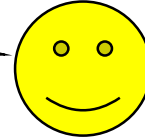


Personal data I can  
use for a lifetime!!



Heck yeah!

## BI 121 Lecture 11

### I. **Announcements** ***Blood Chem Lab today!*** Fun day!!

Personal data!!! If you haven't already done so, please review Lab 5 in LM & in e-mail. Thanks sincerely!

Lab Manual & Exam I remaining returns. Q from last t?

### II. **Safety & Techniques Review for Blood Chem Lab** Q?

### III. **Endocrine Connections**

A. Hypothalamus-Anterior pituitary intimate circulation

B. Anterior pituitary hormones DC pp 105-7, LS pp 502-6

C. GH: Body builder's dream? Fountain of youth?

LS pp 506-11

D. Peripheral endocrine organs

DC pp 109-13, LS pp 513-36

1. Pancreas (insulin – glucagon see-saw!)

2. Thyroid

3. Adrenals

### IV. **Introduction to the Nervous System** LS ch 5, DC Module 9

***No food, drink or gum in lab today! Thanks sincerely!***



**...Healthy, tasty & fresh, but not in lab!!**



# PREPARATION



WASH & DRY



ALCOHOL



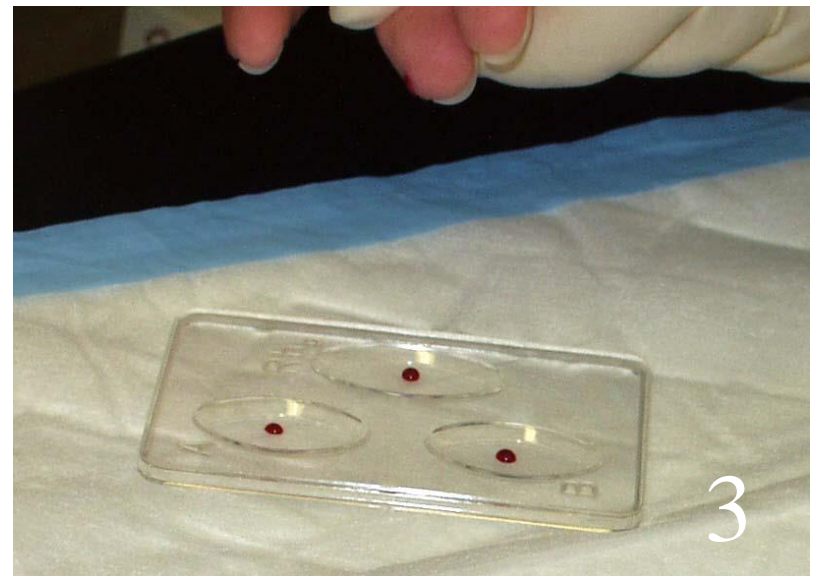
# SAMPLE+TESTS



OBTAIN  $\mu$ SAMPLE



BLOOD GLUCOSE

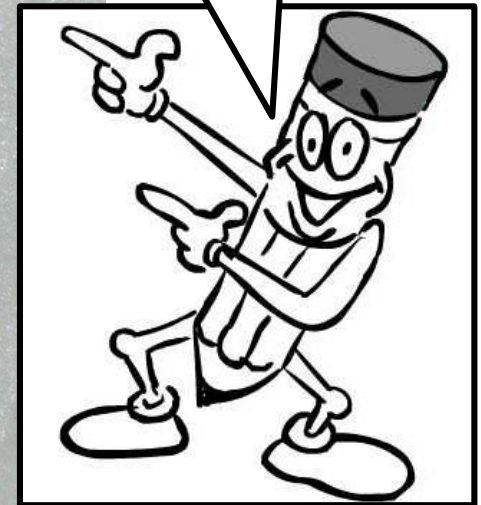


BLOOD TYPING

Glucose:  
*Sugar in Blood*



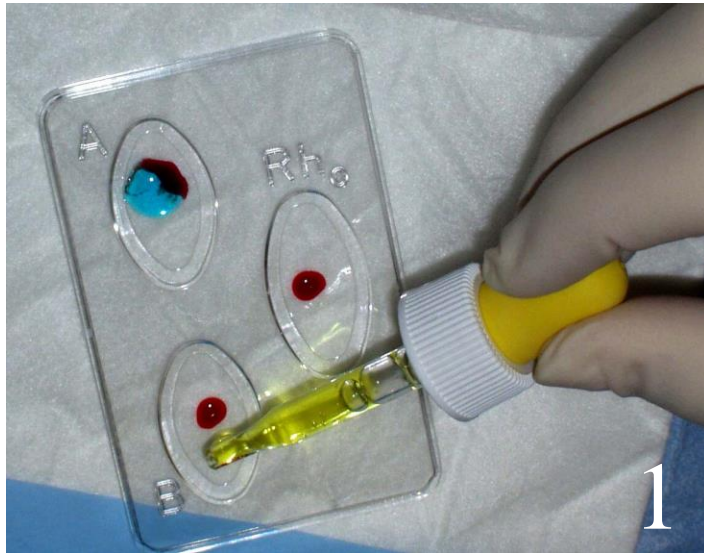
**NB: Read  
& Record!**



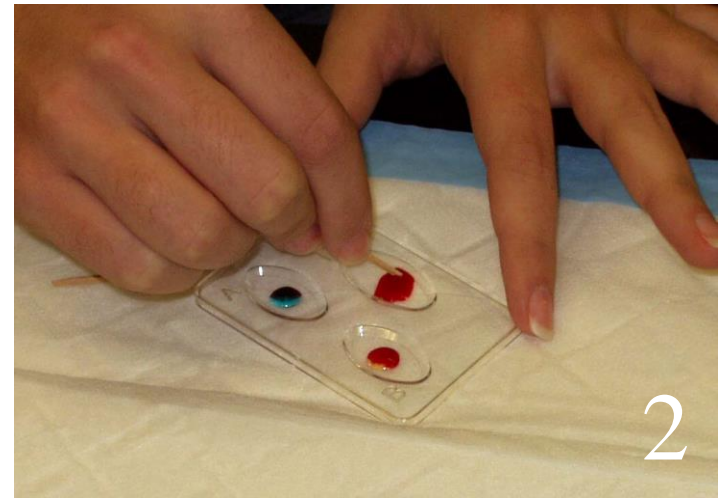
*Normal: 70-99*  
*Pre-Diabetes: 100-125*  
*Diabetes:  $\geq$  126 mg/dL*

<https://doihaveprediabetes.org/>

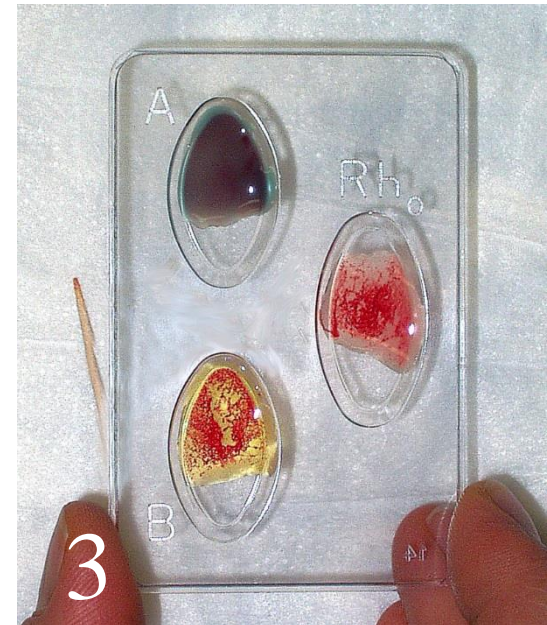
# BLOOD TYPING



ADD ANTISERA



MIX W/TOOTHPICKS



READ & RECORD!!

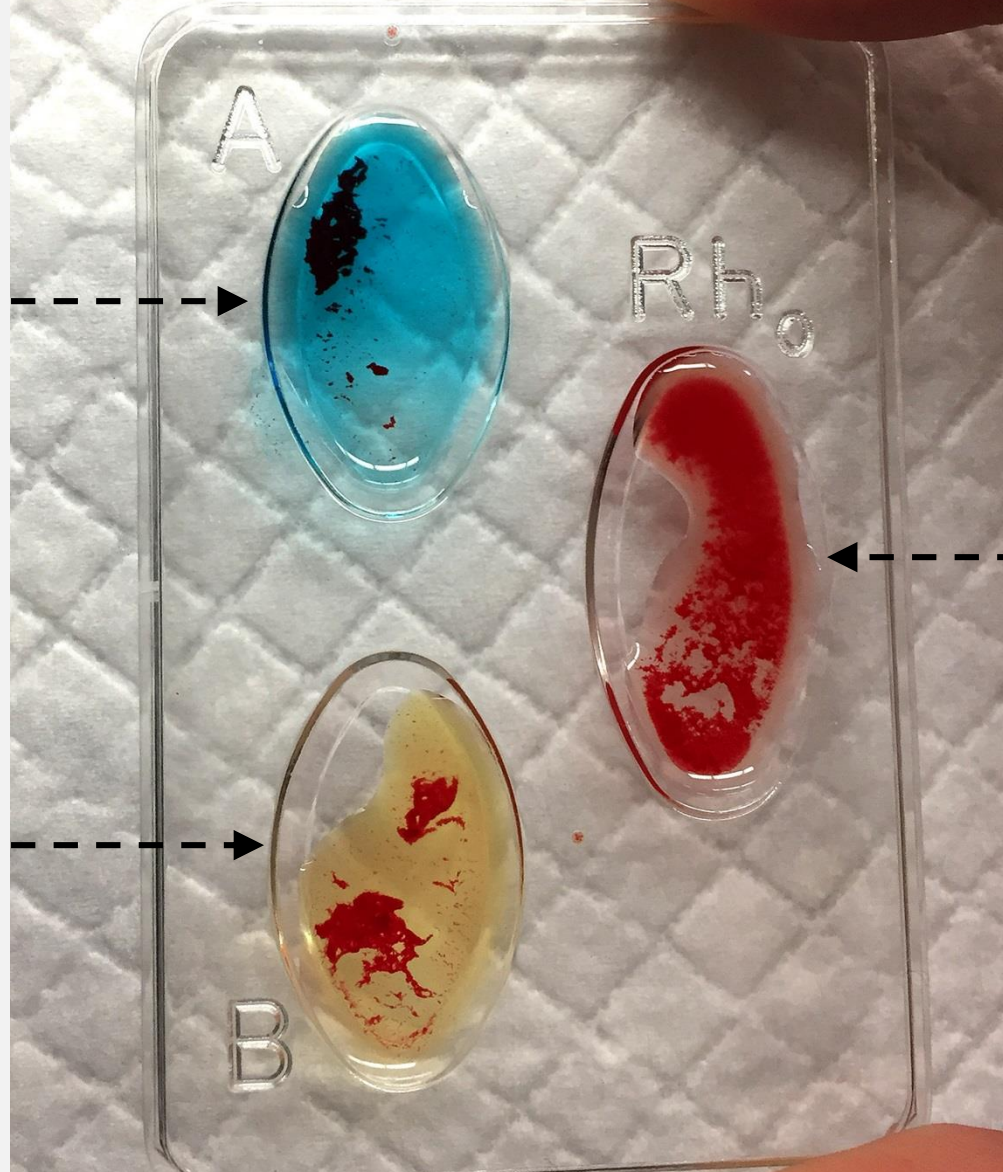
1<sup>o</sup> Q? Clumping in Any Wells?

Type AB+

Here?

Here?

Here?



# CLEAN-UP!



FOLD DIAPER



BLOOD PRODUCTS



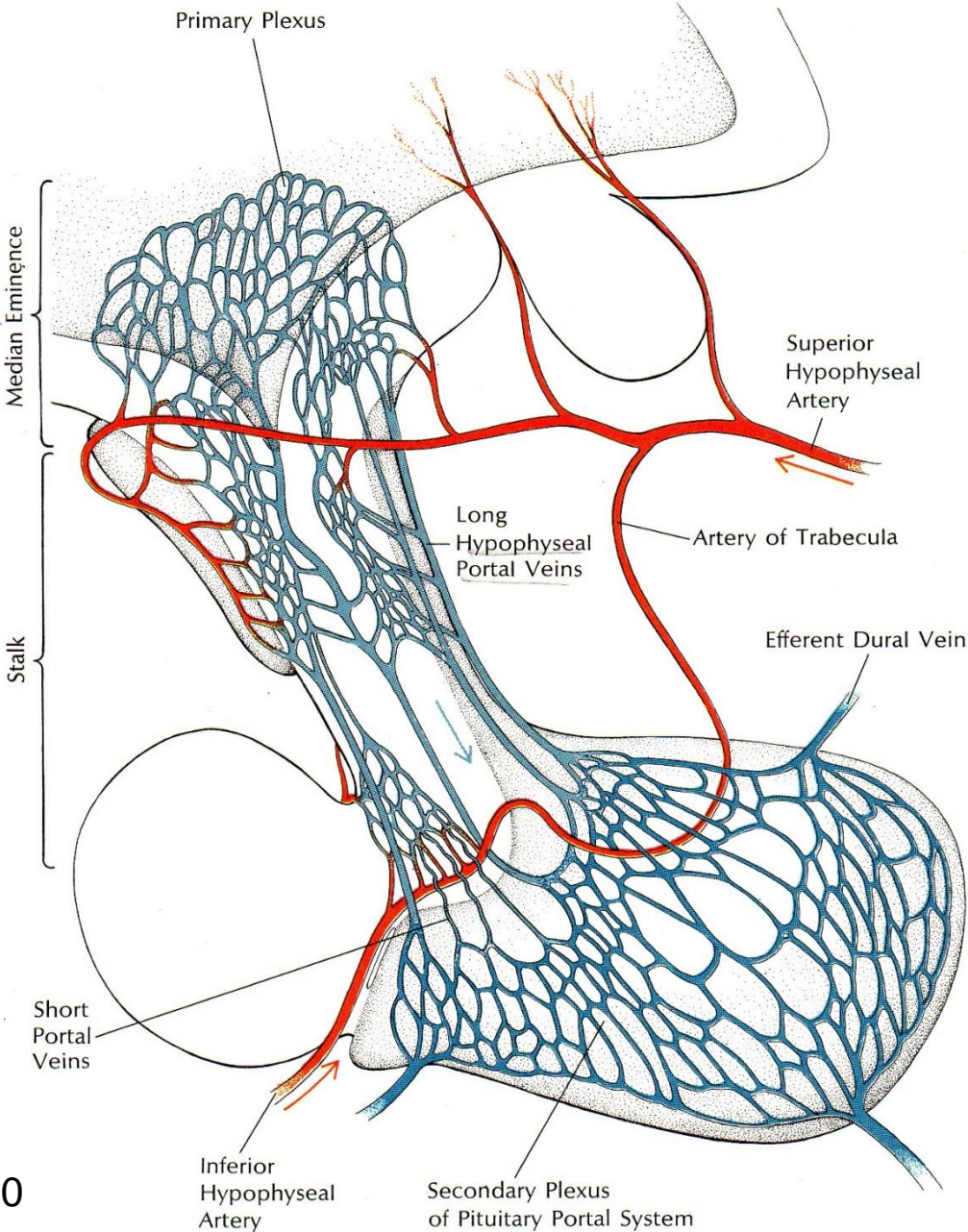
REWASH!!

