

I. Lab 5 Review: Safety & Techniques Q?

II. Introduction to Endocrinology LS ch 17, DC Module 13, SI Fox+

- A. Endocrine vignette: Cushing's syndrome LS fig17-20 p 521-2
- B. Endocrine system DC p 103 fig 13-1, LS fig 17-1, tab 17-1
- C. What's an endocrine? + classes ~ LS pp 495 - 6
- D. Hypothalamus (Master) – Pituitary (subcontroller)
DC pp 104-6 + LS pp 499-506
- E. Posterior pituitary + hormones DC p 108, LS fig 17-4 p 502
- F. Anterior pituitary + hormones DC pp 105-7, LS pp 502-6
- G. GH: Body builder's dream? Fountain of youth? LS pp 506-11
- H. Peripheral endocrine organs DC pp 109-13, LS pp 513-36
 - 1. Pancreas (insulin, glucagon, diabetes) 2. Thyroid 3. Adrenals

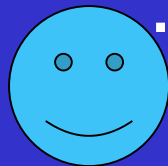
III. Nervous System & Excitable Cell Connections LS ch 5, 4, 7

- A. How is the nervous system organized? fig 5-1 p 108
- B. Neurons? What kind? fig 5-2 p 109
- C. Brain structure & function fig 5-7, 5-8 pp 116 - 7
- D. **Protect your head with a helmet!** Bicycle head injury statistics, *NHTSA & BHSI*

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



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



PREPARATION



1

WASH & DRY



2

ALCOHOL



3

SAMPLE+TESTS

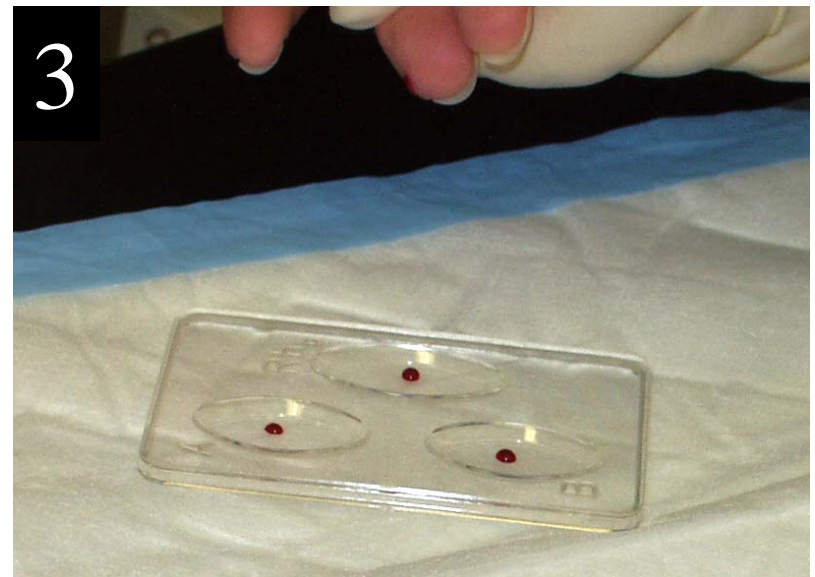


1

OBTAIN μ SAMPLE



BLOOD GLUCOSE



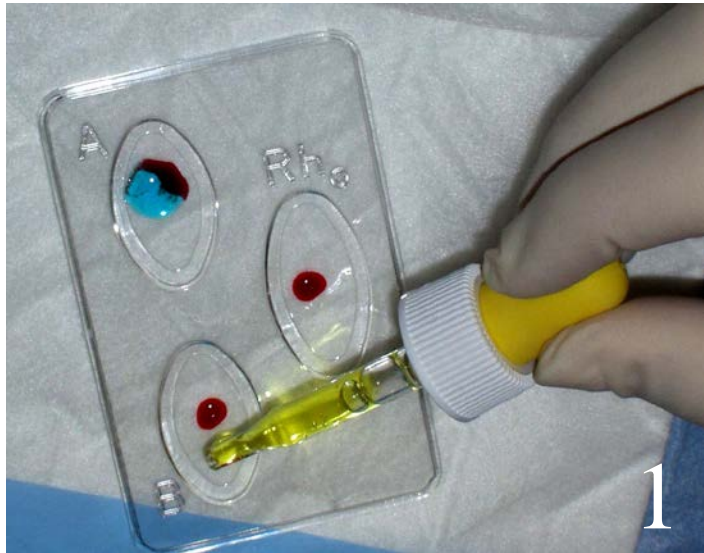
BLOOD TYPING

Glucose:
Sugar in Blood

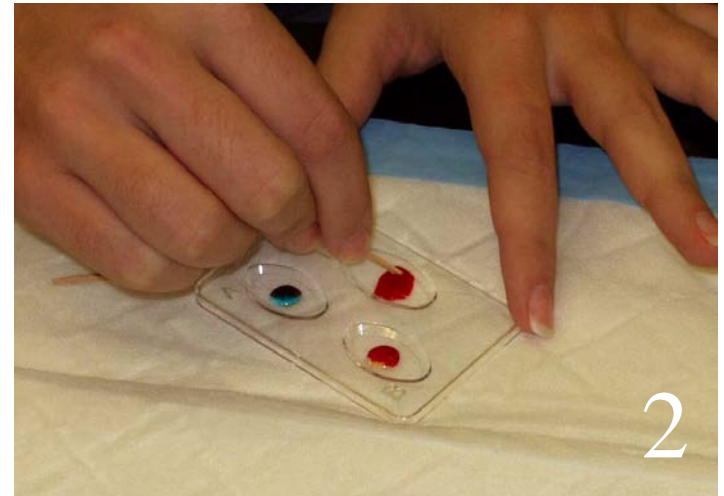


Normal: 70-99
Pre-Diabetes: 100-125
Diabetes: ≥ 126 mg/dL

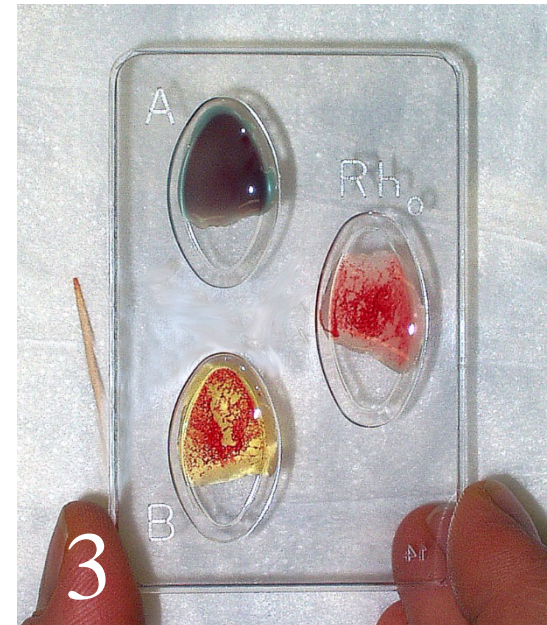
BLOOD TYPING



ADD ANTISERA



MIX W/TOOTHPICKS



READ & RECORD!!

CLEAN-UP!



FOLD DIAPER



BLOOD PRODUCTS

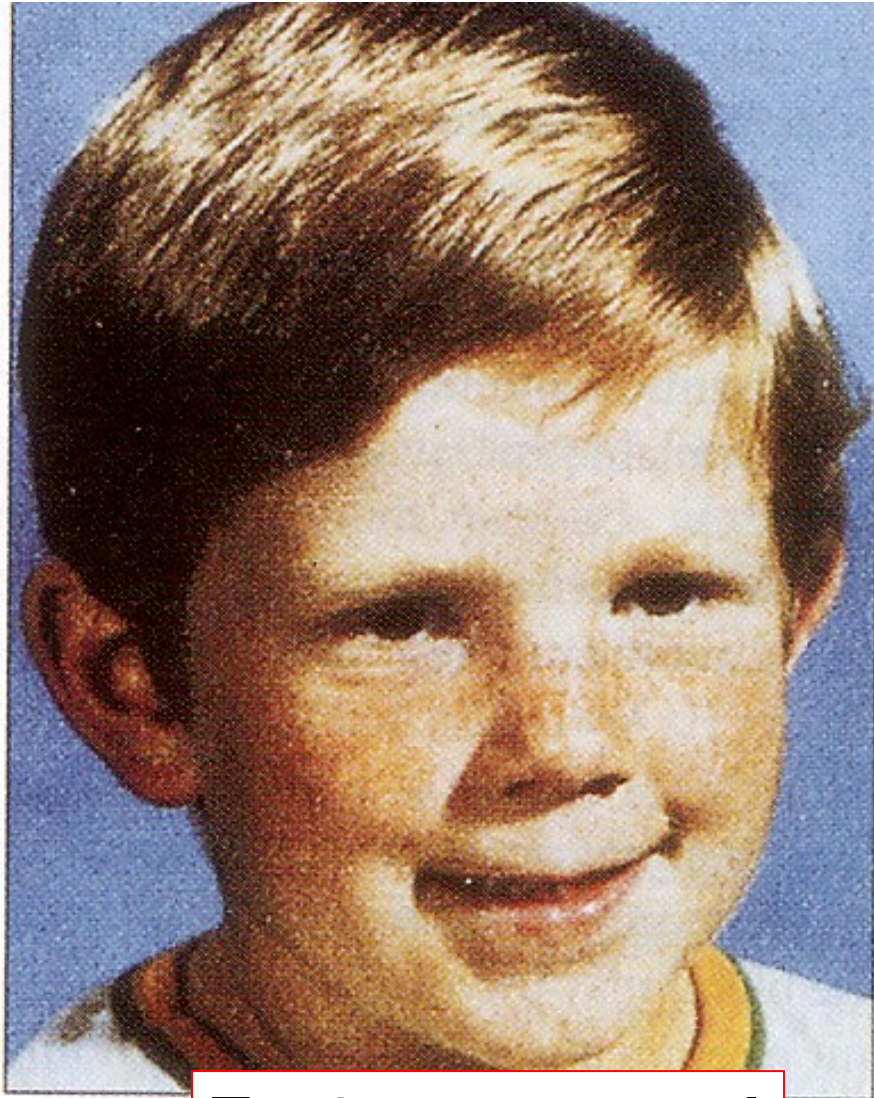


REWASH!!

