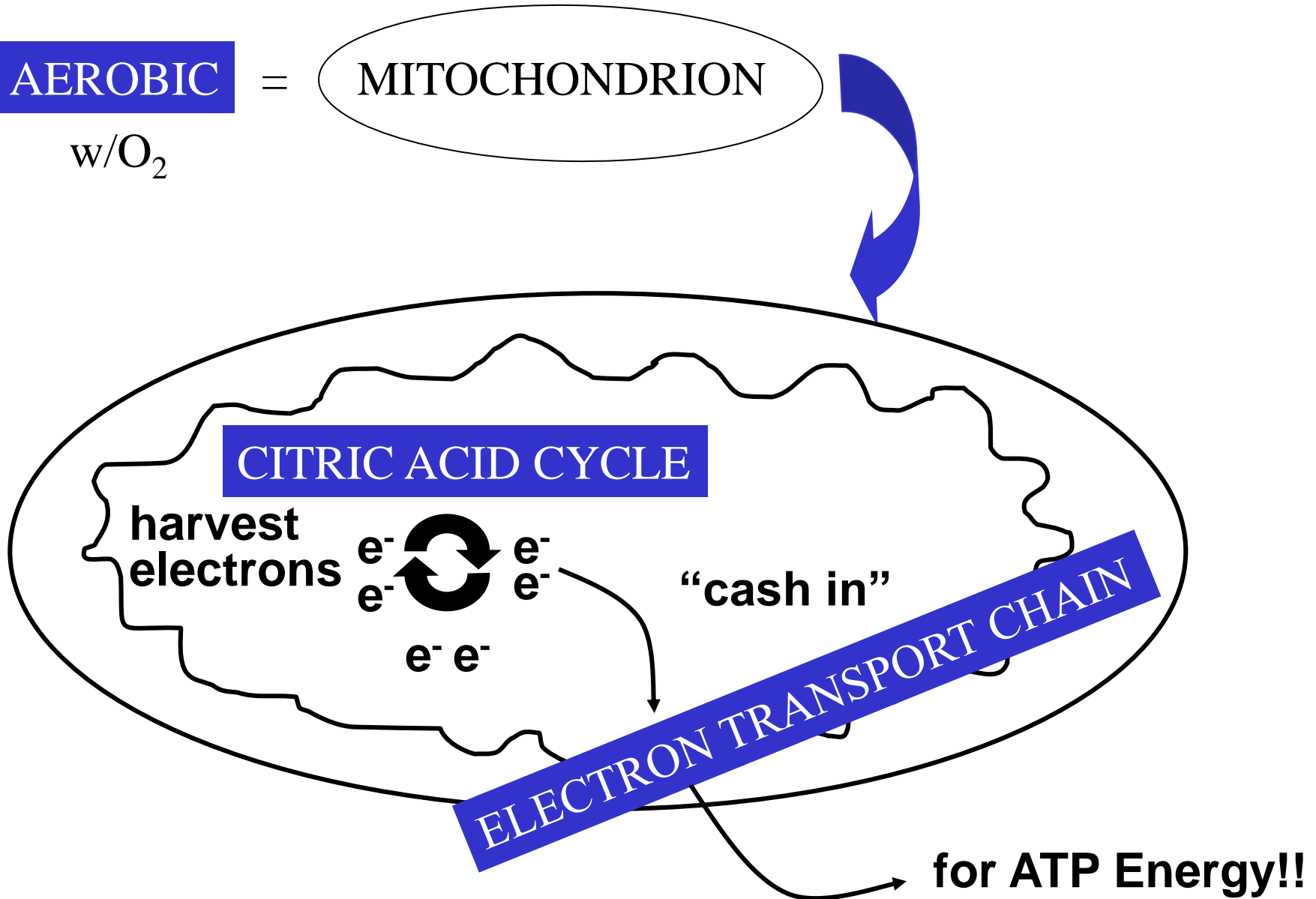
Goals of Aerobic Metabolism

AEROBIC

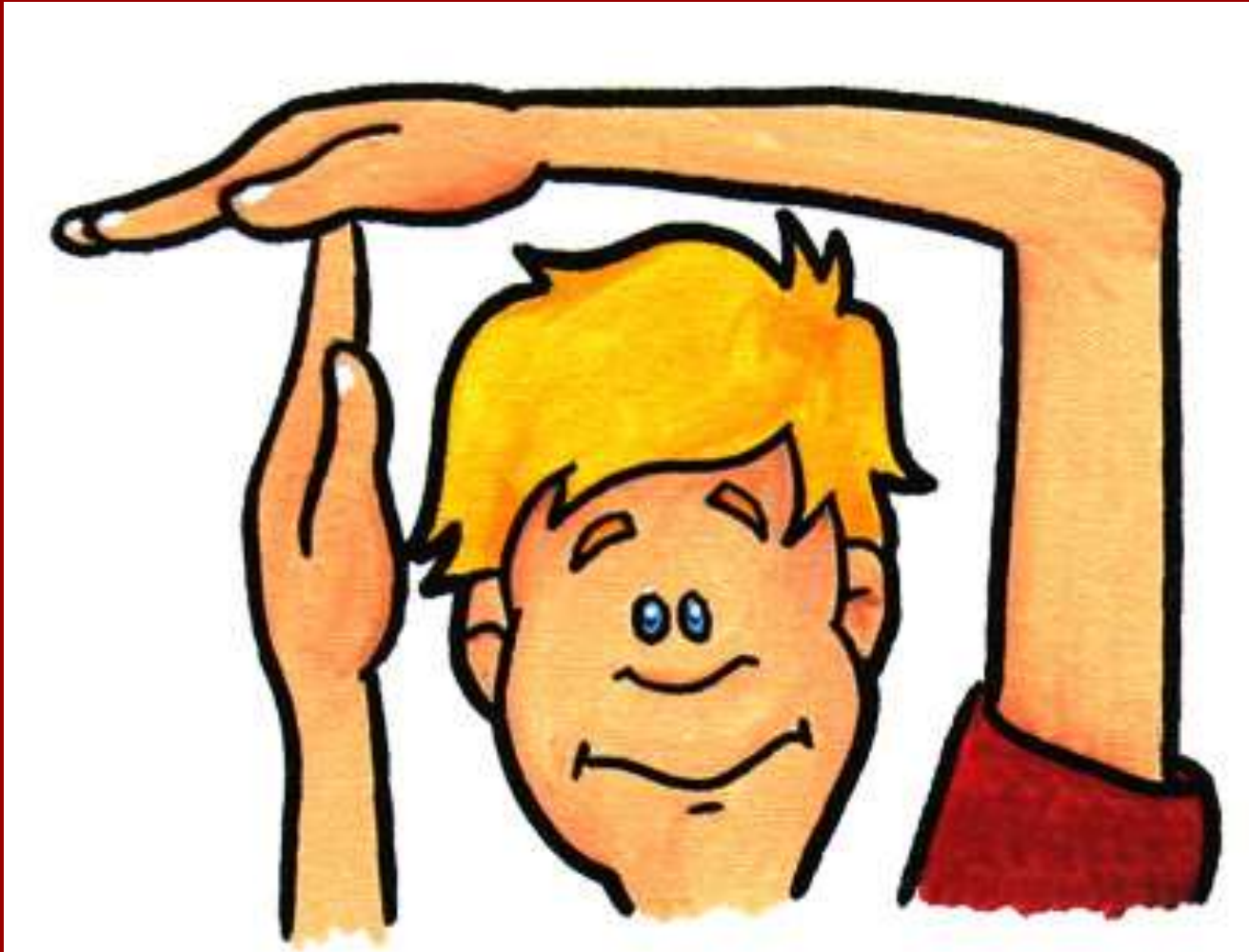