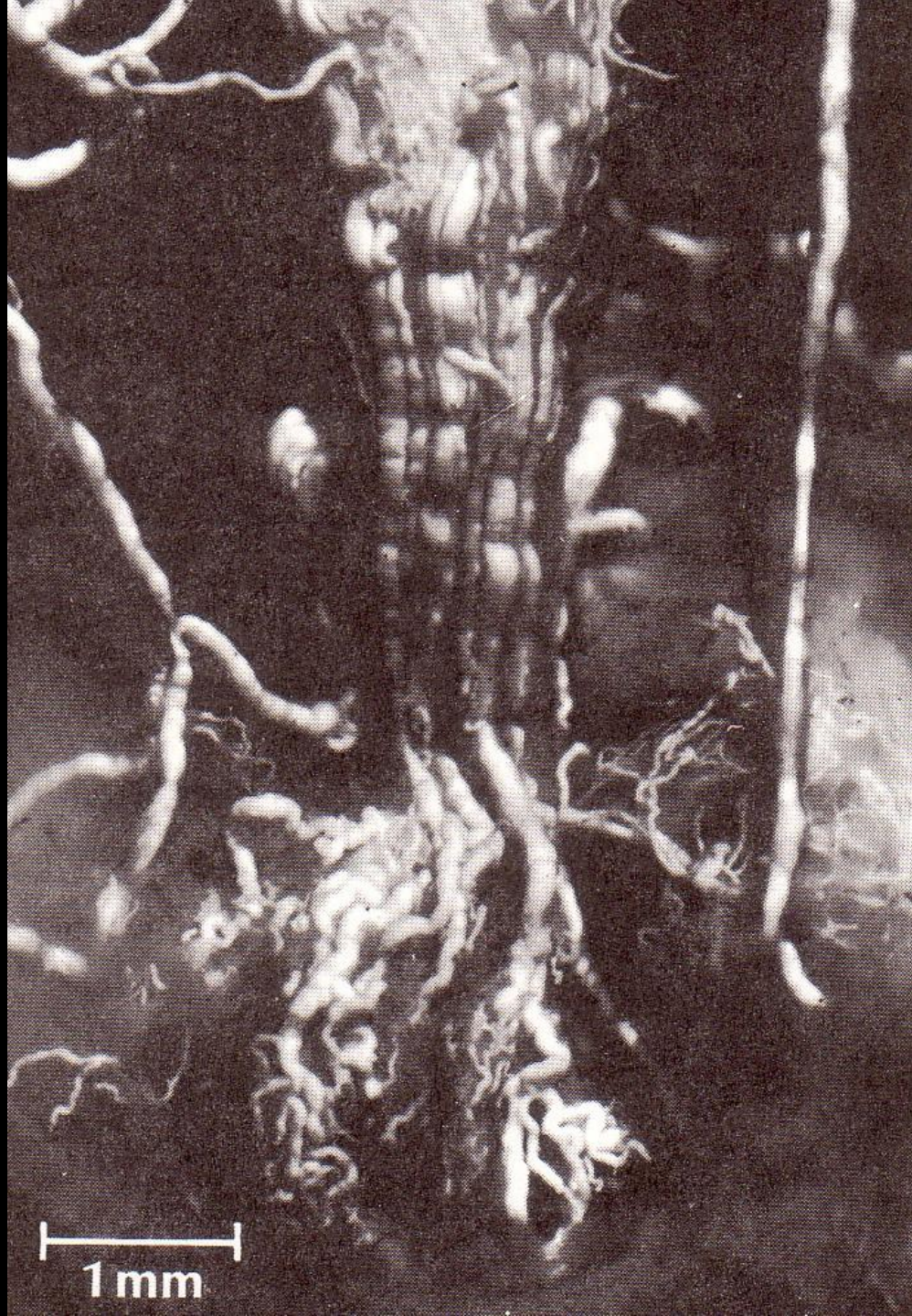


# *Blood Chem Lab Q?*

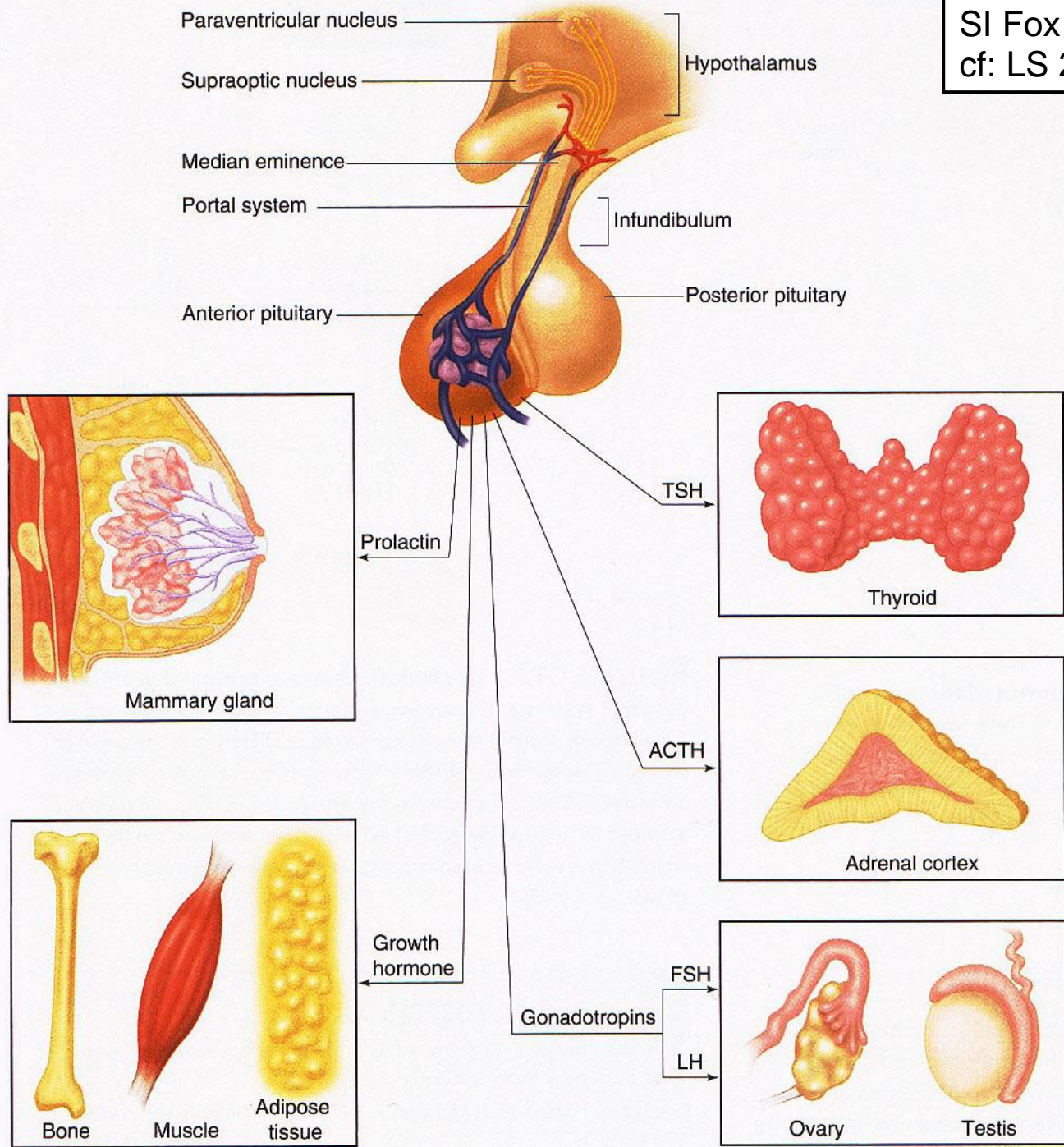


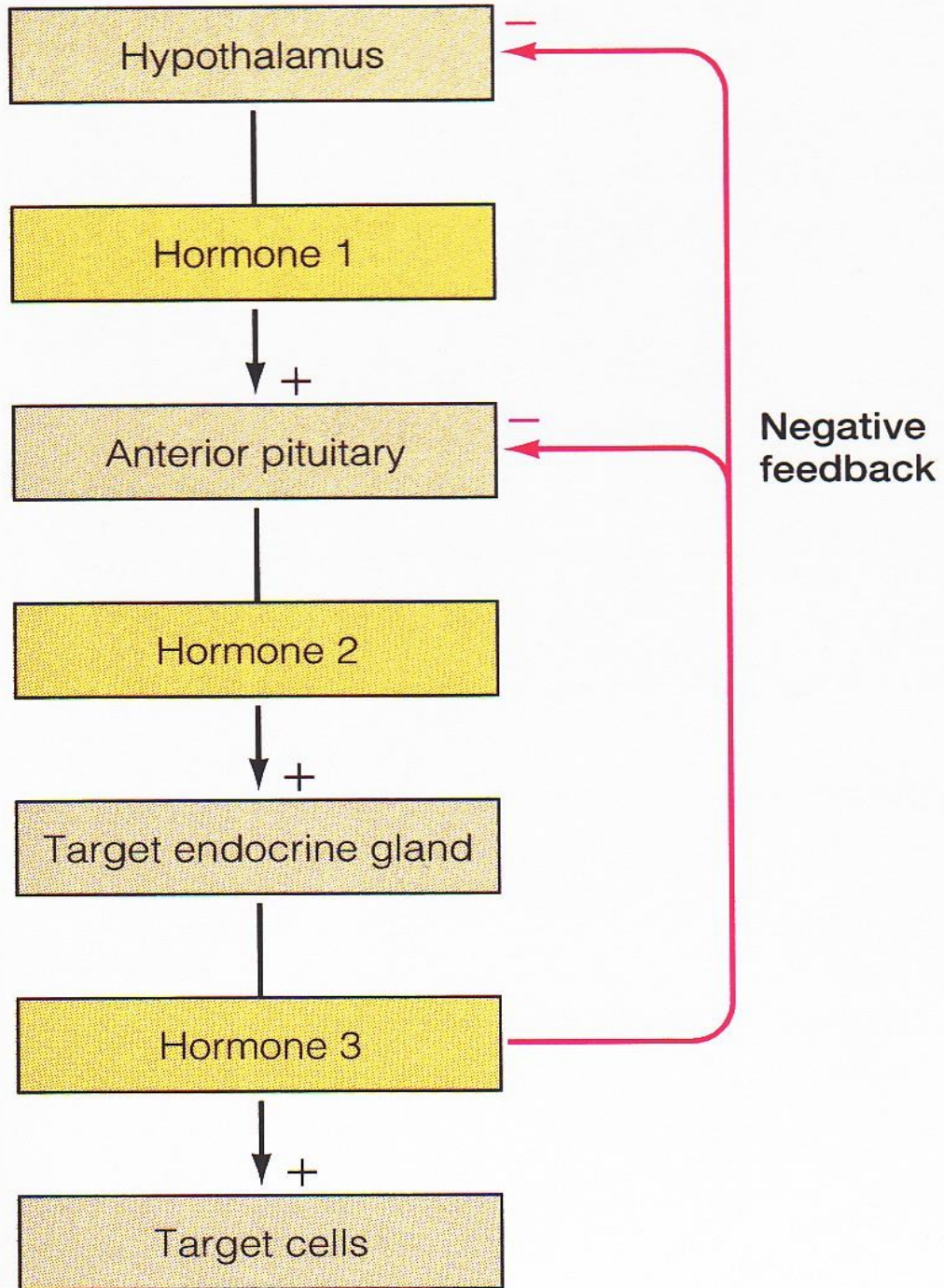
# Capillary-Venule-Capillary Intimate Circulation