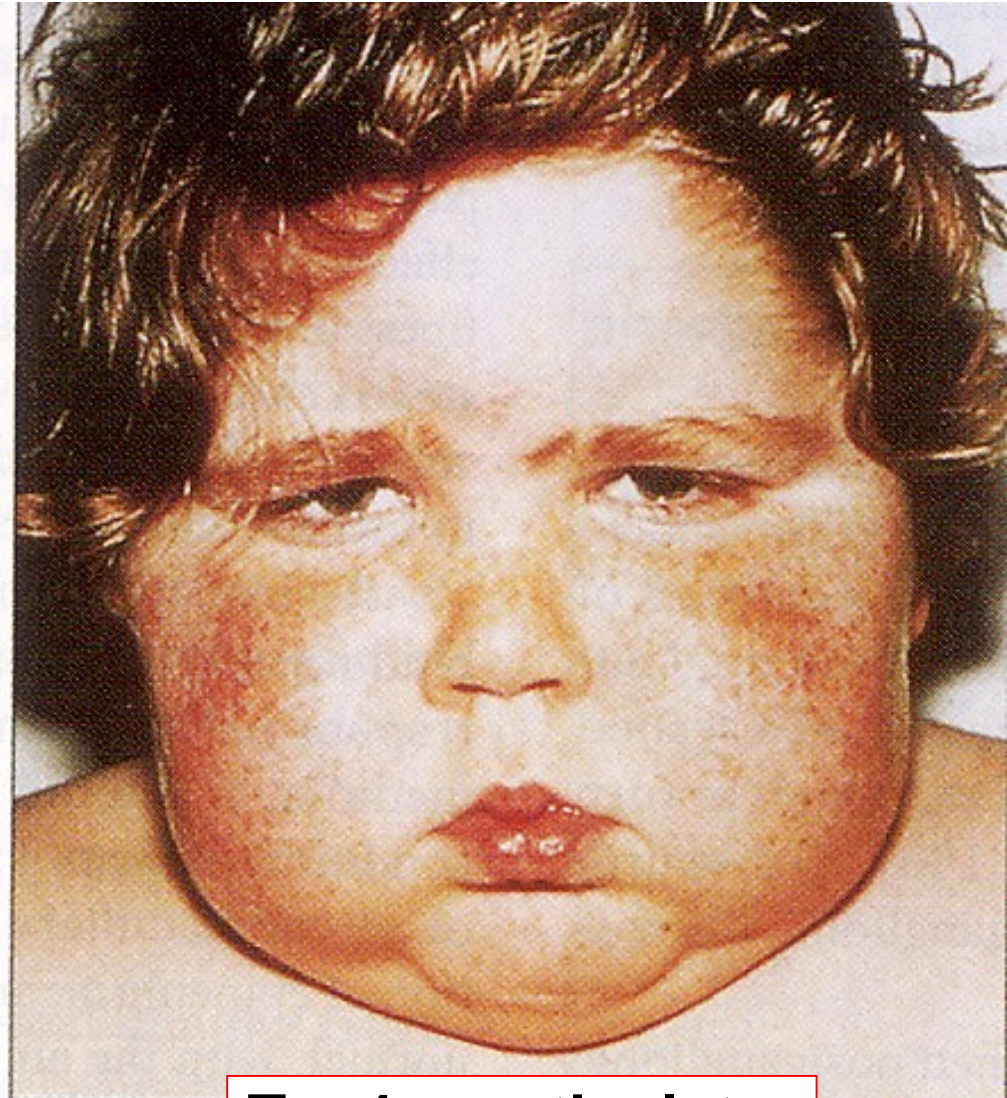
Blood Chem Lab Q?