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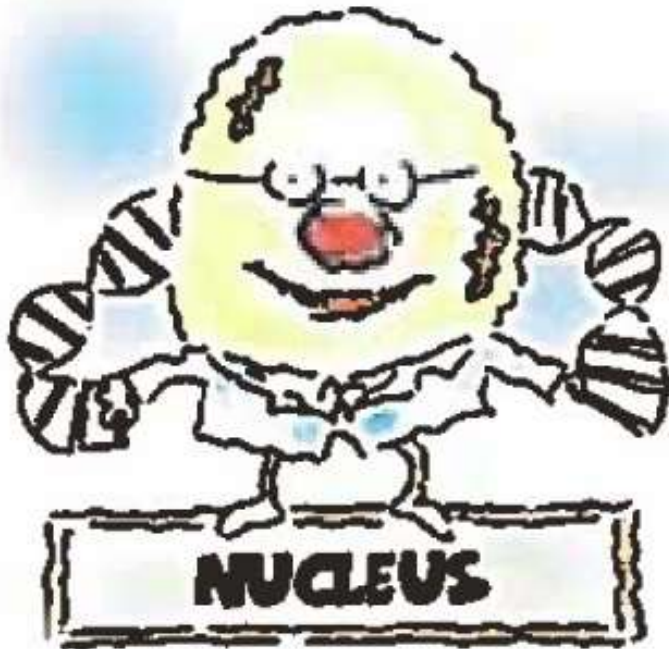
MITOCHONDRION

w/O₂



Time-out for questions!