Krieger & Hughes 1980



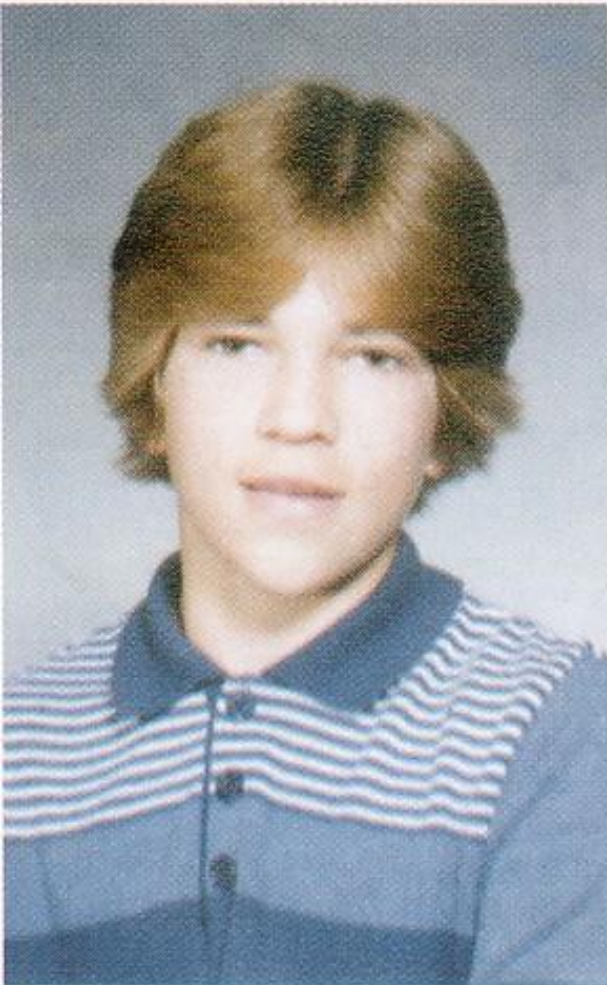




LS 2006, cf: LS 2012  
fig 17-10

# *Progression & Development of Acromegaly*

Age 13

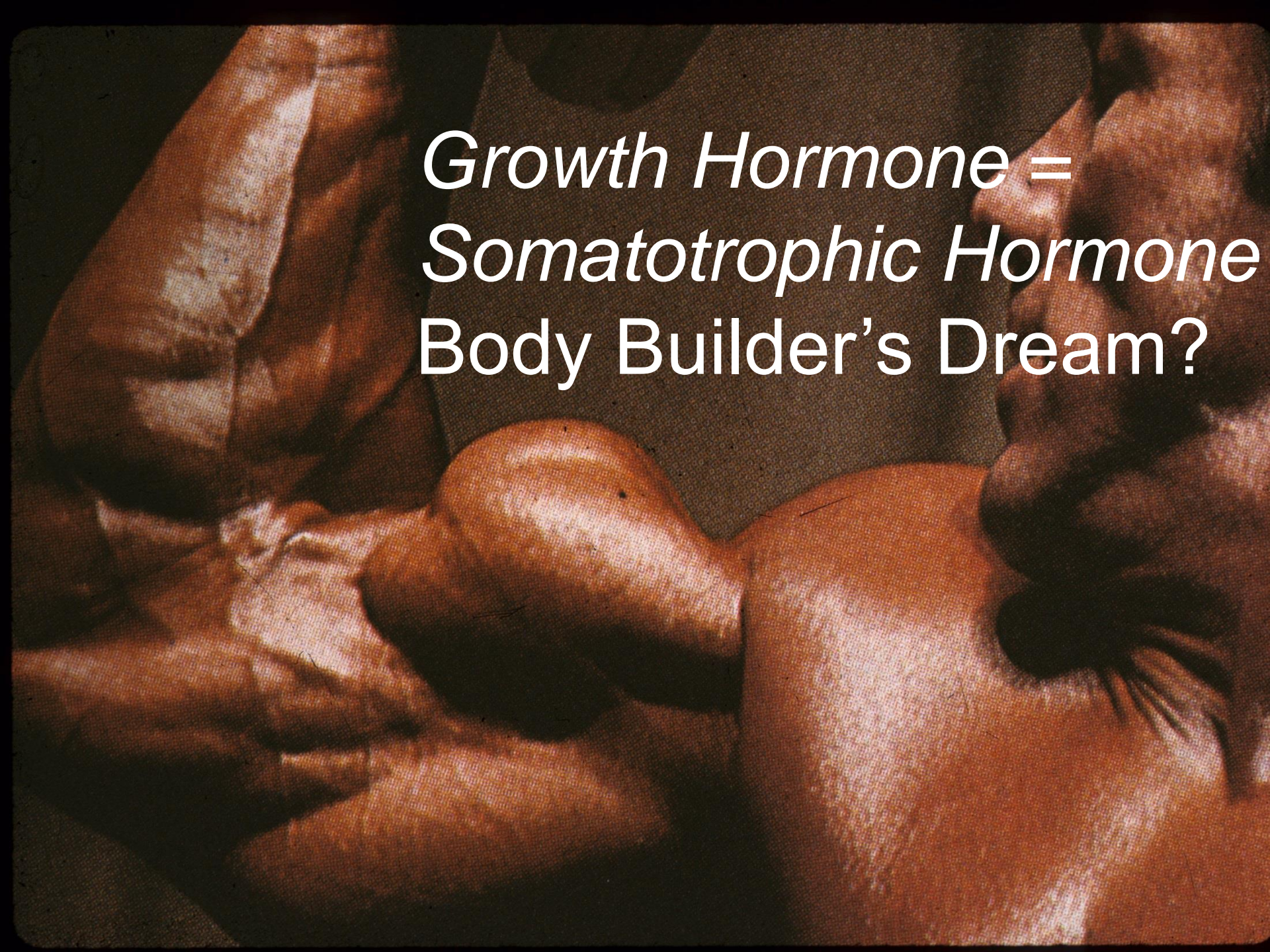


Age 21



Age 35





*Growth Hormone =  
Somatotrophic Hormone  
Body Builder's Dream?*



# ***GH/STH Effects: Insulin Resistance/Type II Diabetes?***

↑ Amino Acid uptake & Protein synthesis

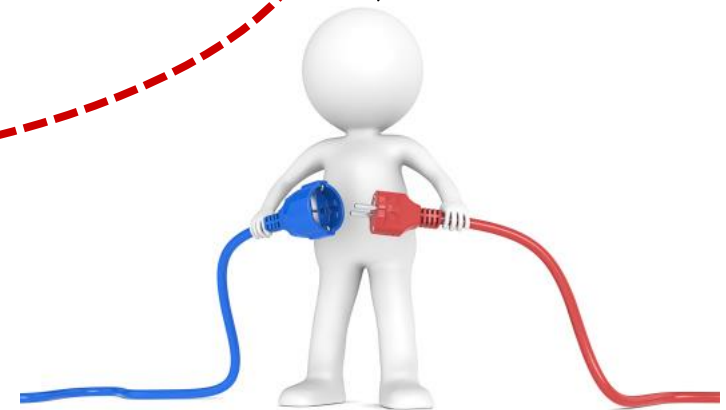
↑ Lipolysis & Fatty Acid mobilization

↓ Glucose uptake  
(skeletal muscle & adipocytes)

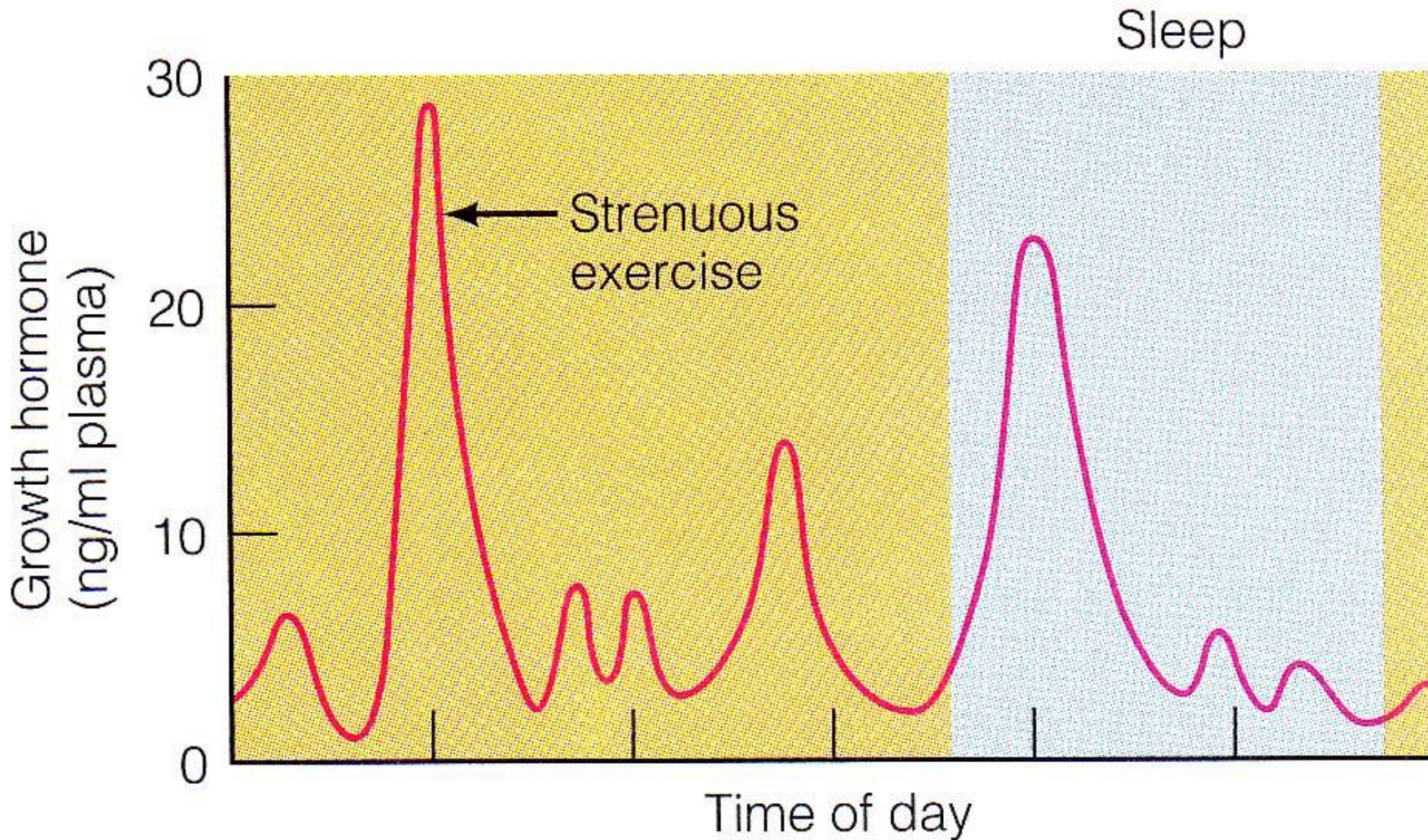
↑ Glucose production  
(liver glycogenolysis)

↑ Insulin secretion

Mismatch!!



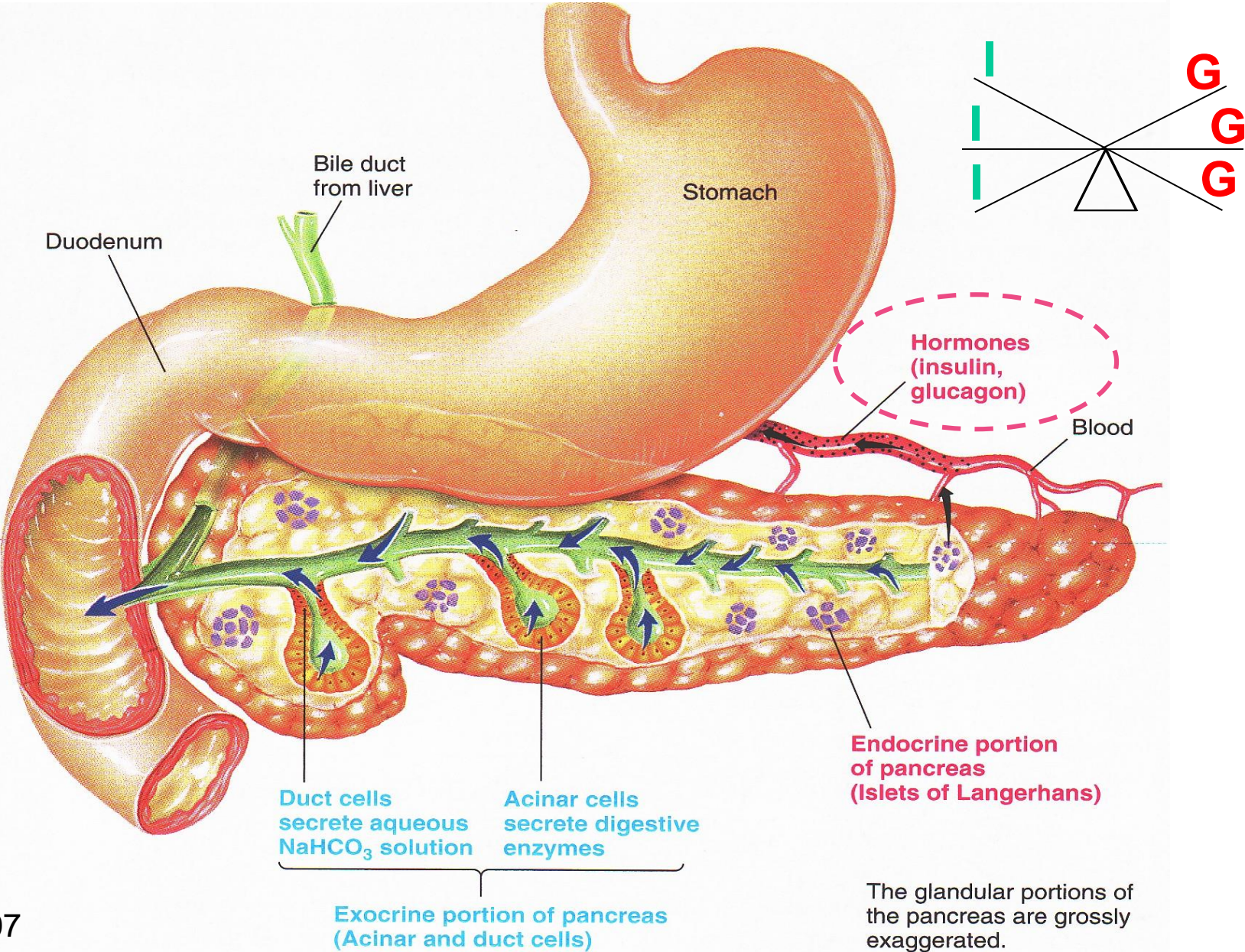
# *Increase GH naturally with exercise & sleep!!*