***Cushing's Syndrome = Hypersecretion
of Cortisol: Hypothalamic (CRH),
Pituitary (ACTH), or Adrenal (Cortisol)***



T = 0, near normal

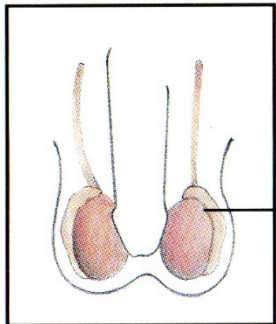


T = 4 months later

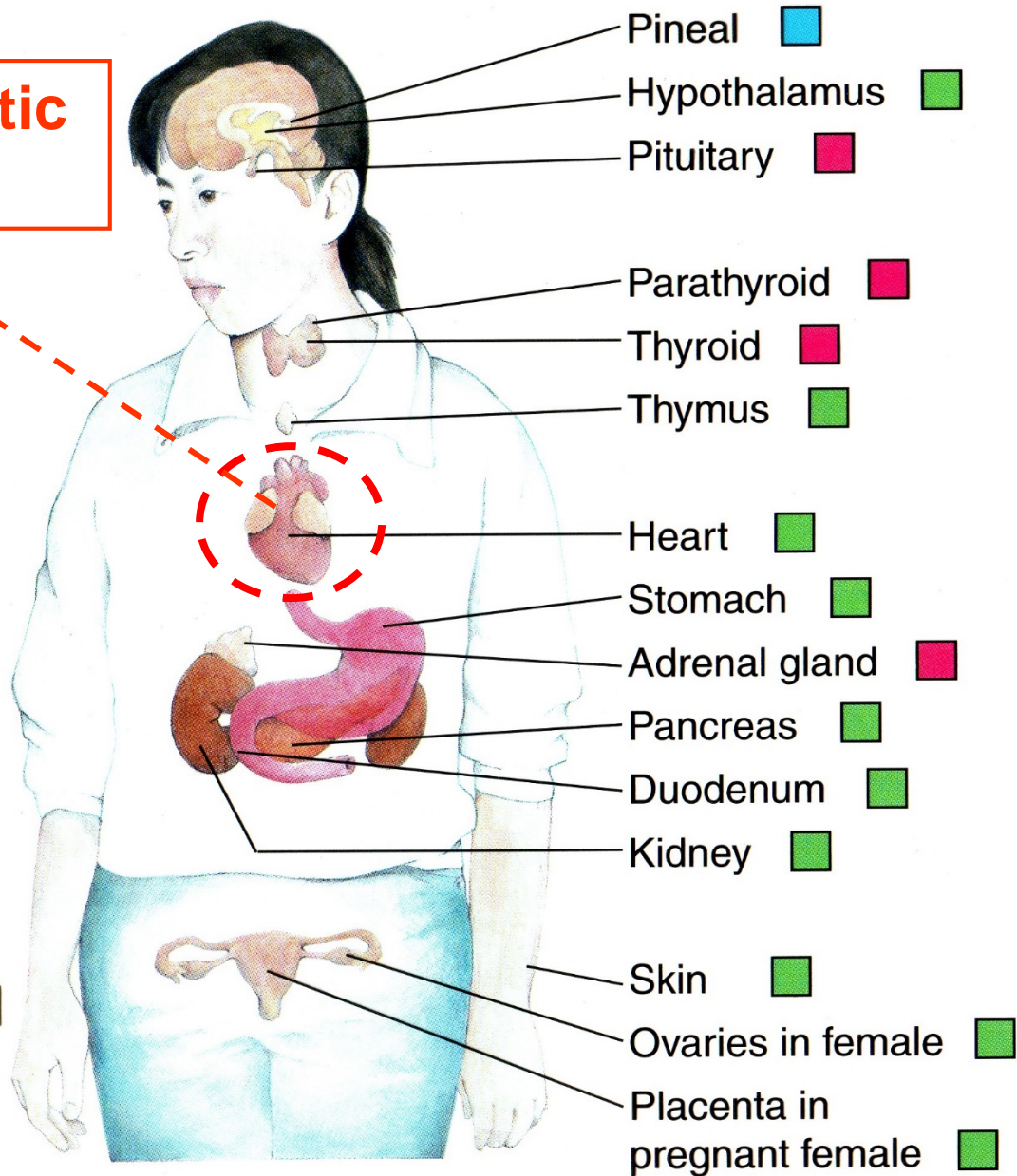
Endocrine System

ANP = Atrial Natriuretic Polypeptide

- Solely endocrine function
- Mixed function
- Complete function uncertain

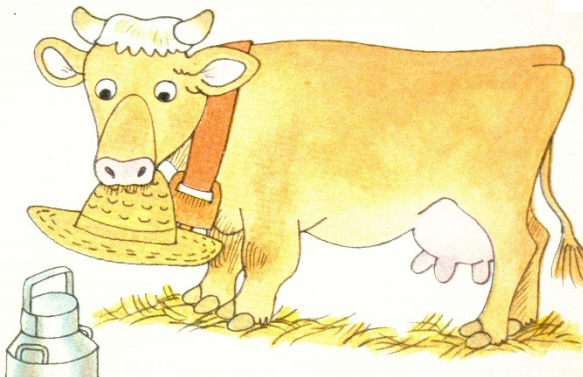
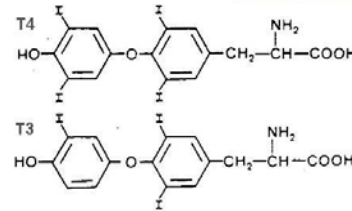


Testes in male ■

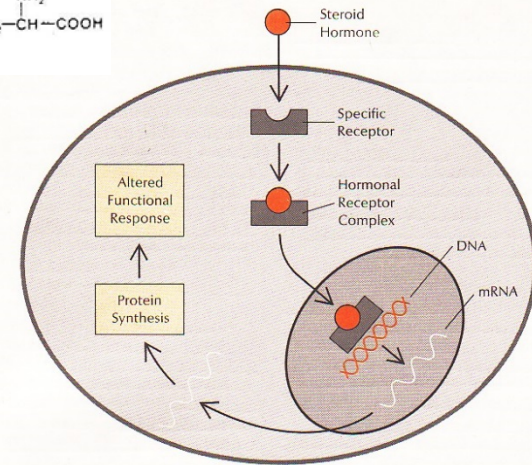
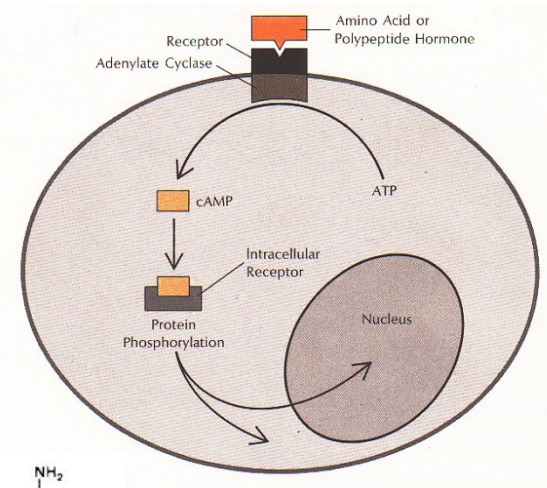