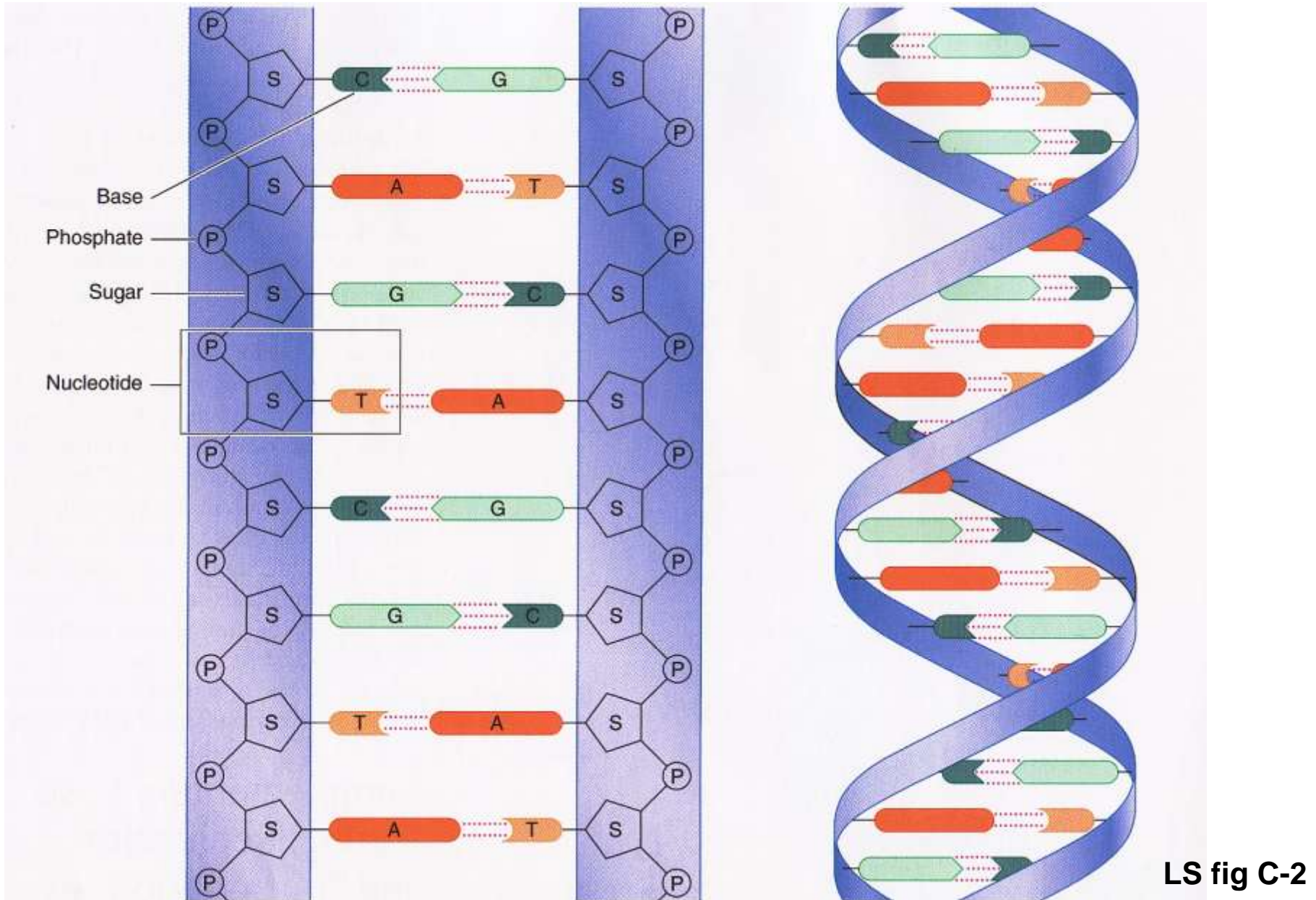
I'm the brain, or control center, of the cell. I carry most of the genetic material, so if you have red hair, it's probably because of me!

SOURCE: Bot Roda, Illustrator. *Anatomy & Physiology made Incredibly Visual!* Wolters Kluwer Health, Lippincott Williams & Wilkins, 2009.