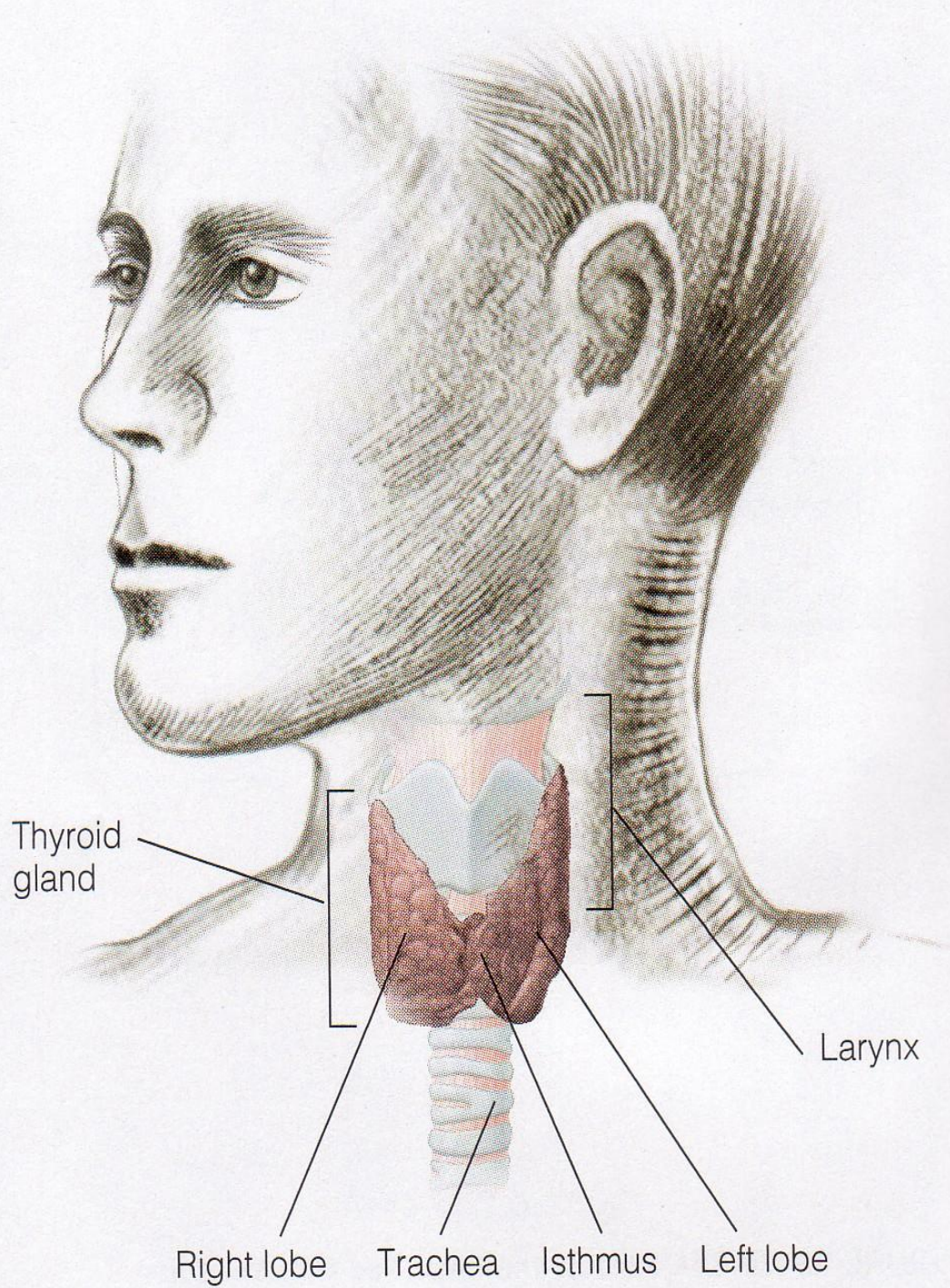


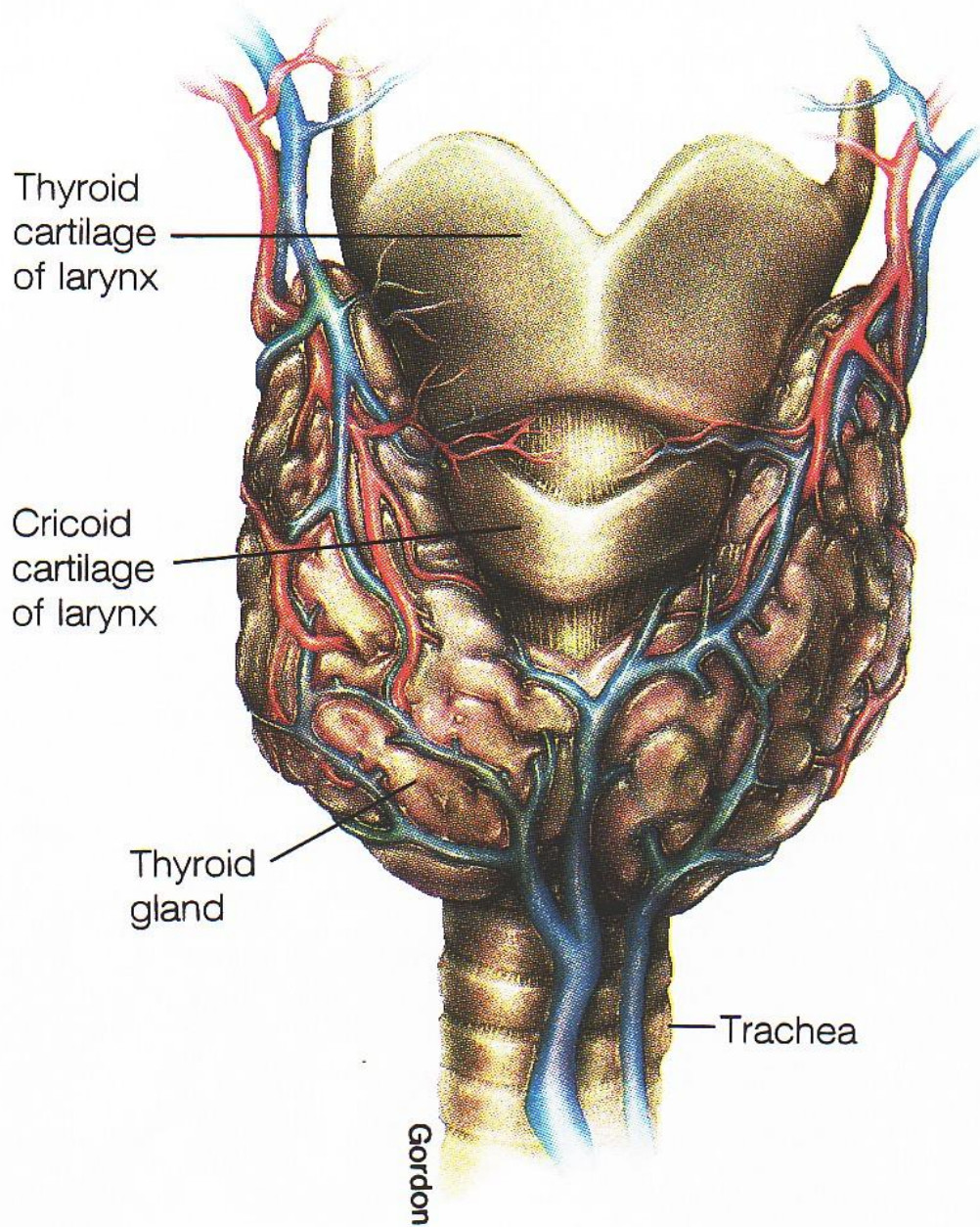
ng/ml = nanograms per milliliter

# Endocrine Pancreas: Insulin (I) & Glucagon (G)

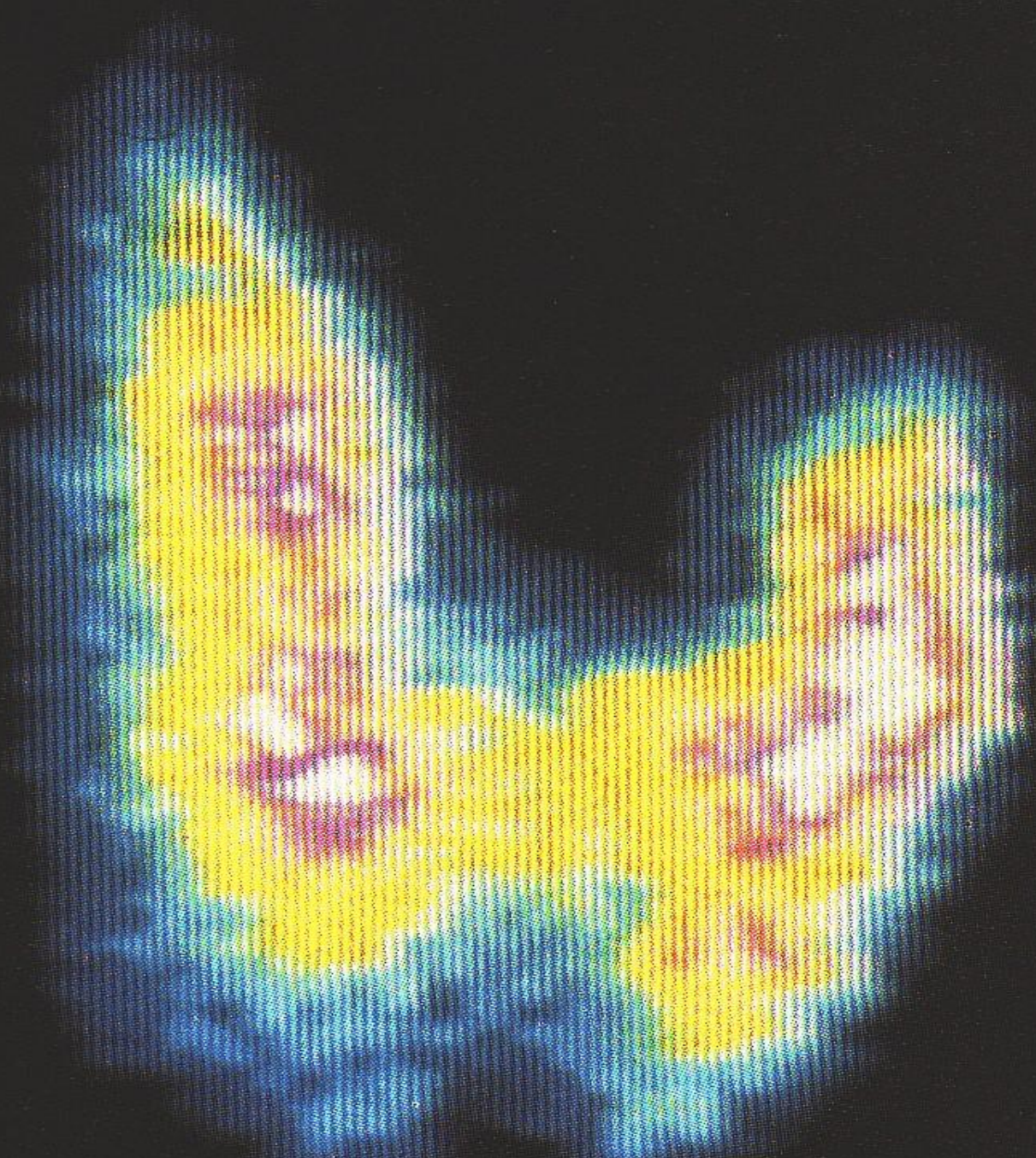
## See-Saw Hormones in Regulating Blood Glucose







(a)









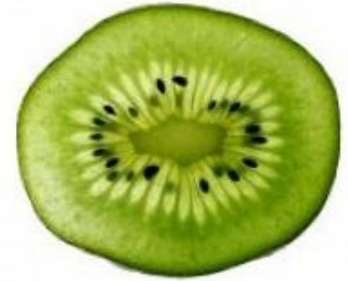
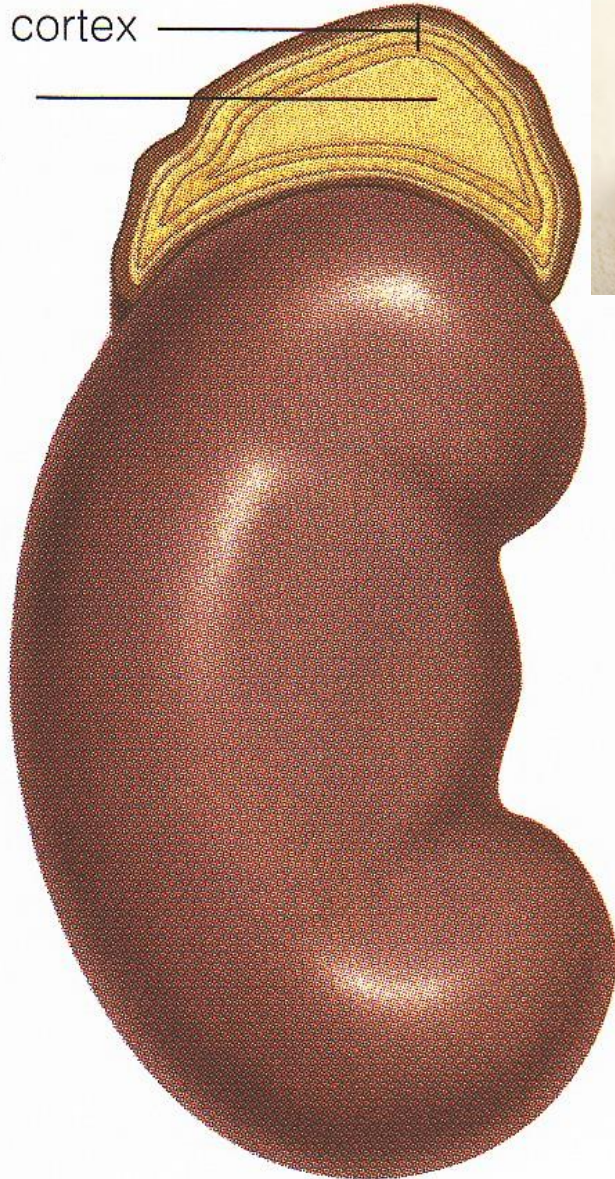