Hormone/Endocrine Classifications

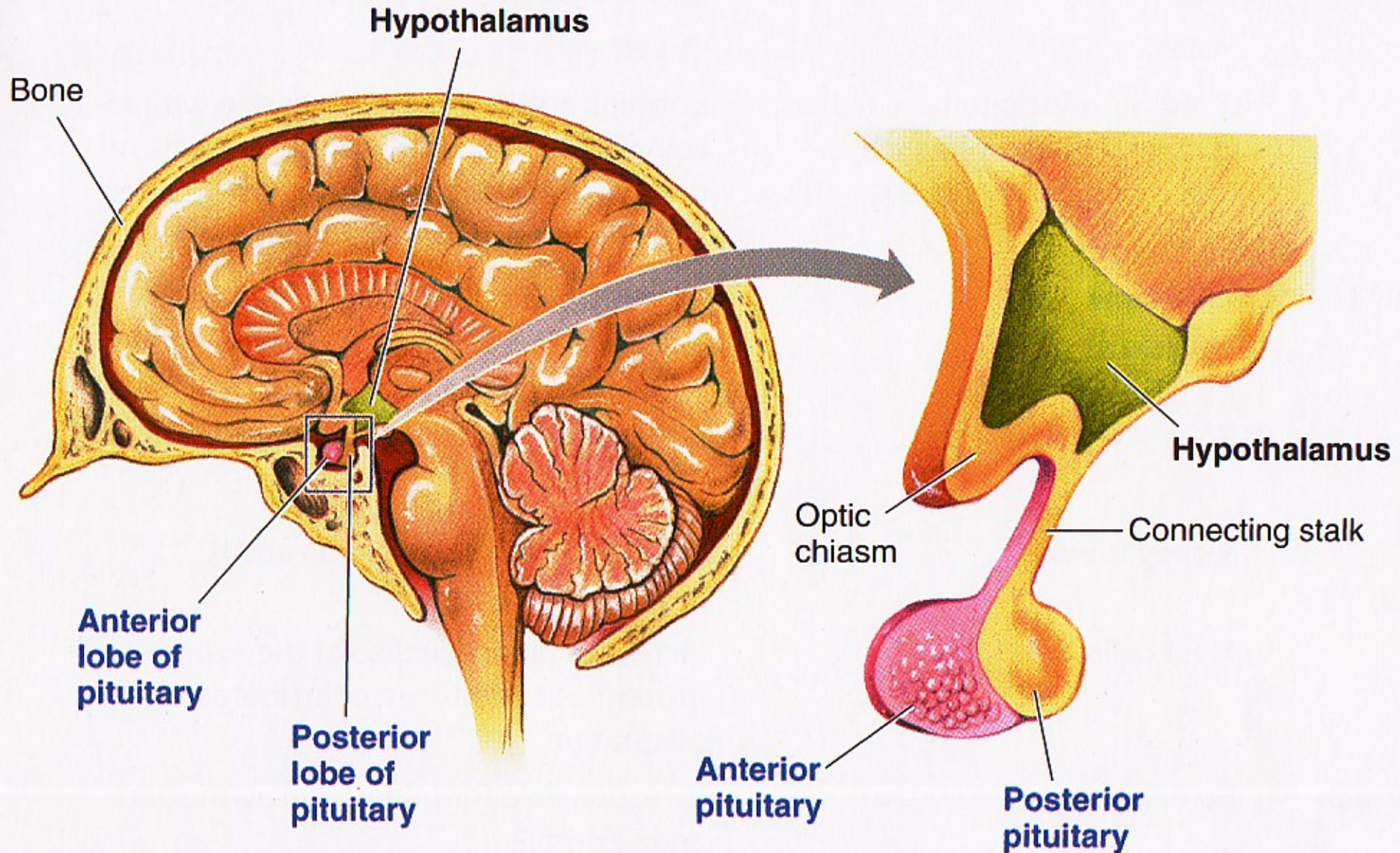
Exogenous



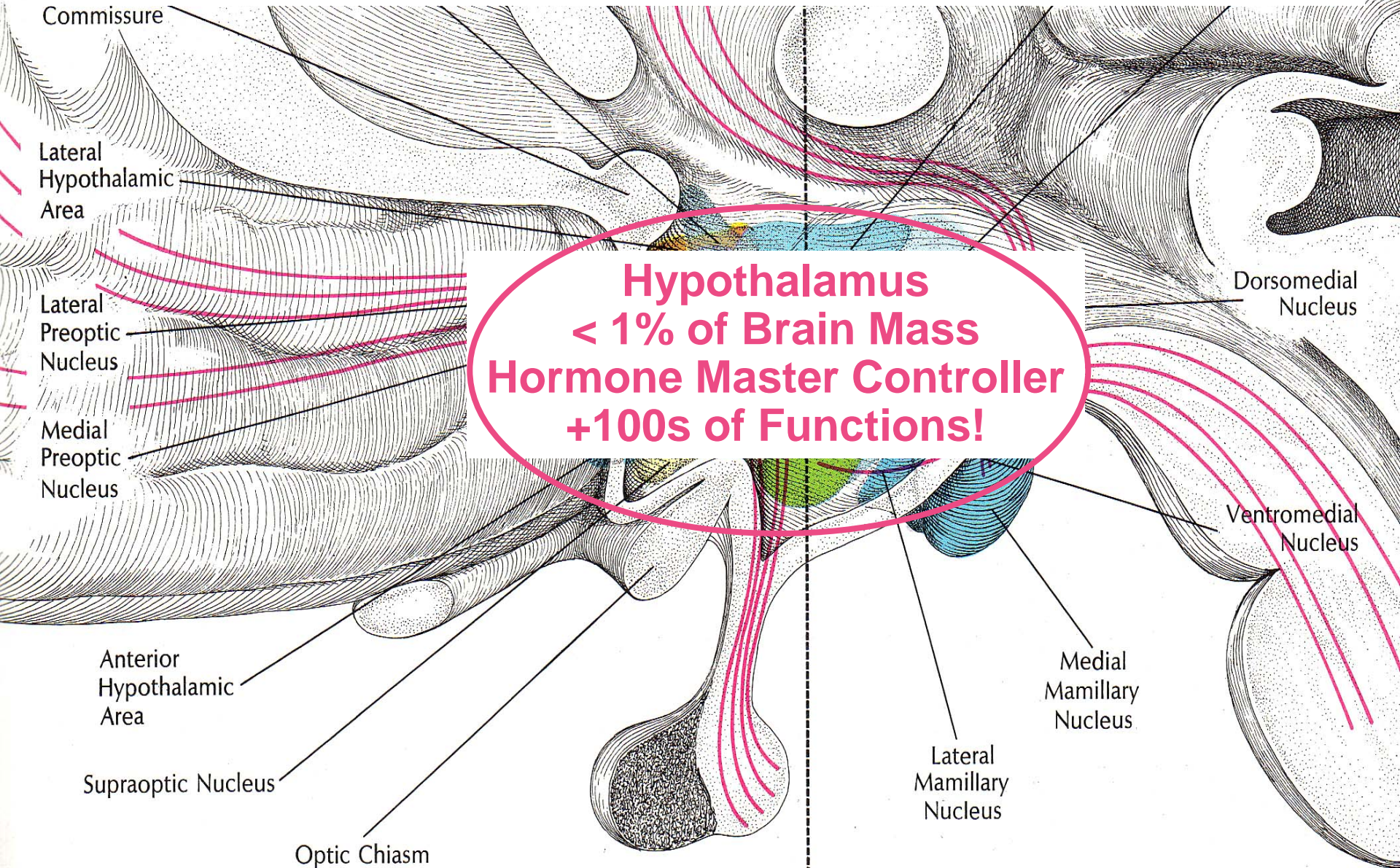
Endogenous

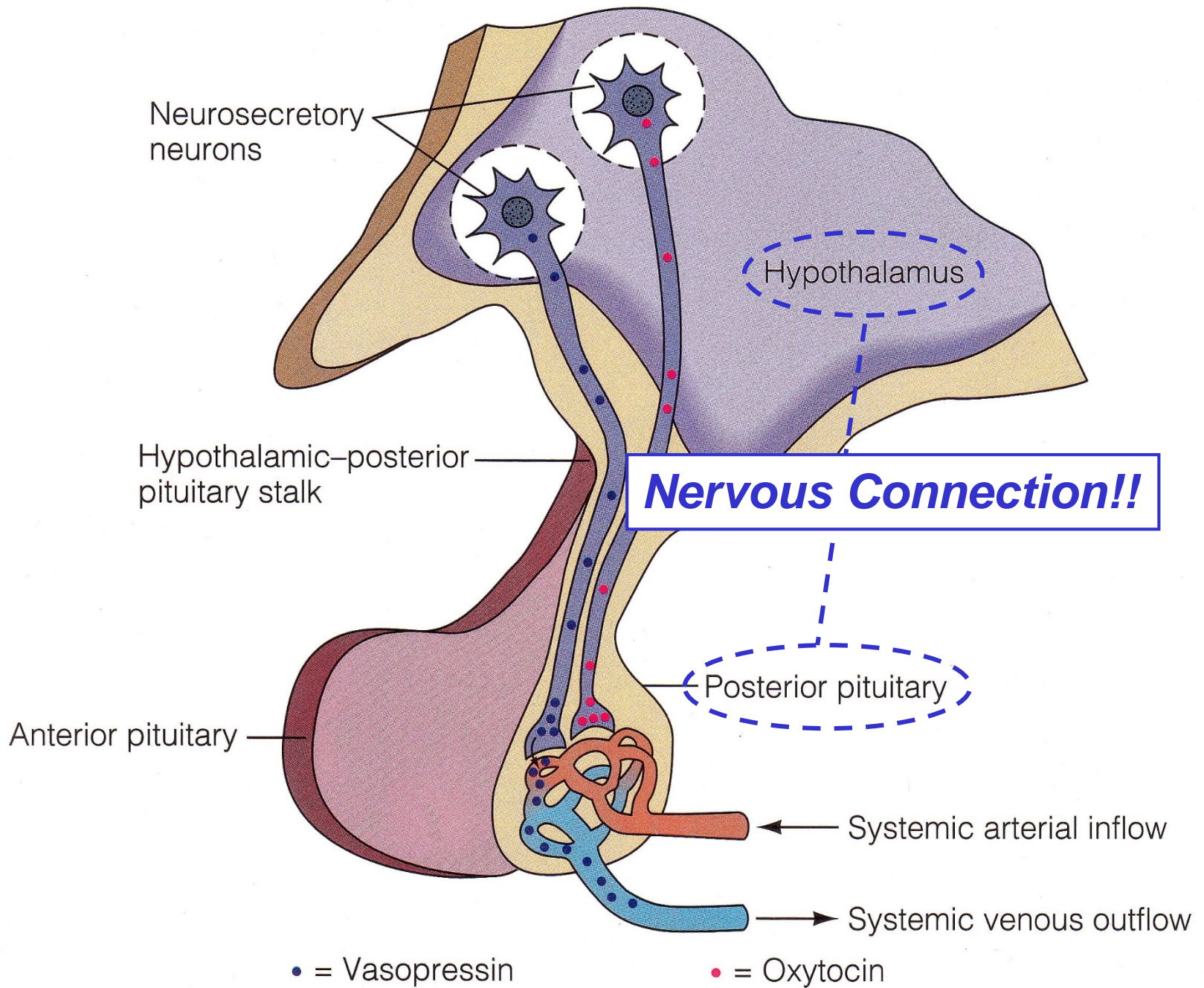


Hypothalamus & Pituitary: Intimate Relationship

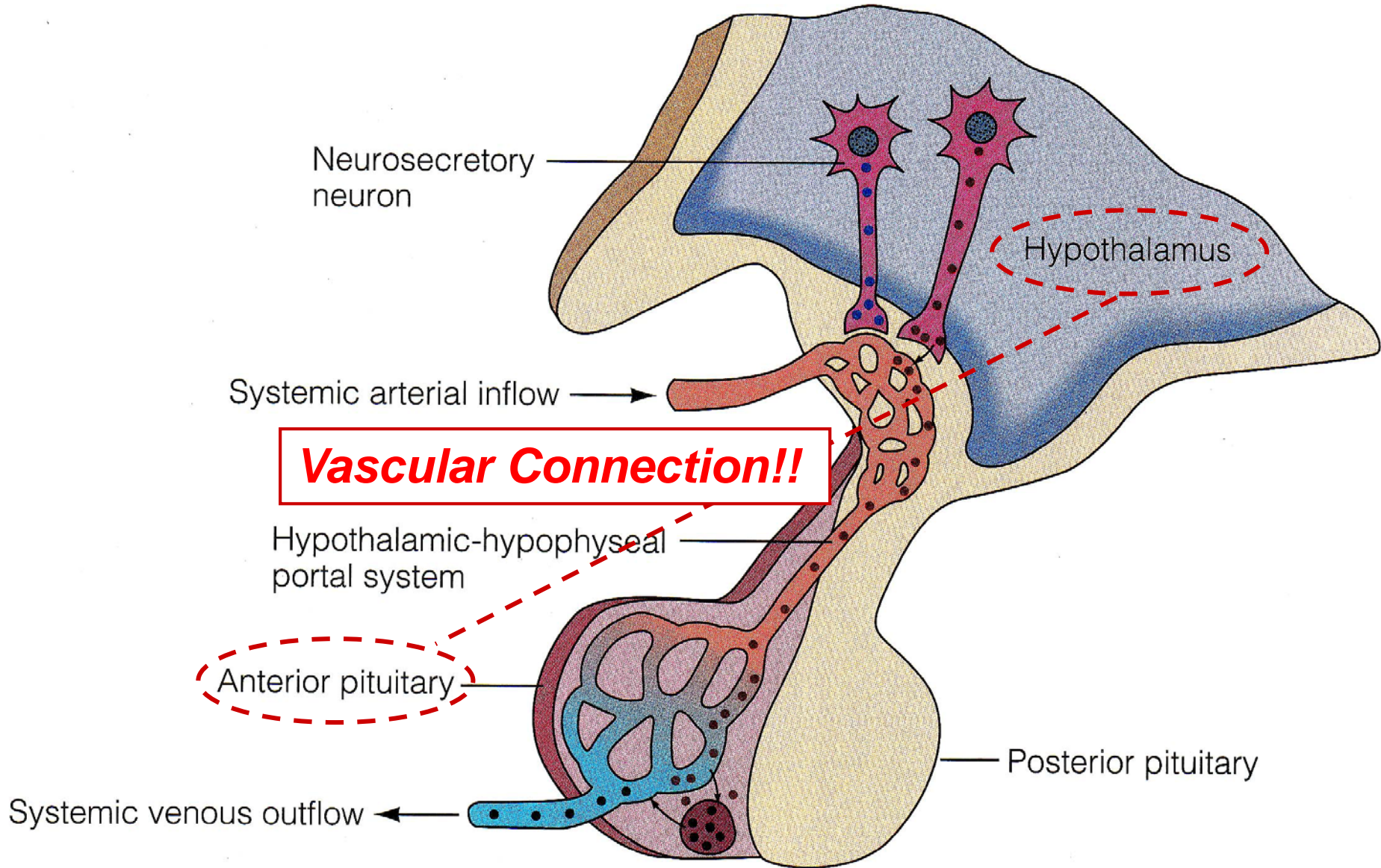


Good Things Come in Small Packages!