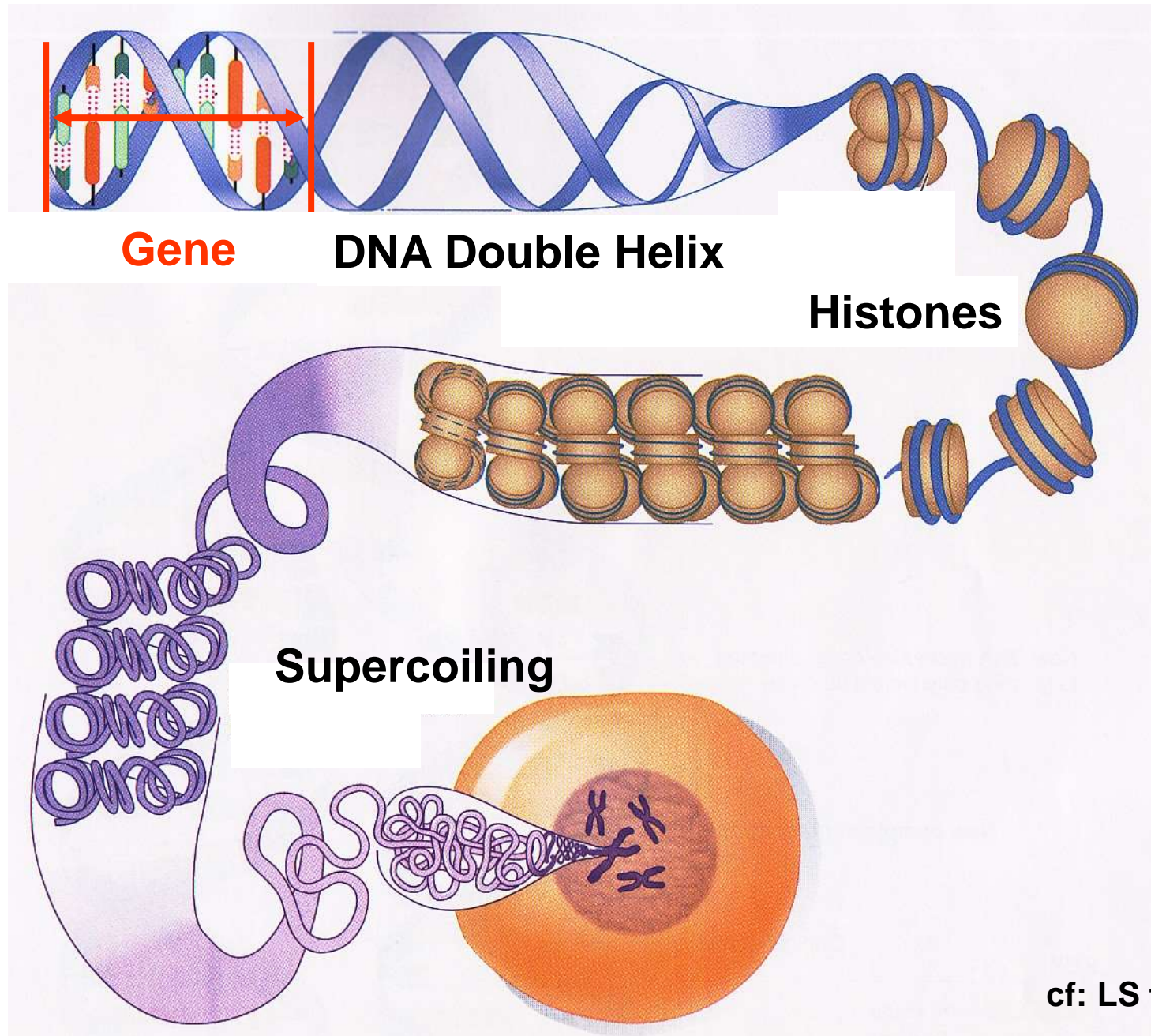
What are DNA's major functions? Heredity + Day-to-Day Cell Function