# Adrenal gland

Adrenal cortex

Adrenal medulla

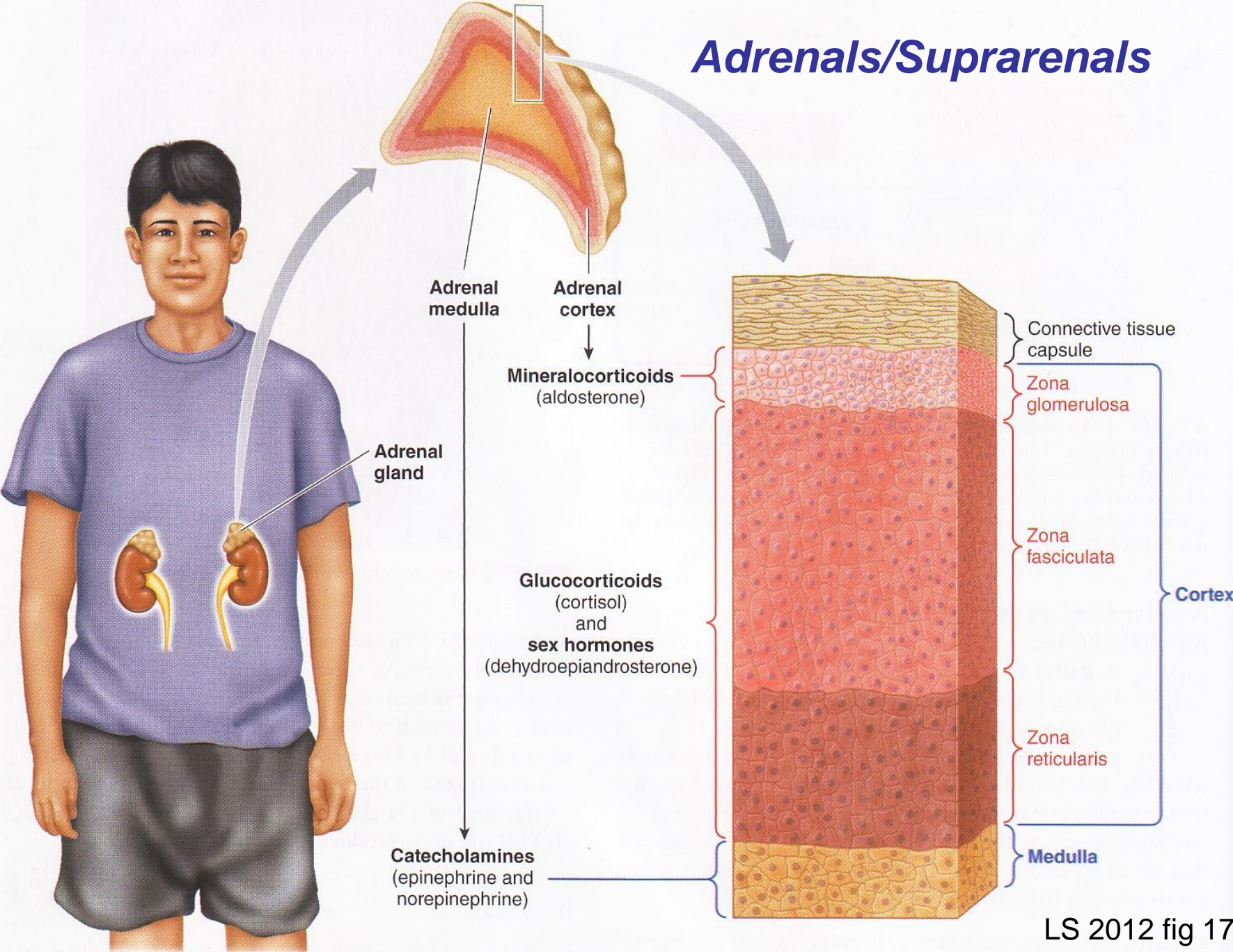
Kidney



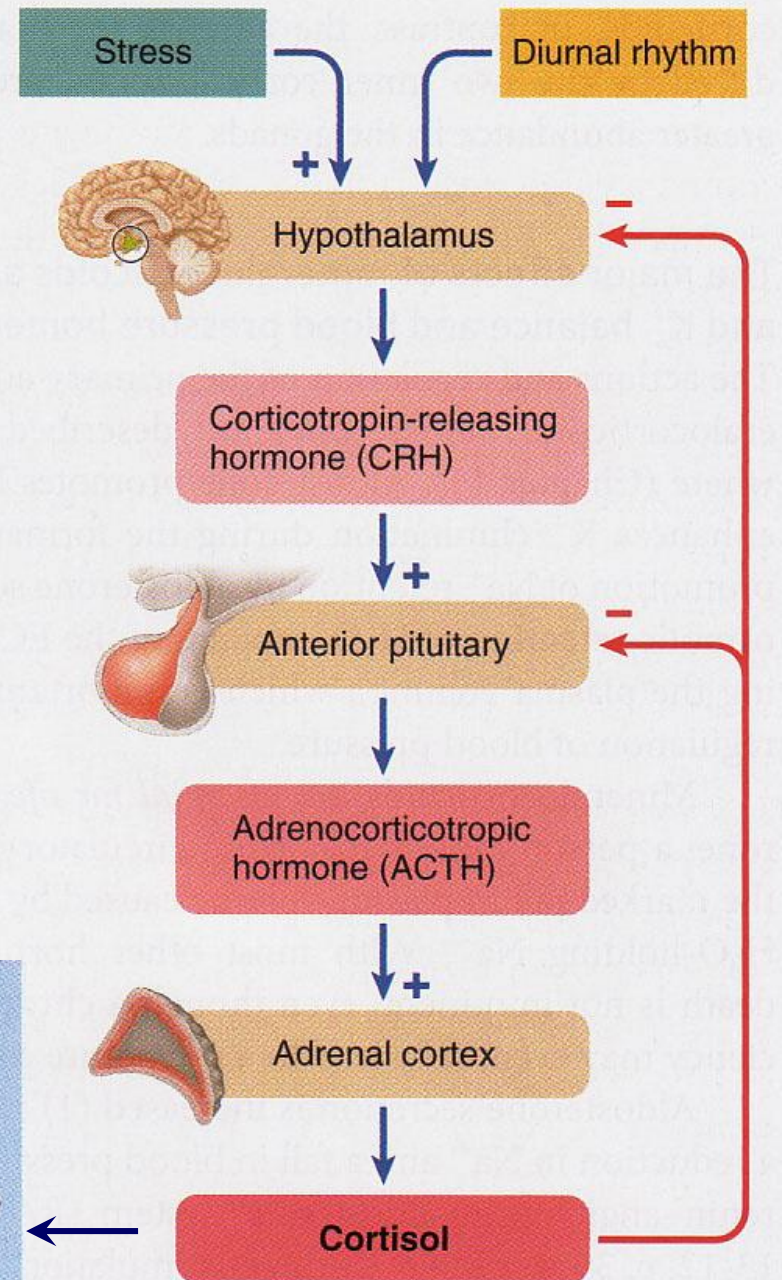
## FIGURE 13-12

**Adrenal Gland** The adrenal glands sit atop the kidney and consist of an outer zone of cells, the adrenal cortex, which produces a variety of steroid hormones, and an inner zone, the adrenal medulla. The adrenal medulla produces adrenalin and noradrenalin.

# Adrenals/Suprarenals



# ***Stress Promotes Cortisol Secretion***



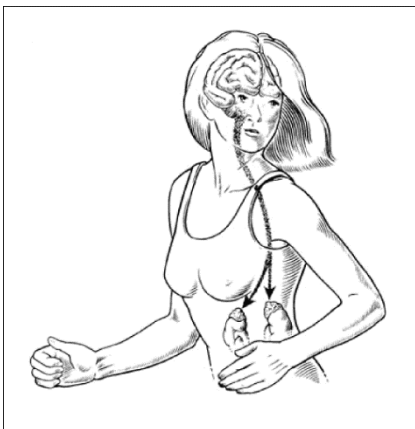
Metabolic fuels and building blocks available to help resist stress

- ↑ Blood glucose (by stimulating gluconeogenesis and inhibiting glucose uptake)
- ↑ Blood amino acids (by stimulating protein degradation)
- ↑ Blood fatty acids (by stimulating lipolysis)

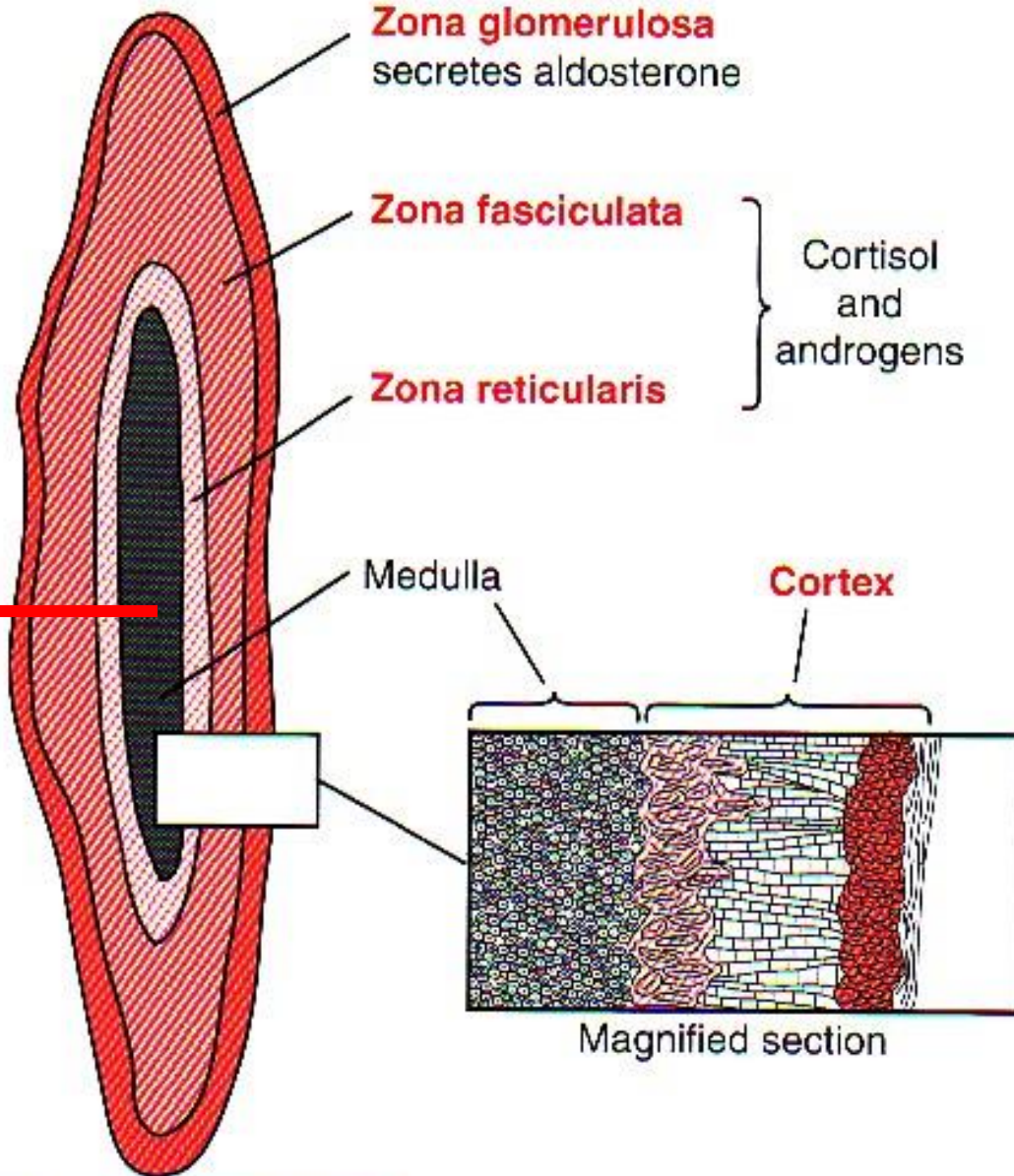
BI 121!!