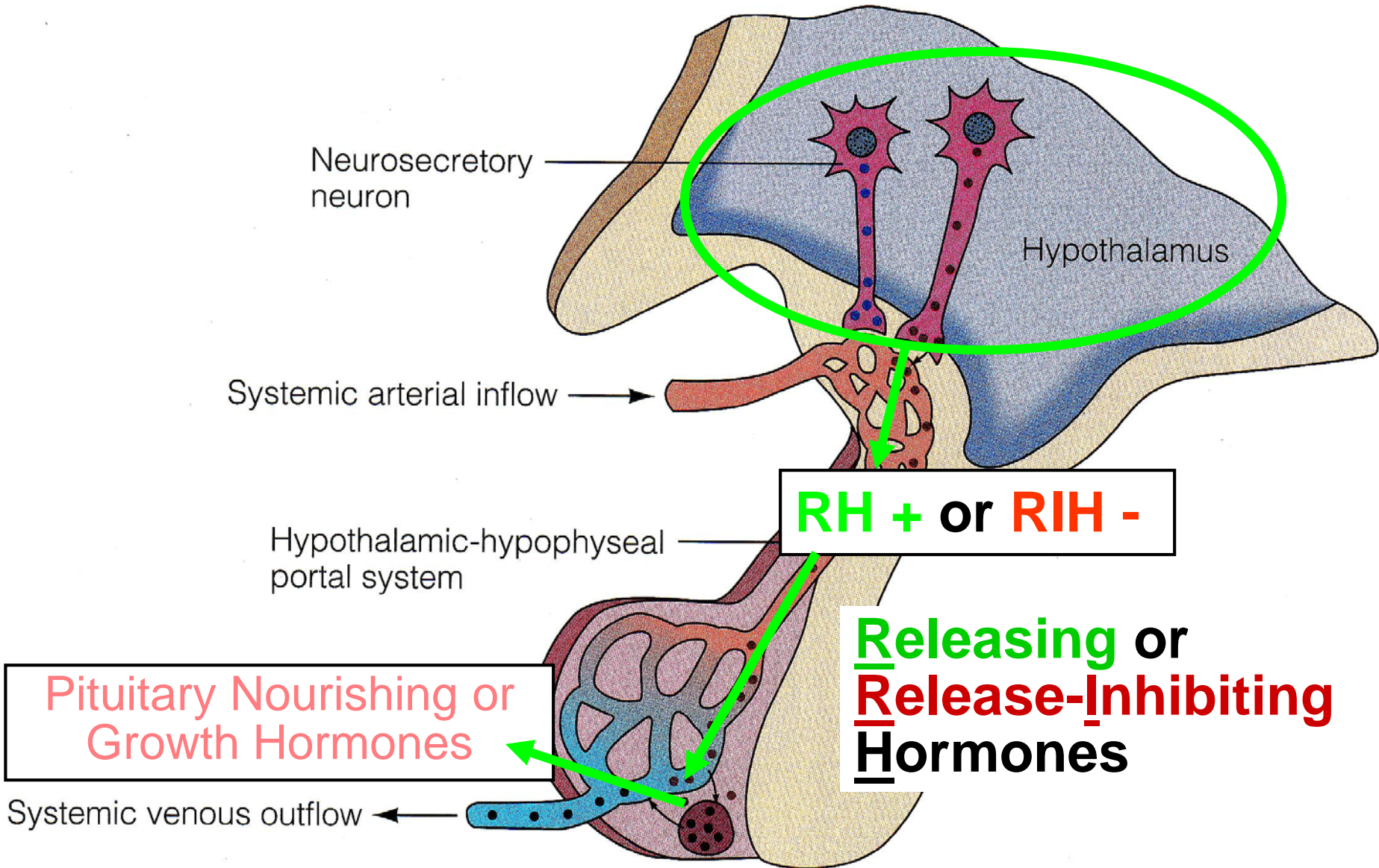


Hypothalamus-Anterior Pituitary Vascular Connection!