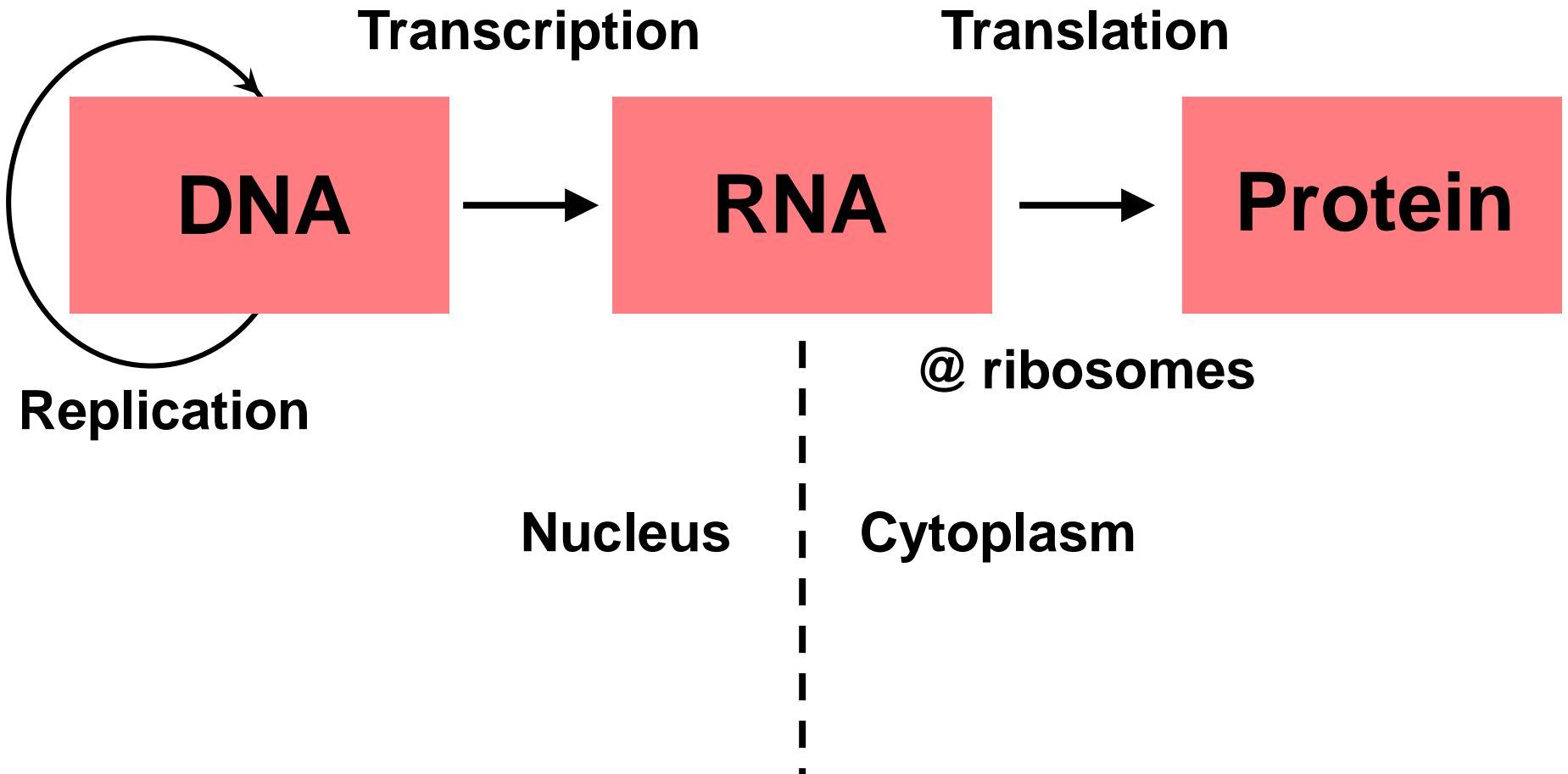
What does DNA look like? Double-helix!!



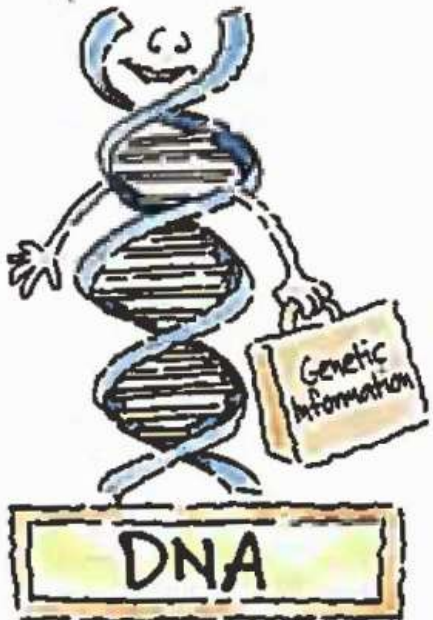
Gene = *Stretch of DNA that codes for a protein*



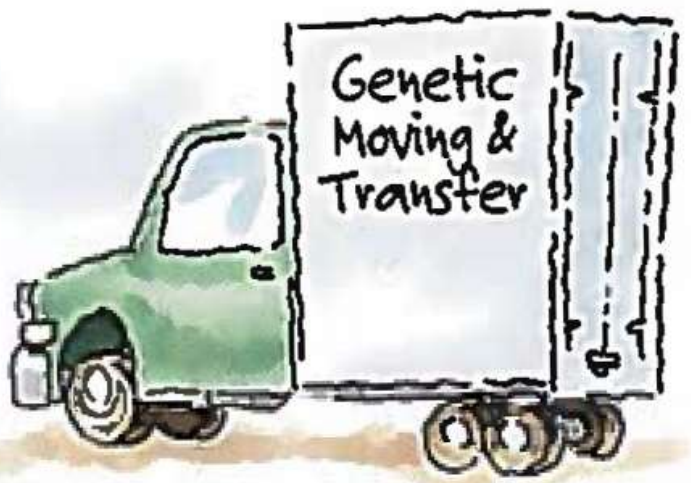
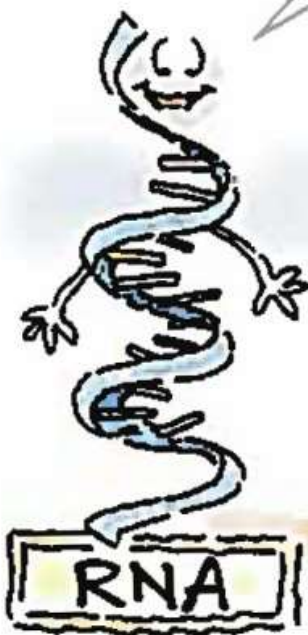
What does DNA do, day-to-day?