**Epinephrine**  
**80%**  
**Norepinephrine**  
**20%**



Guyton & Hall 2000



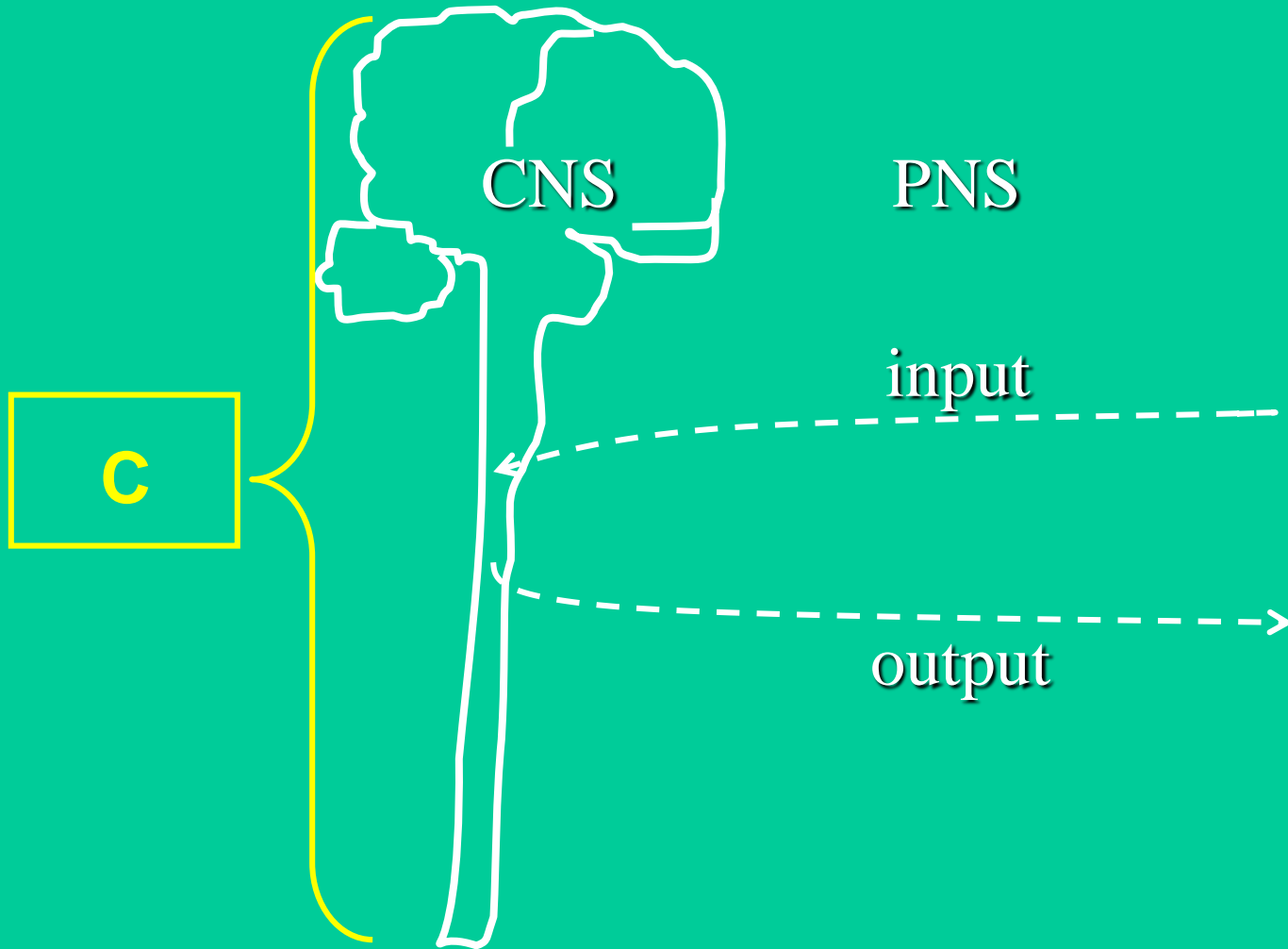
**FIGURE 77 - 1**

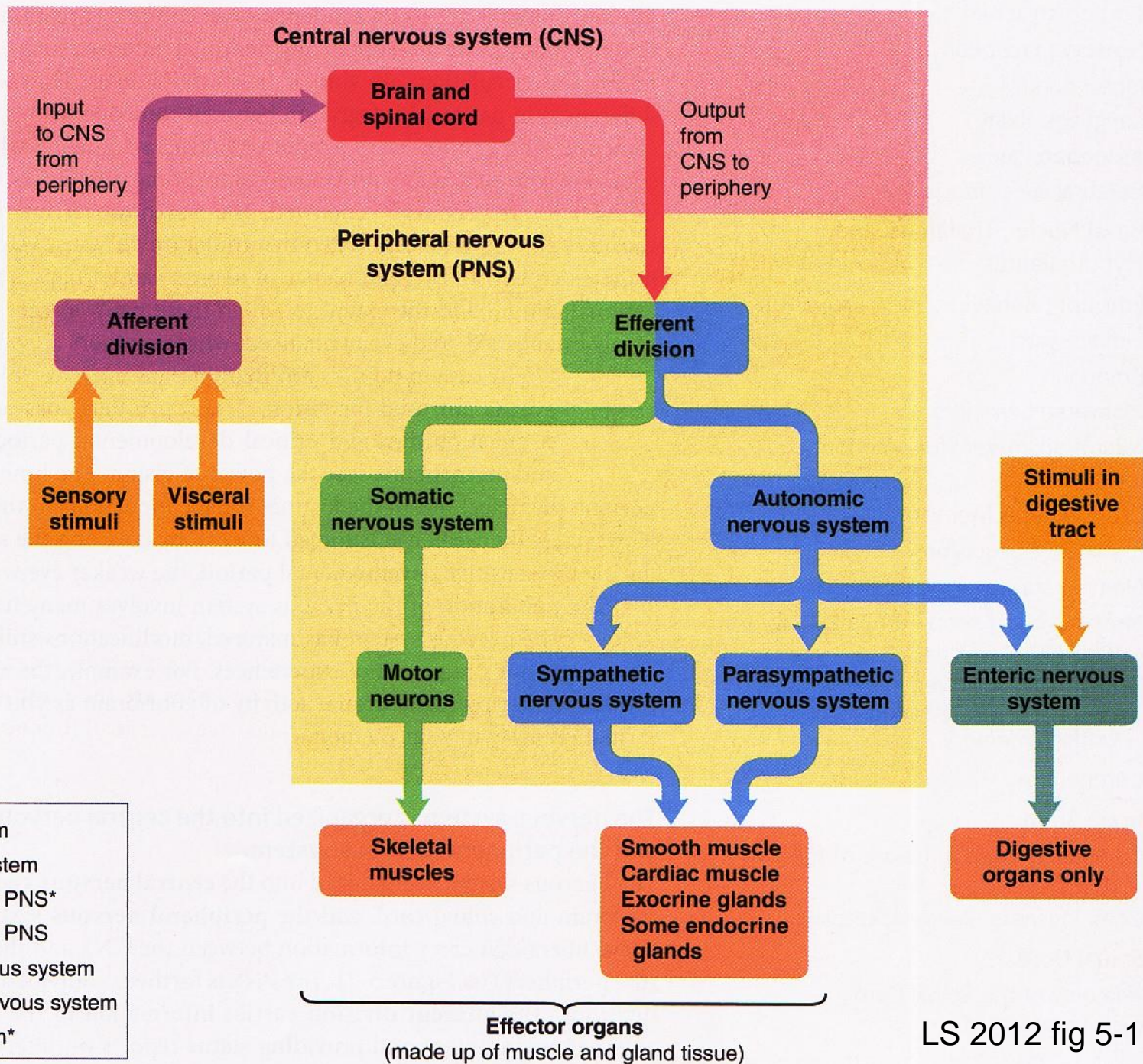
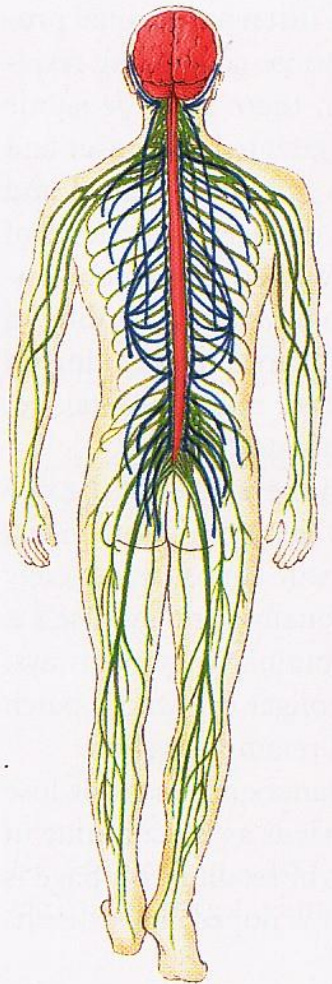
Secretion of adrenocortical hormones by the different zones of the adrenal cortex.