• = Hypophysiotropic hormones

• = Anterior pituitary hormone

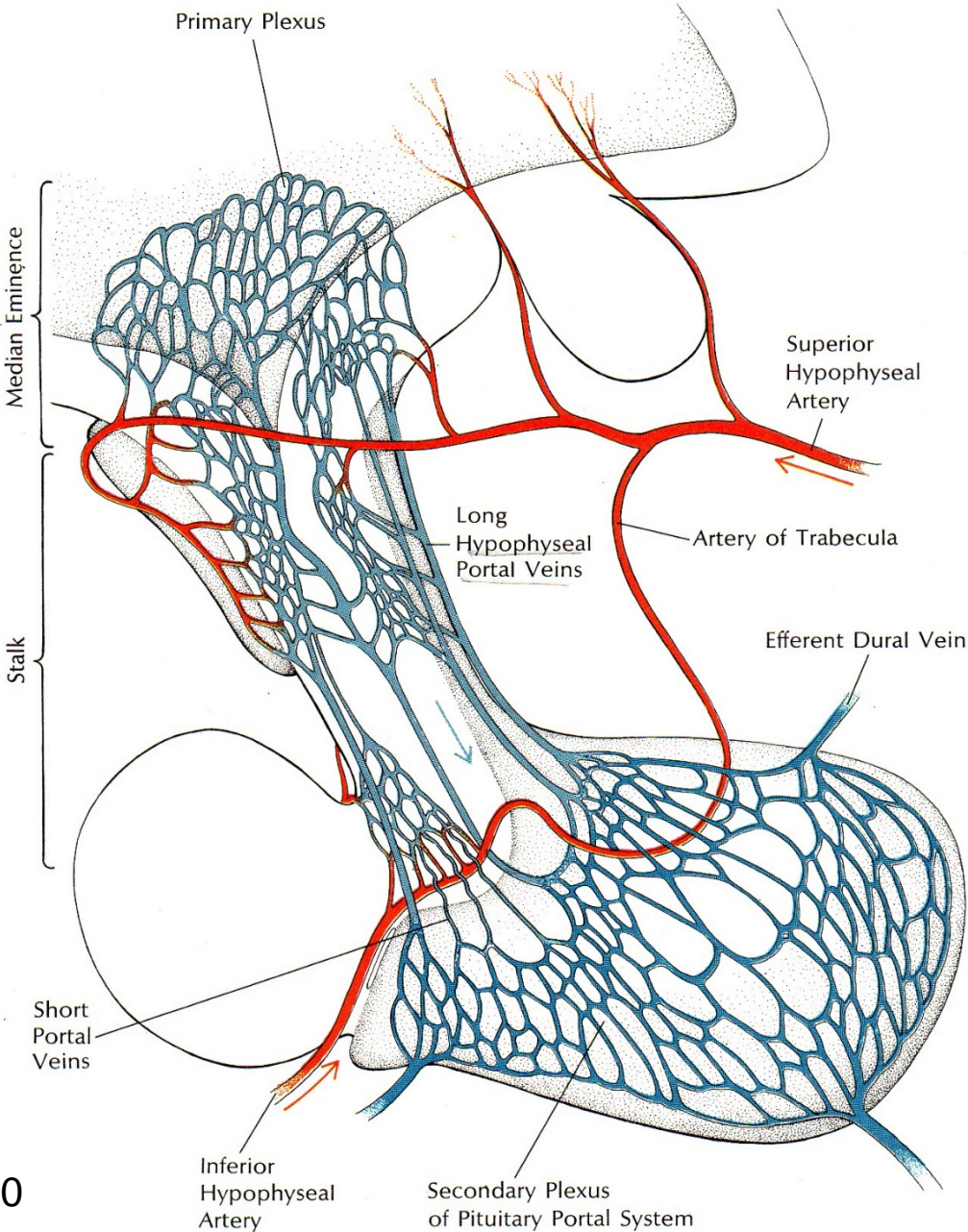


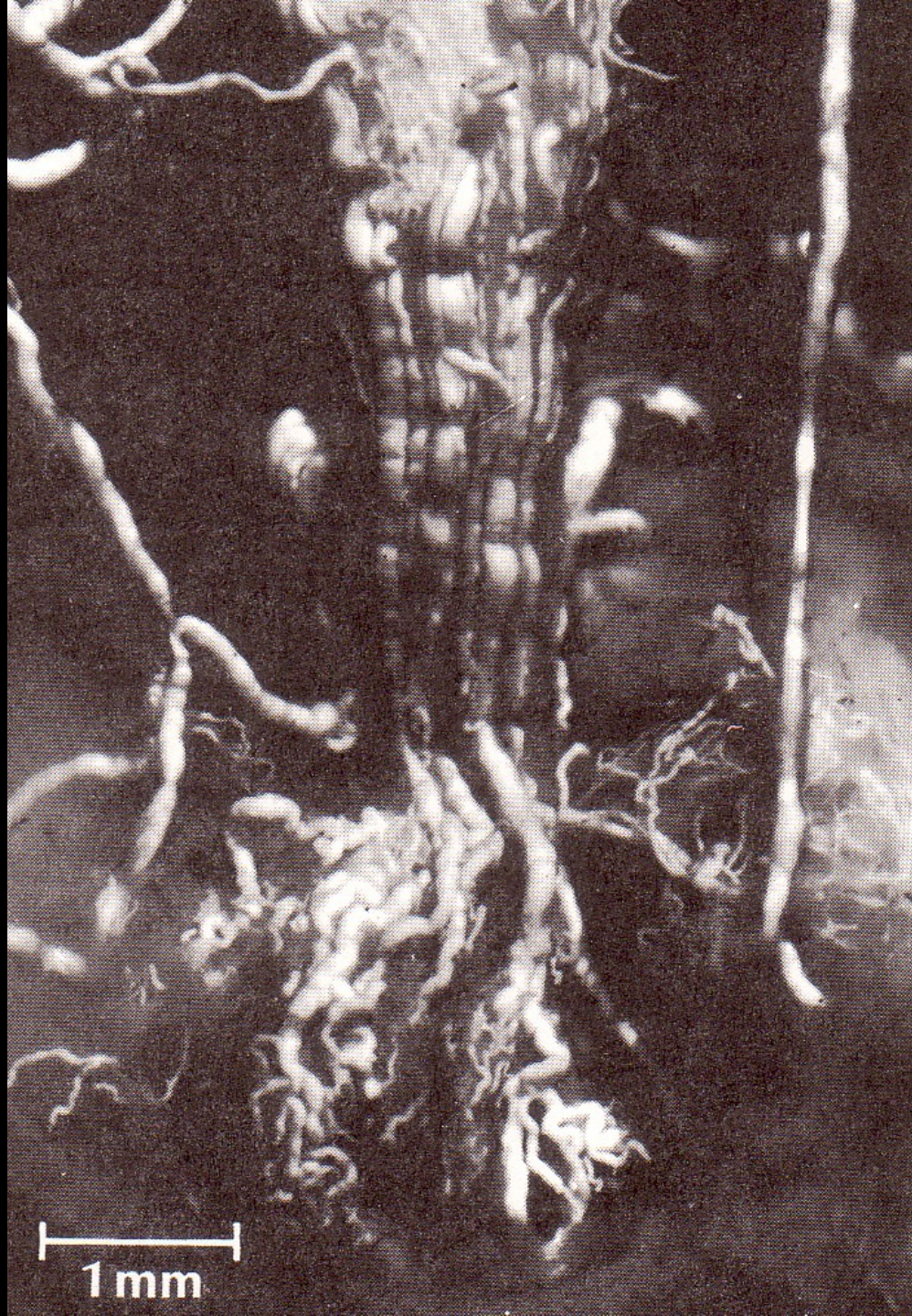
• • = Hypophysiotropic hormones

• = Anterior pituitary hormone

Hypophysis ≡ Pituitary

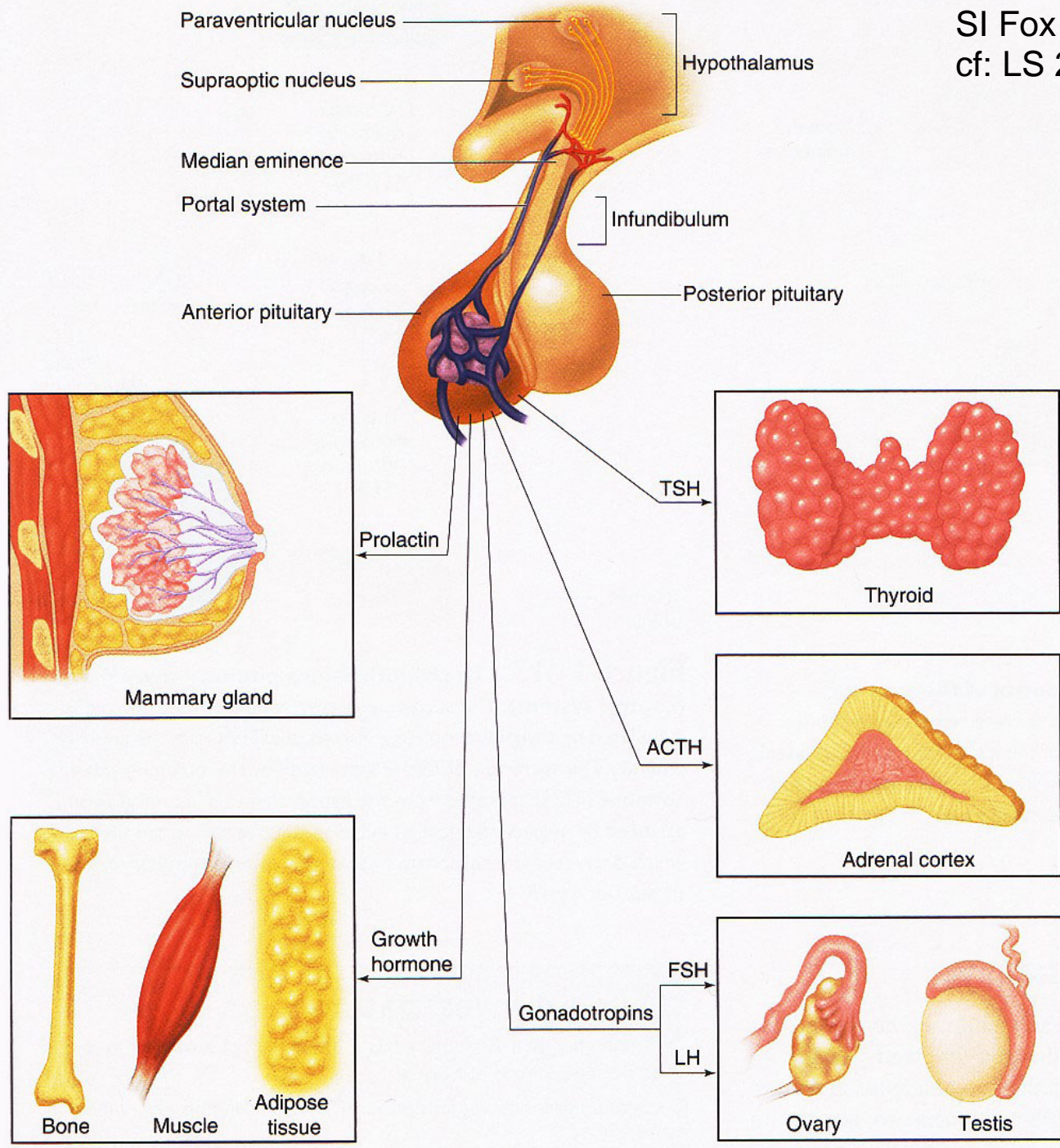
Capillary-Venule-Capillary Intimate Circulation