I carry the genetic information that provides the blueprint for protein synthesis.



I transfer genetic information to the ribosomes, where protein synthesis occurs.



SOURCE: Bot Roda, Illustrator. *Anatomy & Physiology made Incredibly Visual!* Wolters Kluwer Health, Lippincott Williams & Wilkins, 2009.

DNA vs RNA?

1. Double-stranded

2. Deoxyribose
(without oxygen)

3. A, T, C, G
Thymine

4. Self-replicative
(can copy itself)

5. Nucleus
(+mitochondria)

1. Single-stranded

2. Ribose
(with oxygen)

3. A, U, C, G
Uracil

4. Needs DNA as
template

5. 1^o Cytoplasm
(but Nucleus origin)

6. mRNA, rRNA, tRNA

*Triplets of bases code for amino acids,
the building blocks of proteins*

DNA

mRNA

tRNA

code word

codon

anti-codon

TAT

AUA

UAU

ACG

UGC

ACG

TTT

AAA

UUU

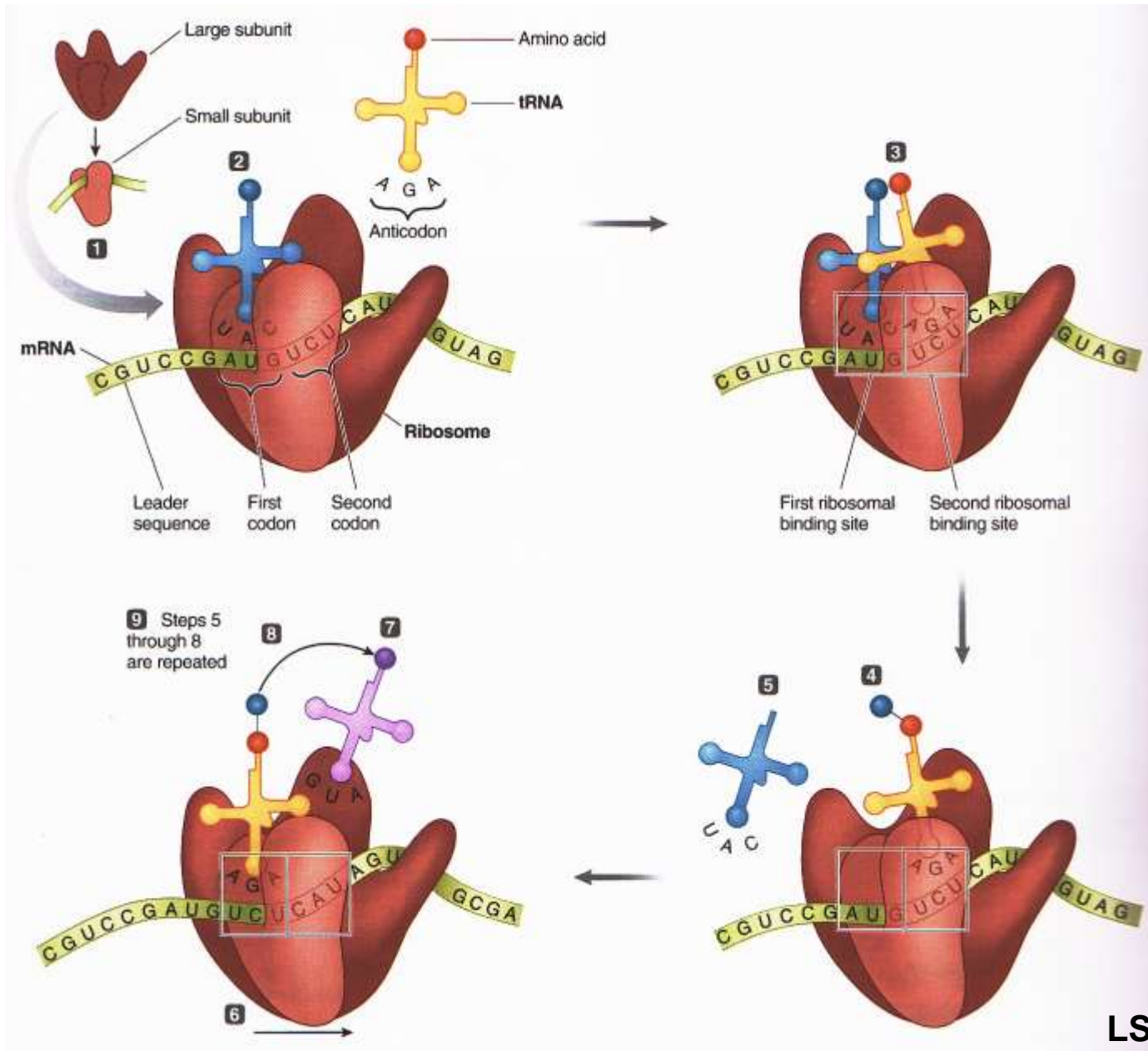
TAC

AUG

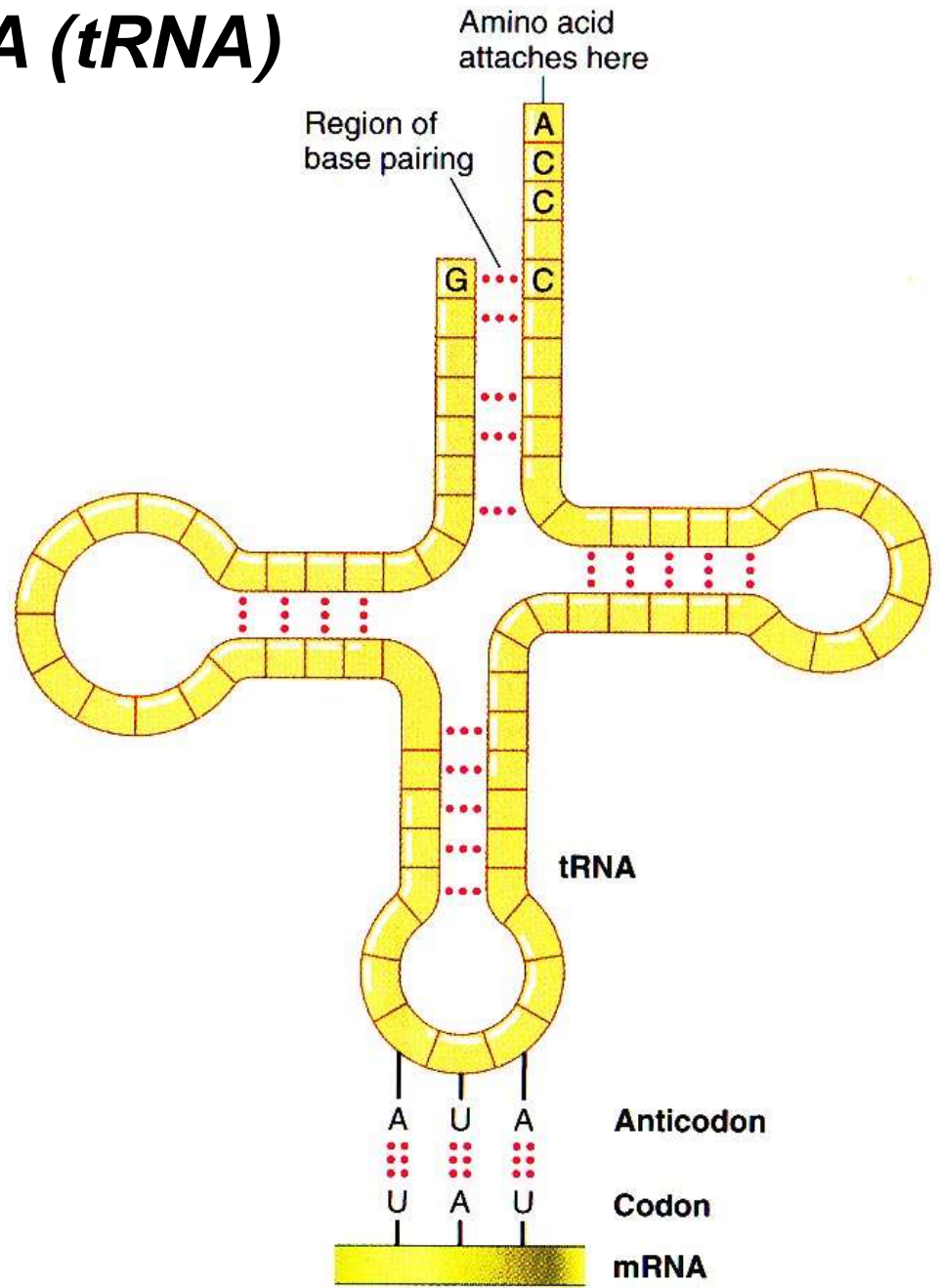
UAC

		Second base of codon				
		U	C	A	G	
First base of codon	U	UUU } Phe UUC } UUA } Leu UUG }	UCU } Ser UCC } UCA } UCG }	UAU } Tyr UAC } UAA } Stop UAG } Stop	UGU } Cys UGC } UGA } Stop UGG } Trp	U C A G
	C	CUU } Leu CUC } CUA } CUG }	CCU } Pro CCC } CCA } CCG }	CAU } His CAC } CAA } Gln CAG }	CGU } Arg CGC } CGA } CGG }	U C A G
	A	AUU } Ile AUC } AUA } AUG } Met Start	ACU } Thr ACC } ACA } ACG }	AAU } Asn AAC } AAA } Lys AAG }	AGU } Ser AGC } AGA } Arg AGG }	U C A G
	G	GUU } Val GUC } GUA } GUG }	GCU } Ala GCC } GCA } GCG }	GAU } Asp GAC } GAA } Glu GAG }	GGU } Gly GGC } GGA } GGG }	U C A G