# Questions + Discussion

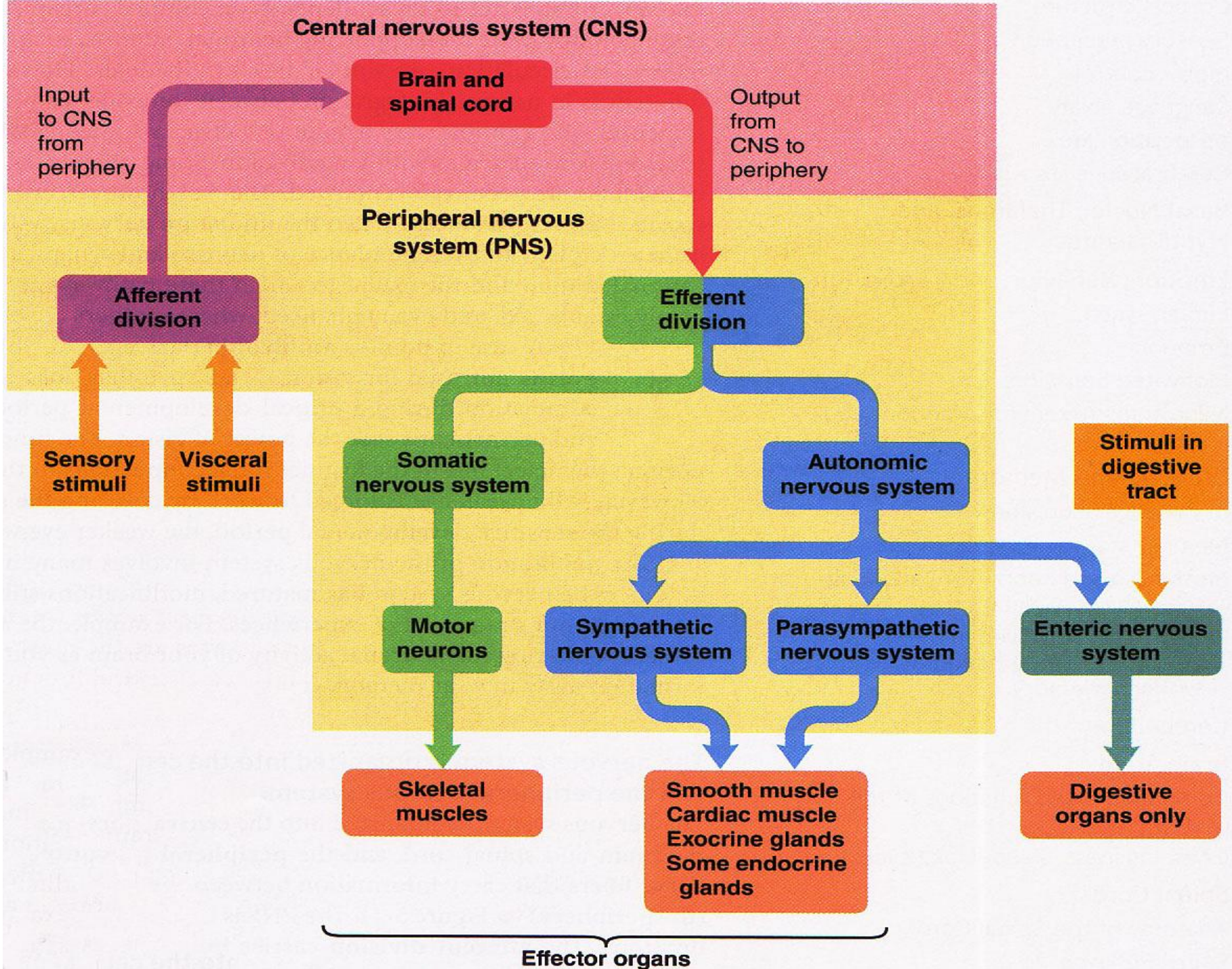


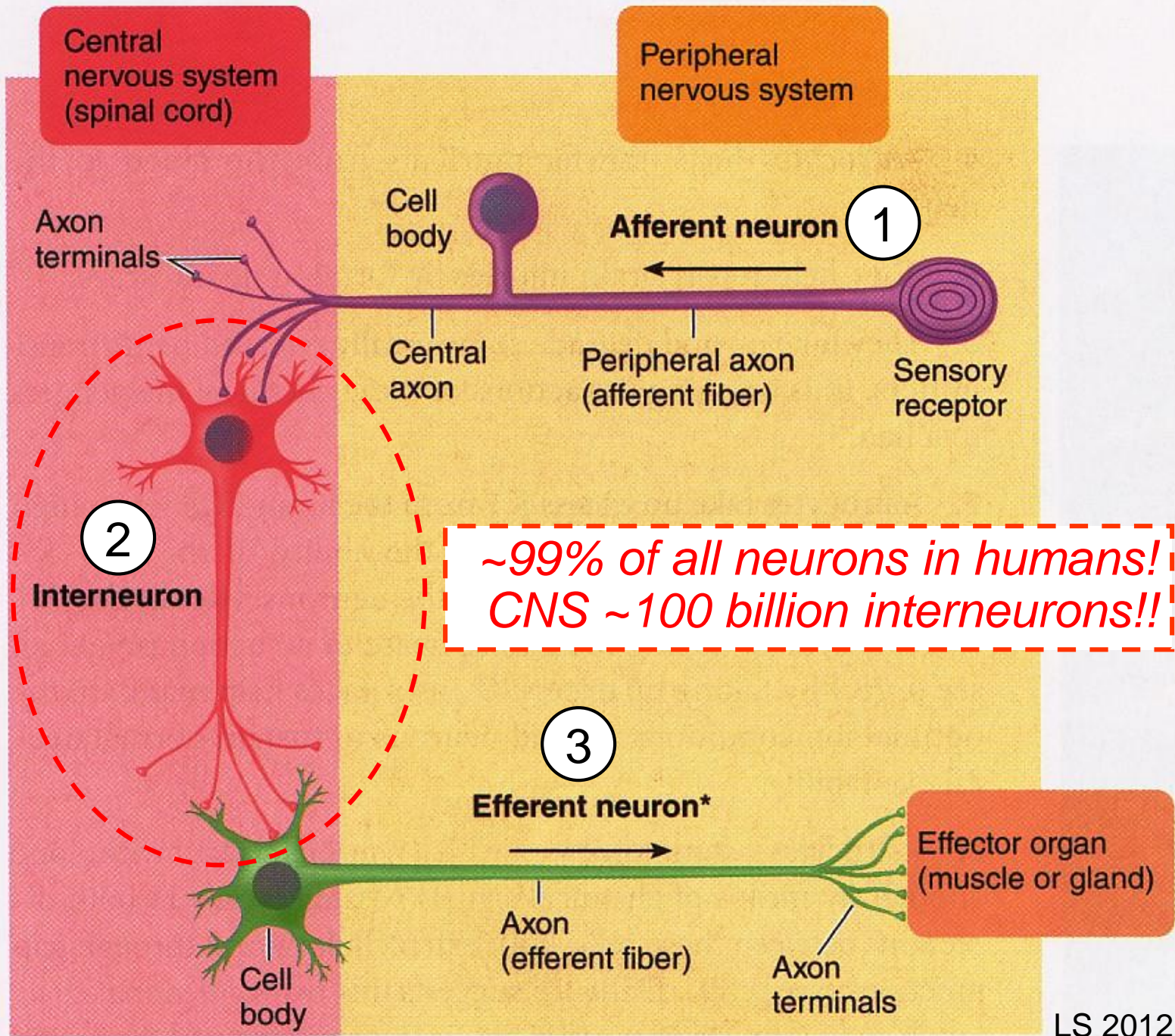
# Nervous System







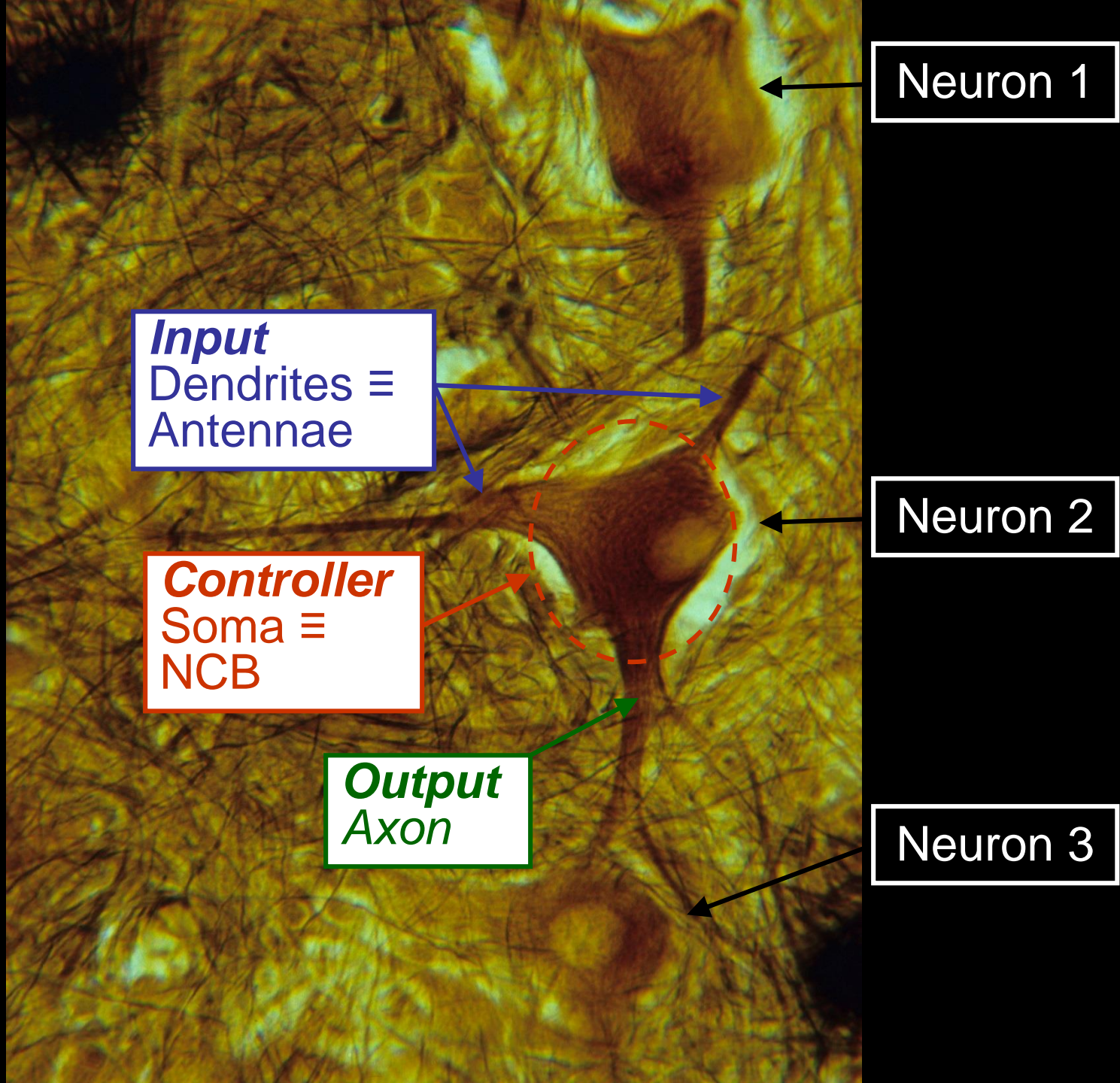




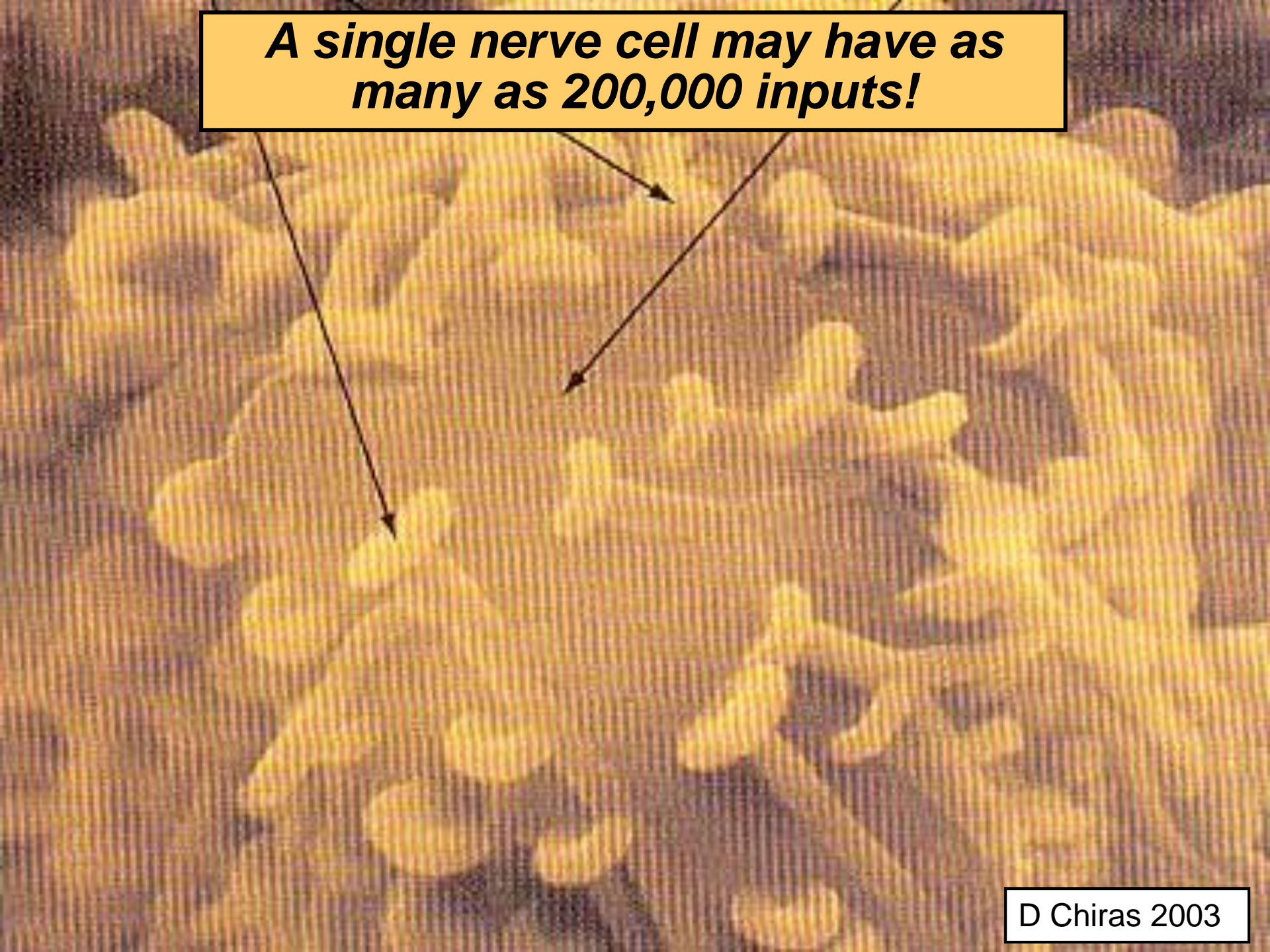
~ 90% of Cells w/in CNS are not neurons but glial cells  $\equiv$  neuroglia or nerve glue!

Astrocytes

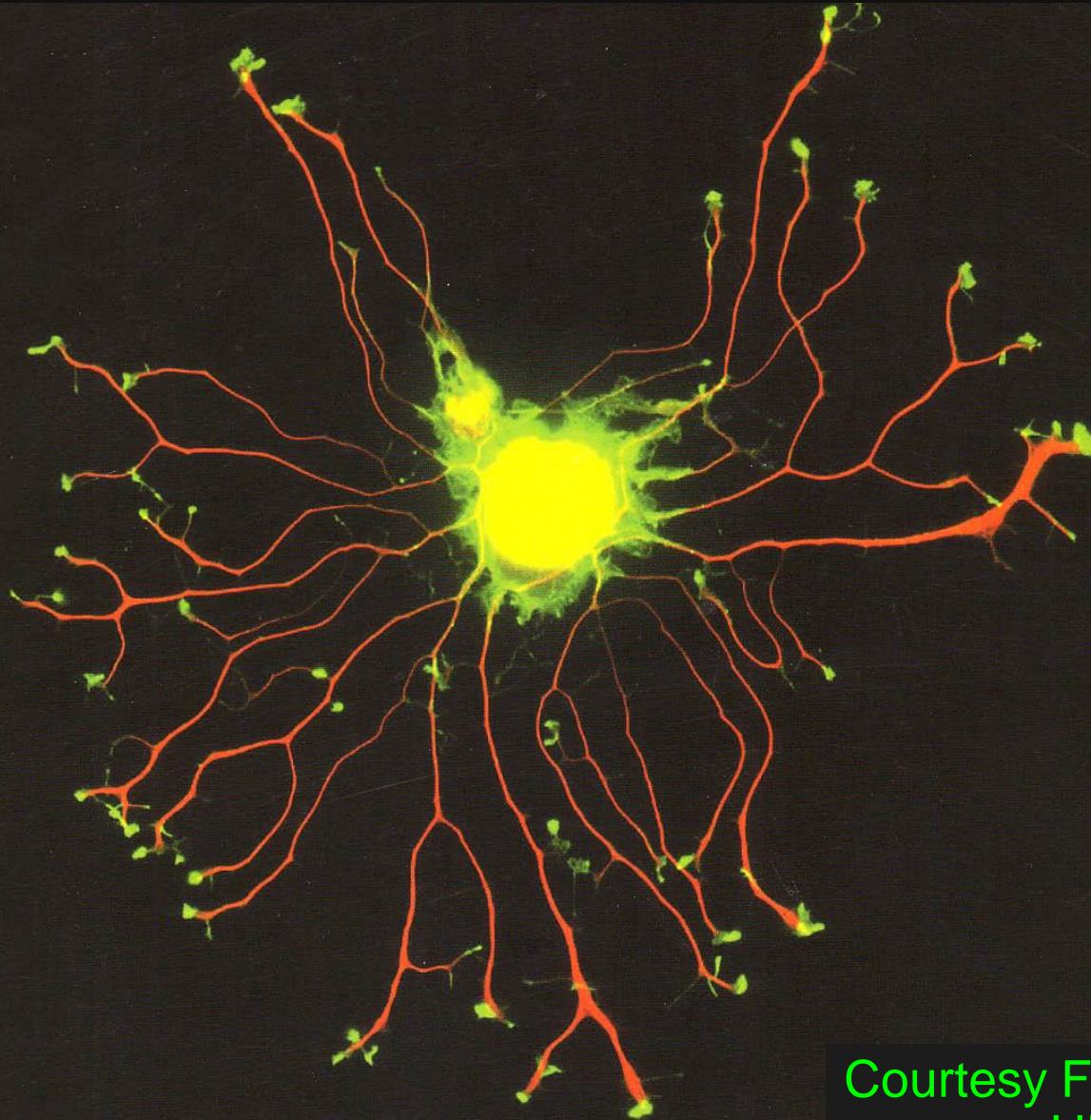
A fluorescence micrograph showing several astrocytes. The cells are stained with a red dye that highlights their complex, branching cytoplasmic processes. The cell bodies are stained with a purple dye. The background is dark, with some blue-stained nuclei visible. Two white arrows point from the text 'Astrocytes' to two of the purple-stained cell bodies.



***A single nerve cell may have as many as 200,000 inputs!***

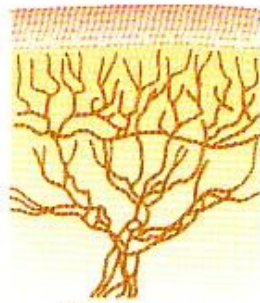


***Nerve cell with multiple axons grown by adding  
a mitogen/neurogen  $\equiv$  nerve growth factor!***



Courtesy Fengquan Zhou  
UNC Chapel Hill

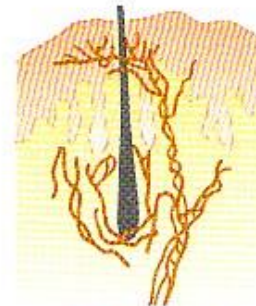
**Sensory  
nerves  
especially,  
come in all  
shapes &  
sizes!**



Free nerve endings



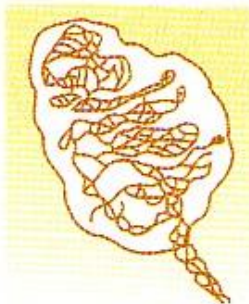
Expanded tip receptor



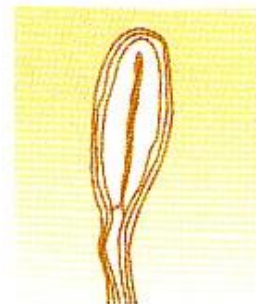
Tactile hair



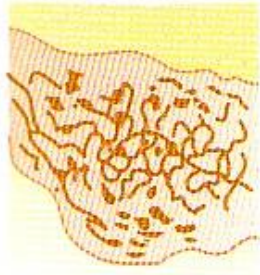
Pacinian corpuscle



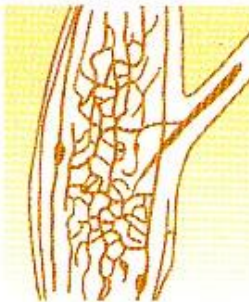
Meissner's corpuscle



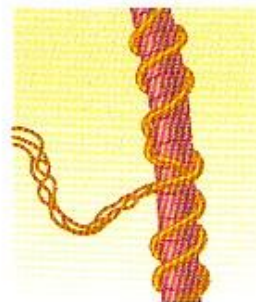
Krause's corpuscle



Ruffini's end-organ



Golgi tendon apparatus



Muscle spindle

**Figure 46-1**

Several types of somatic sensory nerve endings.