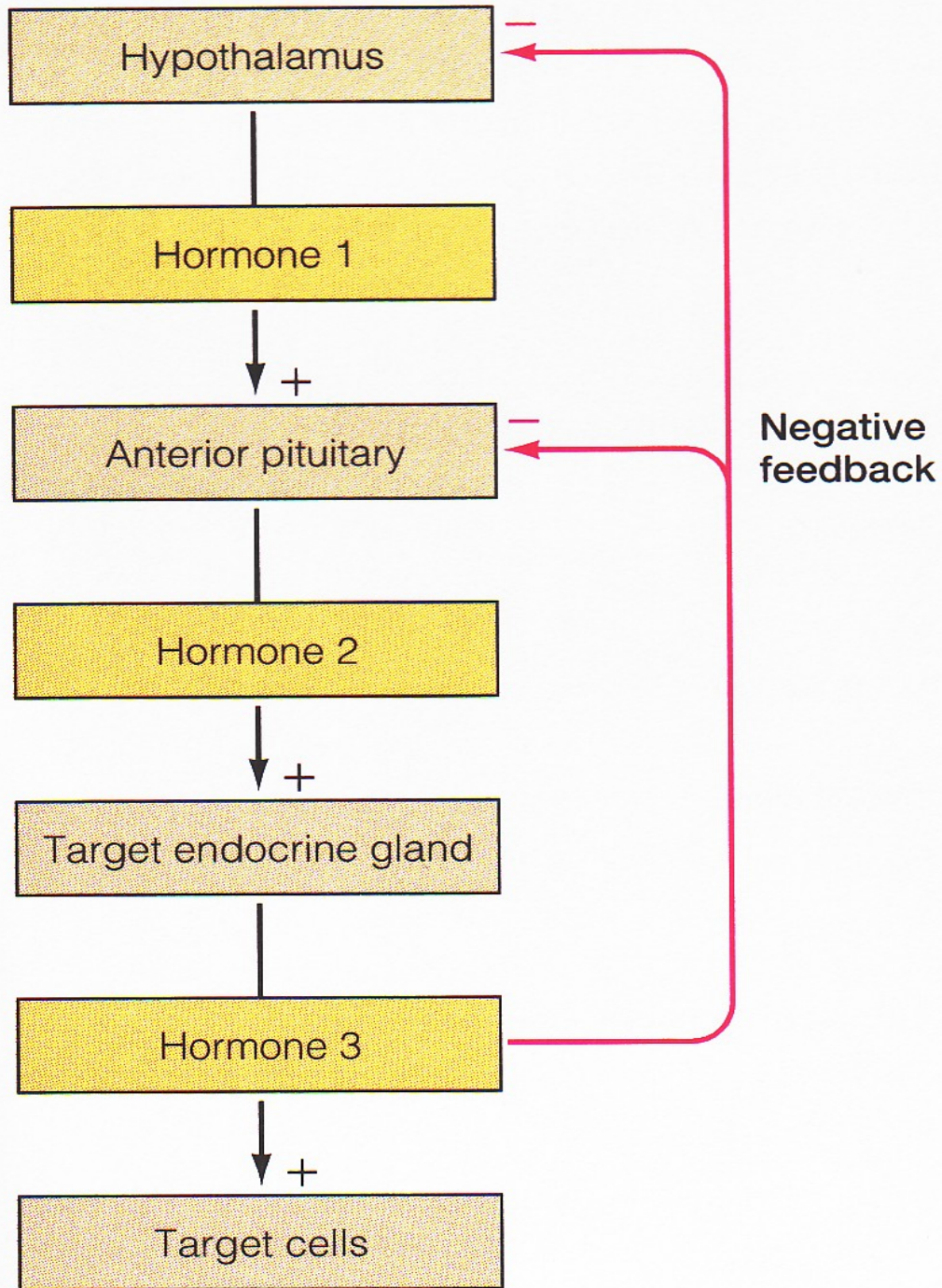


Krieger & Hughes 1980

1 mm



**Discussion
&/or
Break?**





LS 2006, cf: LS 2012
fig 17-10

Progression & Development of Acromegaly

Age 13

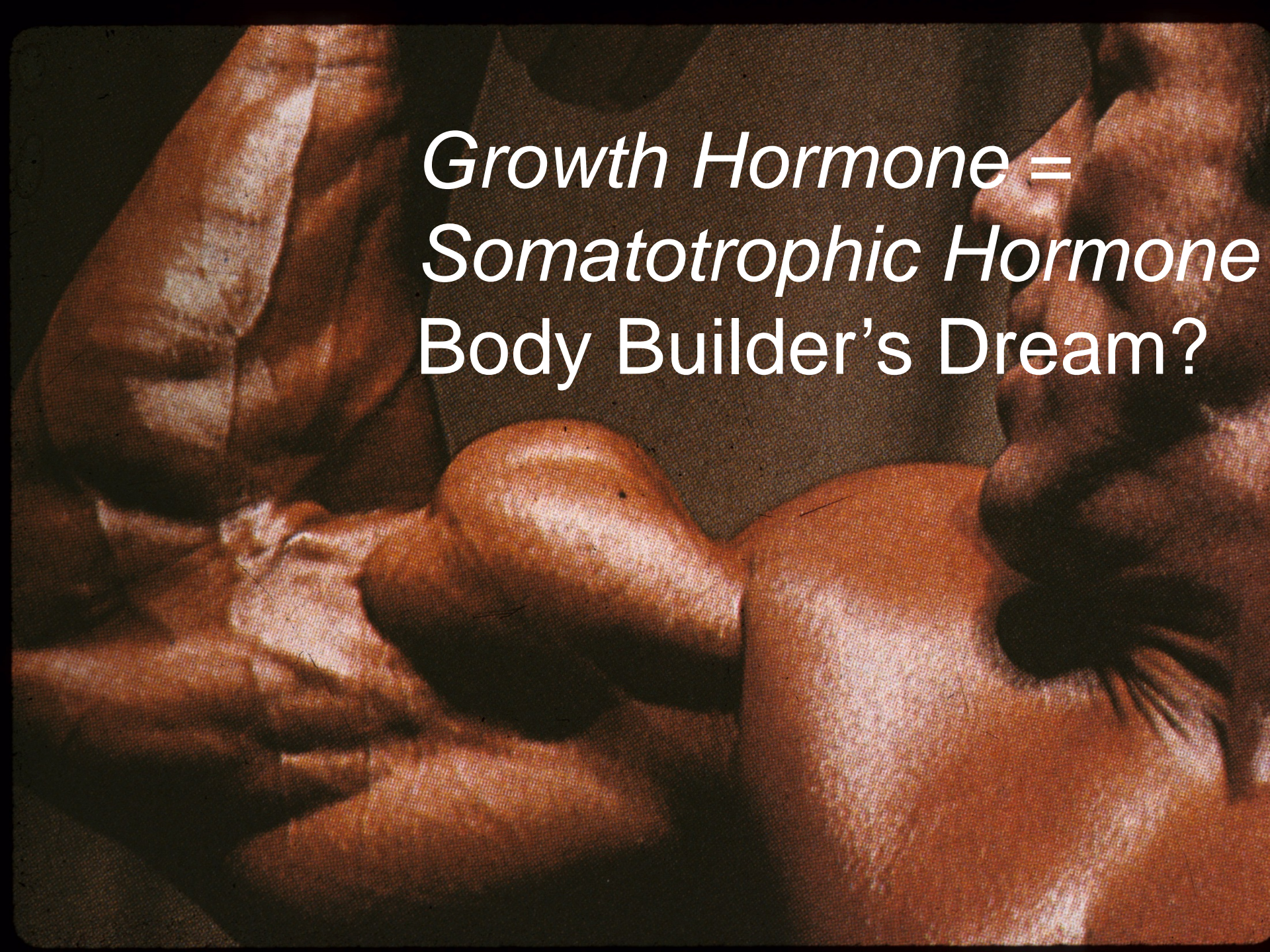


Age 21



Age 35





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

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

↑ Amino Acid uptake & Protein synthesis

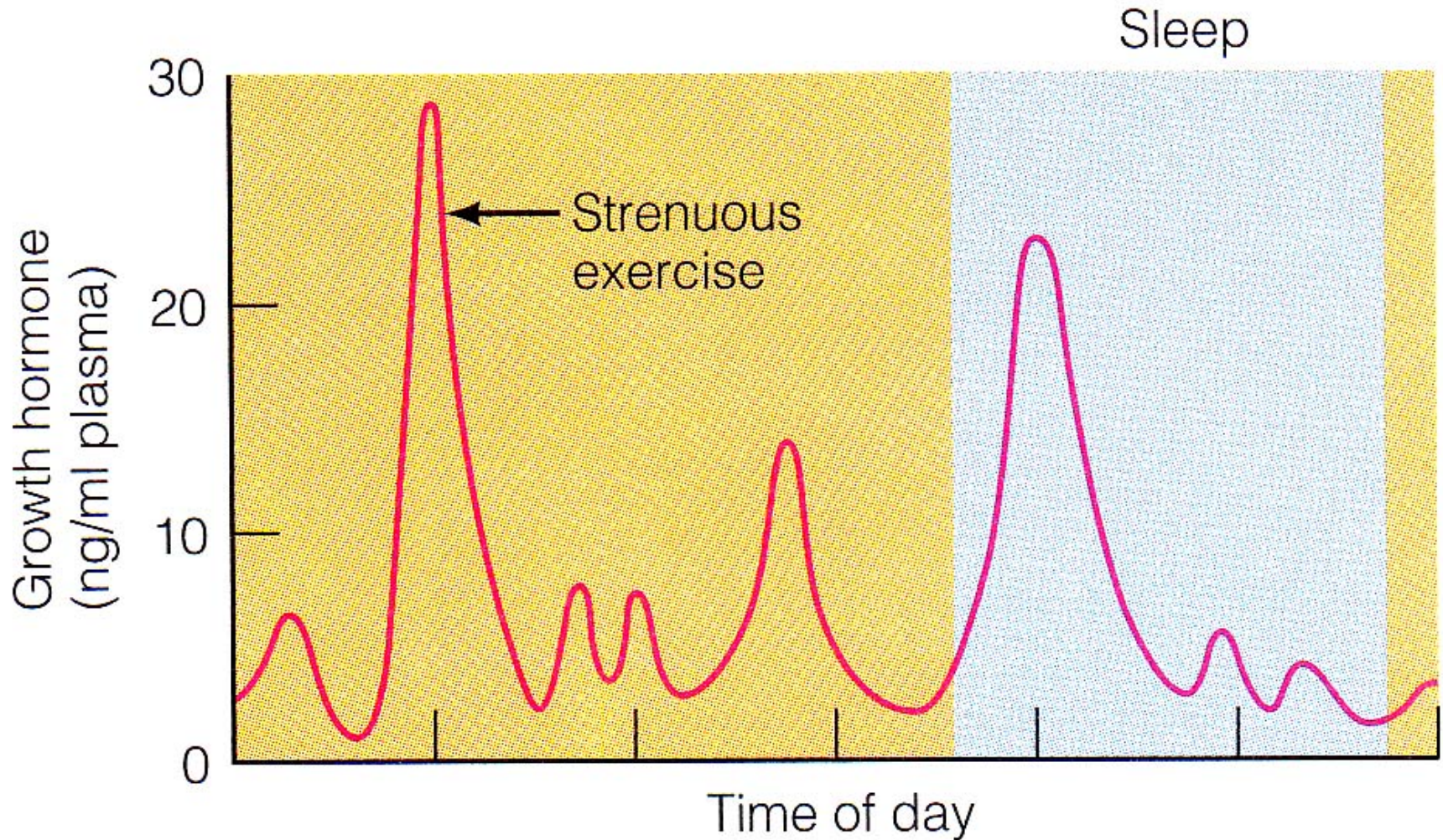
↑ Lipolysis & Fatty Acid mobilization

↓ Glucose uptake
(skeletal muscle & adipocytes)