Translation? Ribosomes Make Proteins

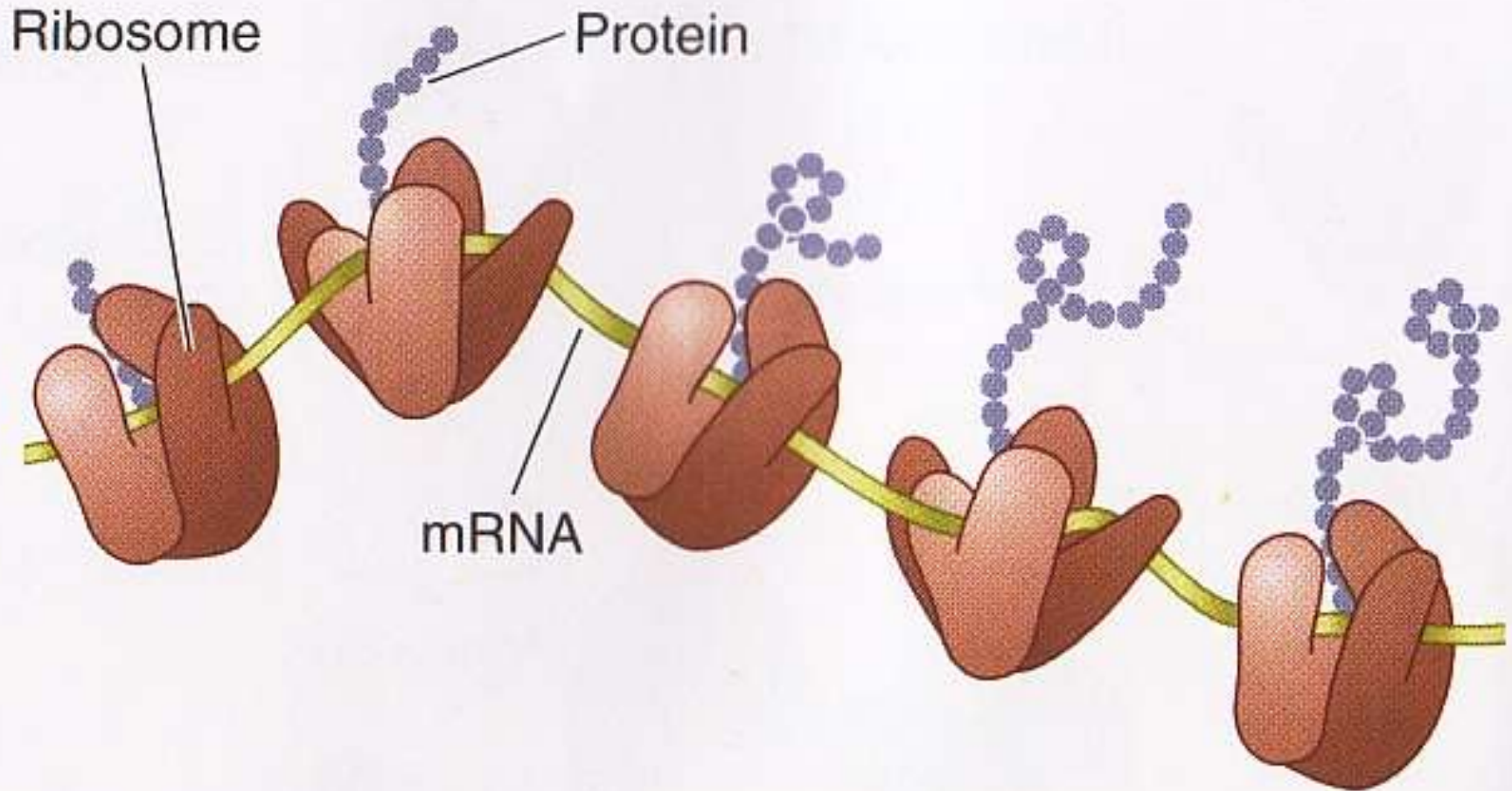


Transfer RNA (tRNA)



LS fig C-8

A Polyribosome. Which Way is Synthesis?



Class Skit on Translation!



A *protein* synthesizing factory, where *translation* takes place!

What's a ribosome?



You rock, baby!



Questions + Discussion