# Nerve Extremes: Far ends of the Continuum

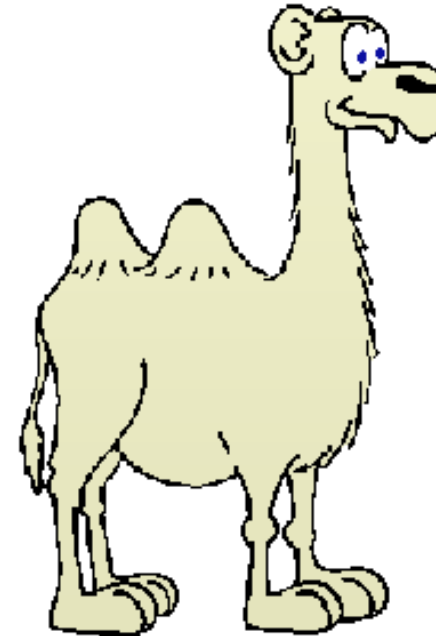
A = Large to medium  
myelinated, up to  
( 120 m/sec )

$\alpha, \beta, \gamma, \delta$



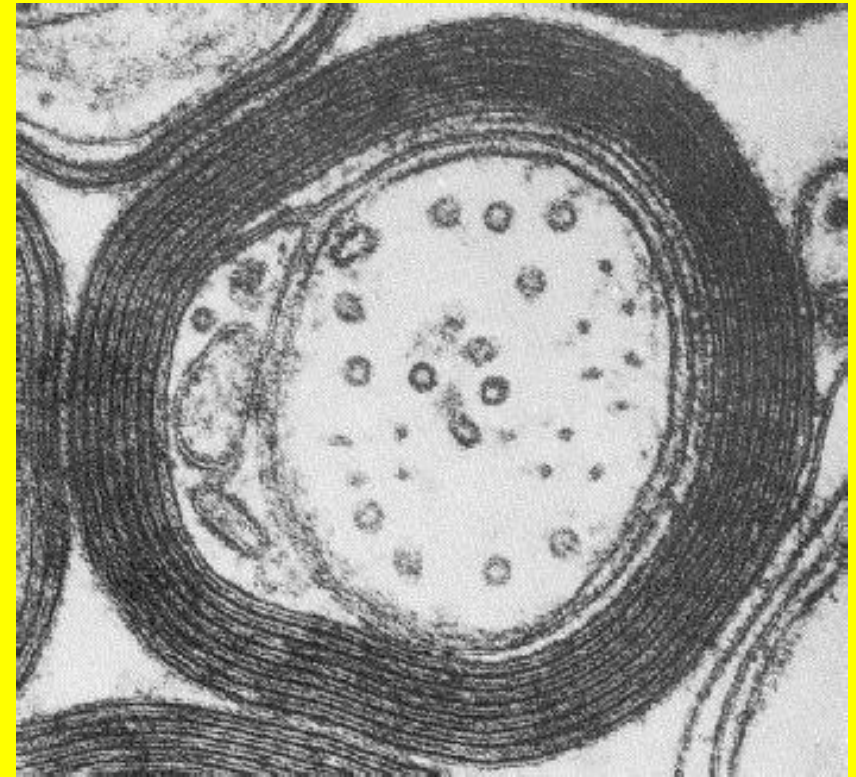
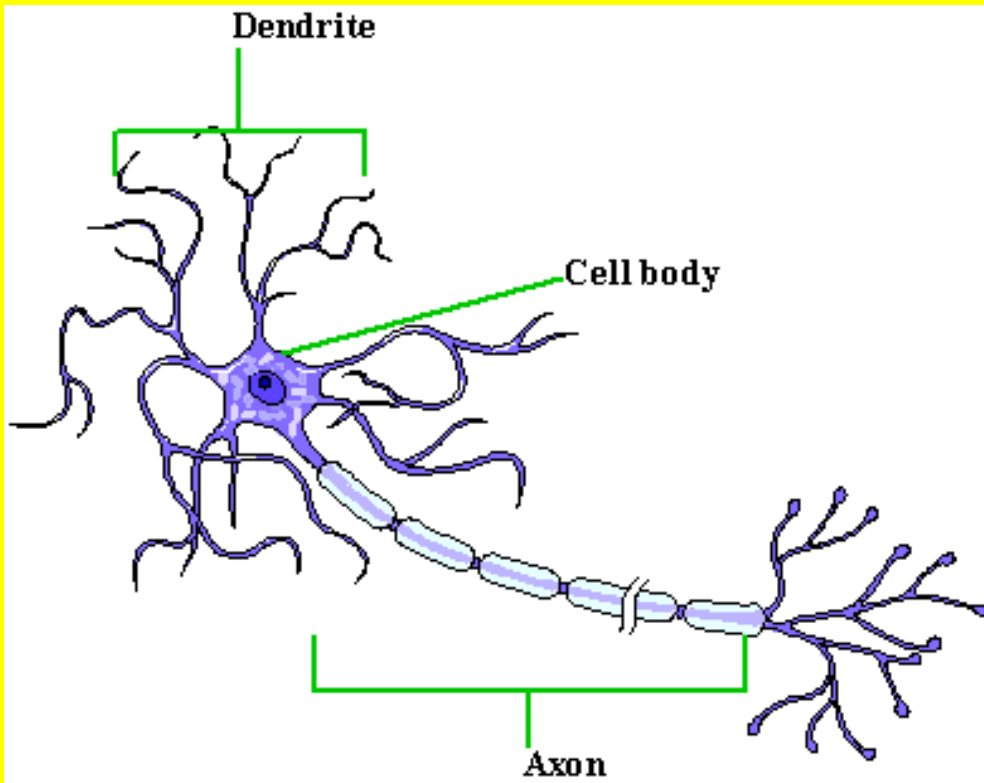
C = Small  
unmyelinated,  
( 0.25 m/sec )

IV



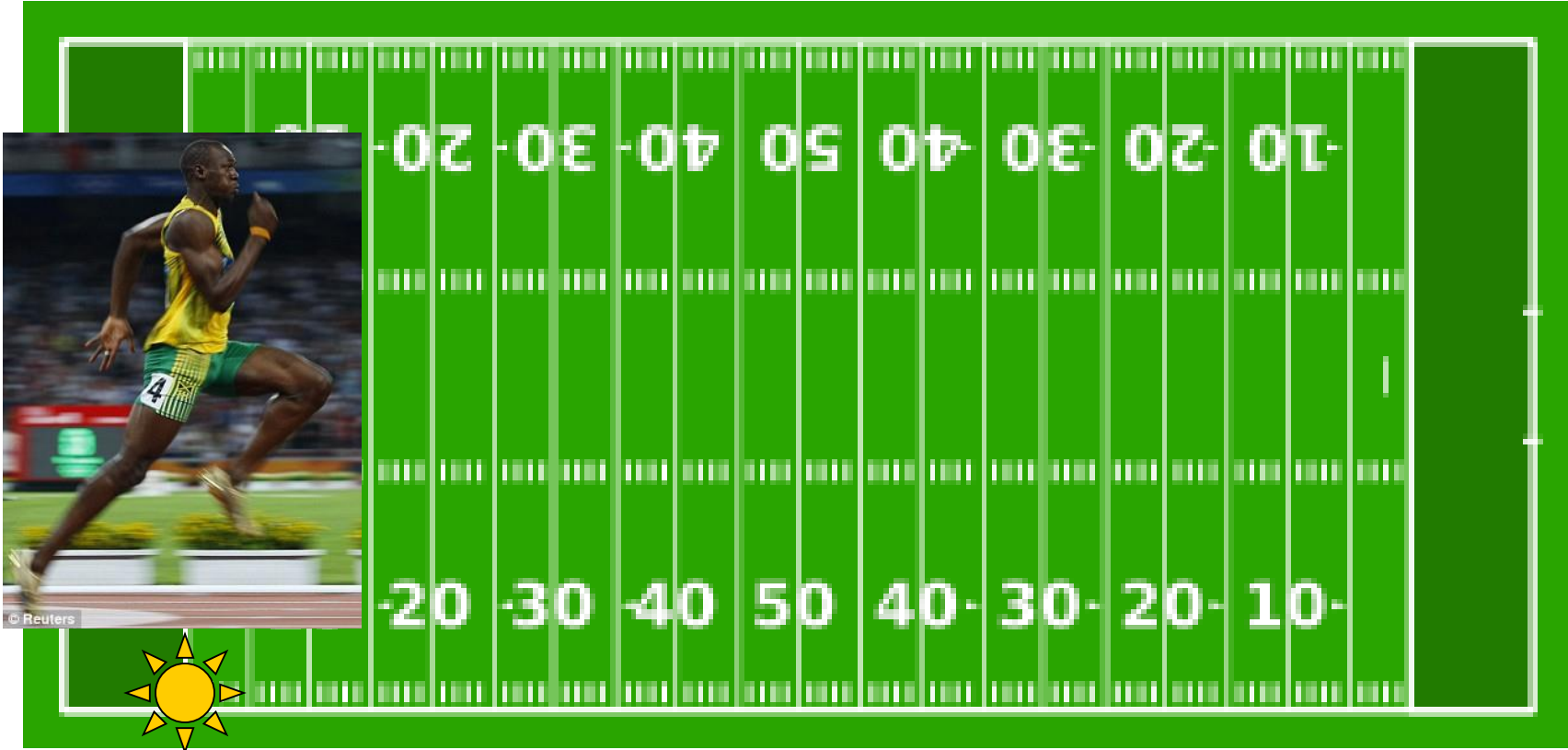


# *What is myelin? Why is it important?*

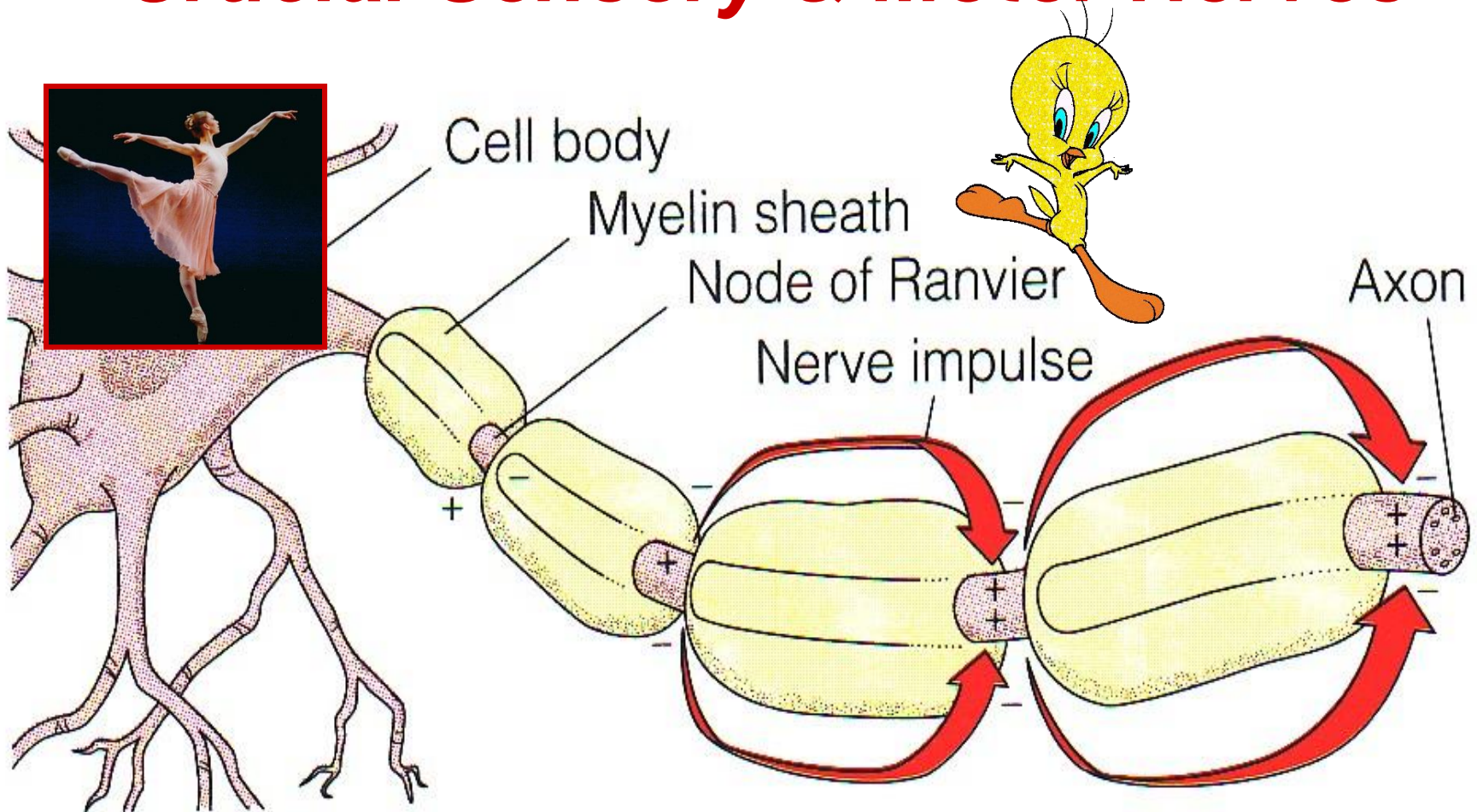


*Lipid insulative coat*  
 $\uparrow \vec{v}$ , *conserves ions & ATP*

*A large myelinated "survival" nerve can conduct impulses the length of football field in < 1 second!*



# Saltatory/Leaping Conduction! *Crucial Sensory & Motor Nerves*



L. saltare to hop or leap! Fr. salt, sautier, sauté, leap, high air, vault