↑ Glucose production
(liver glycogenolysis)

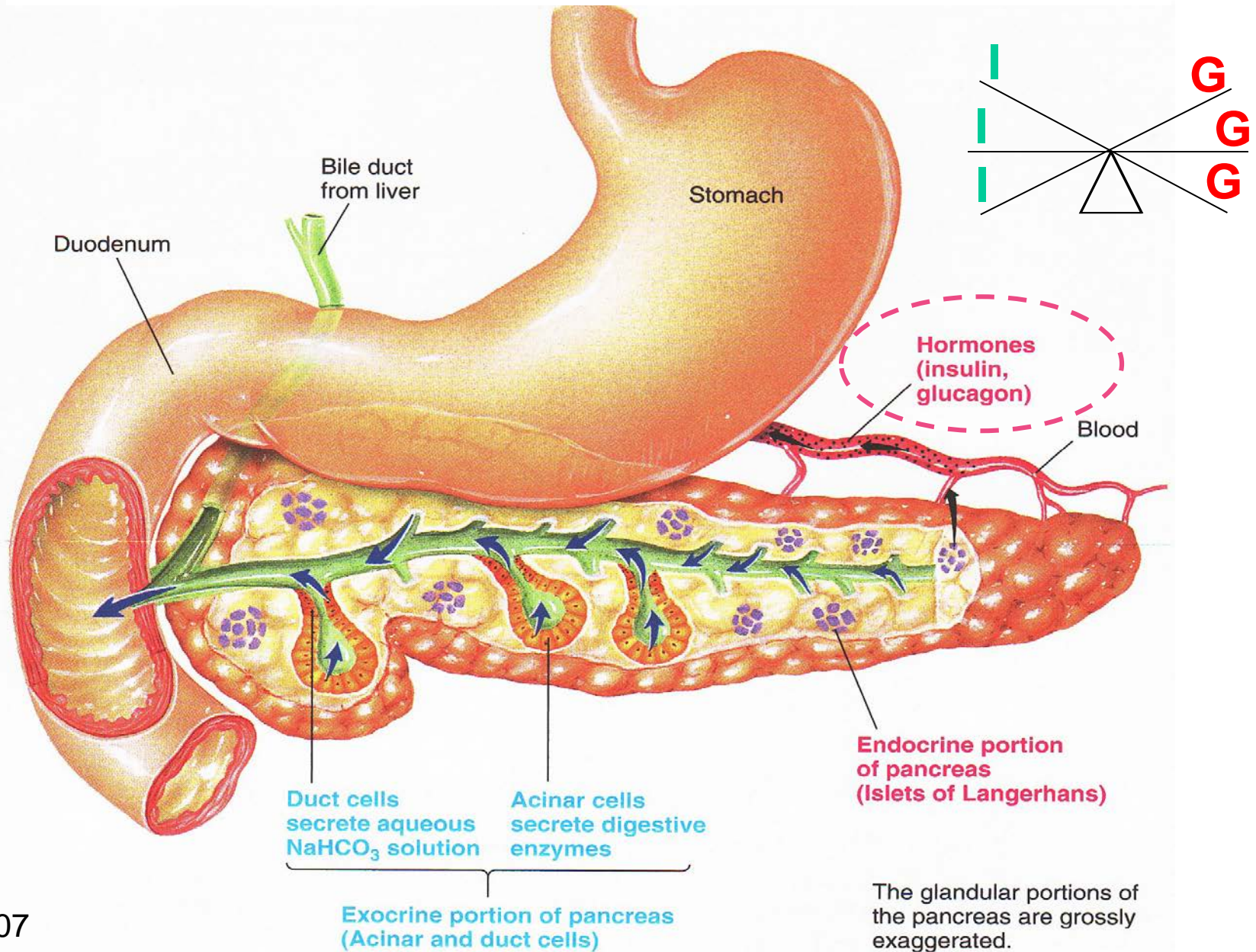
↑ Insulin secretion

Increase GH naturally with exercise & sleep!!

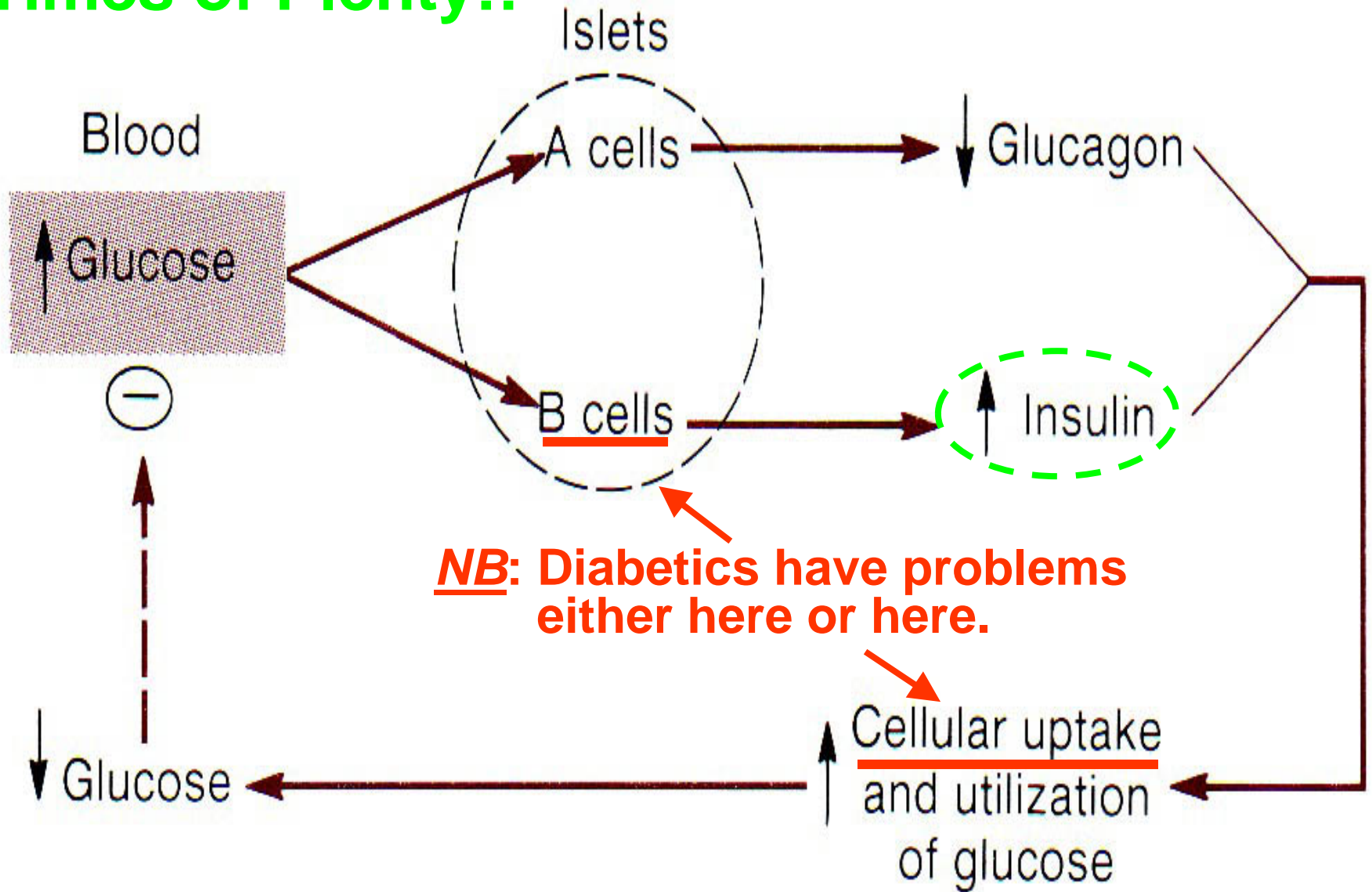


ng/ml = nanograms per milliliter

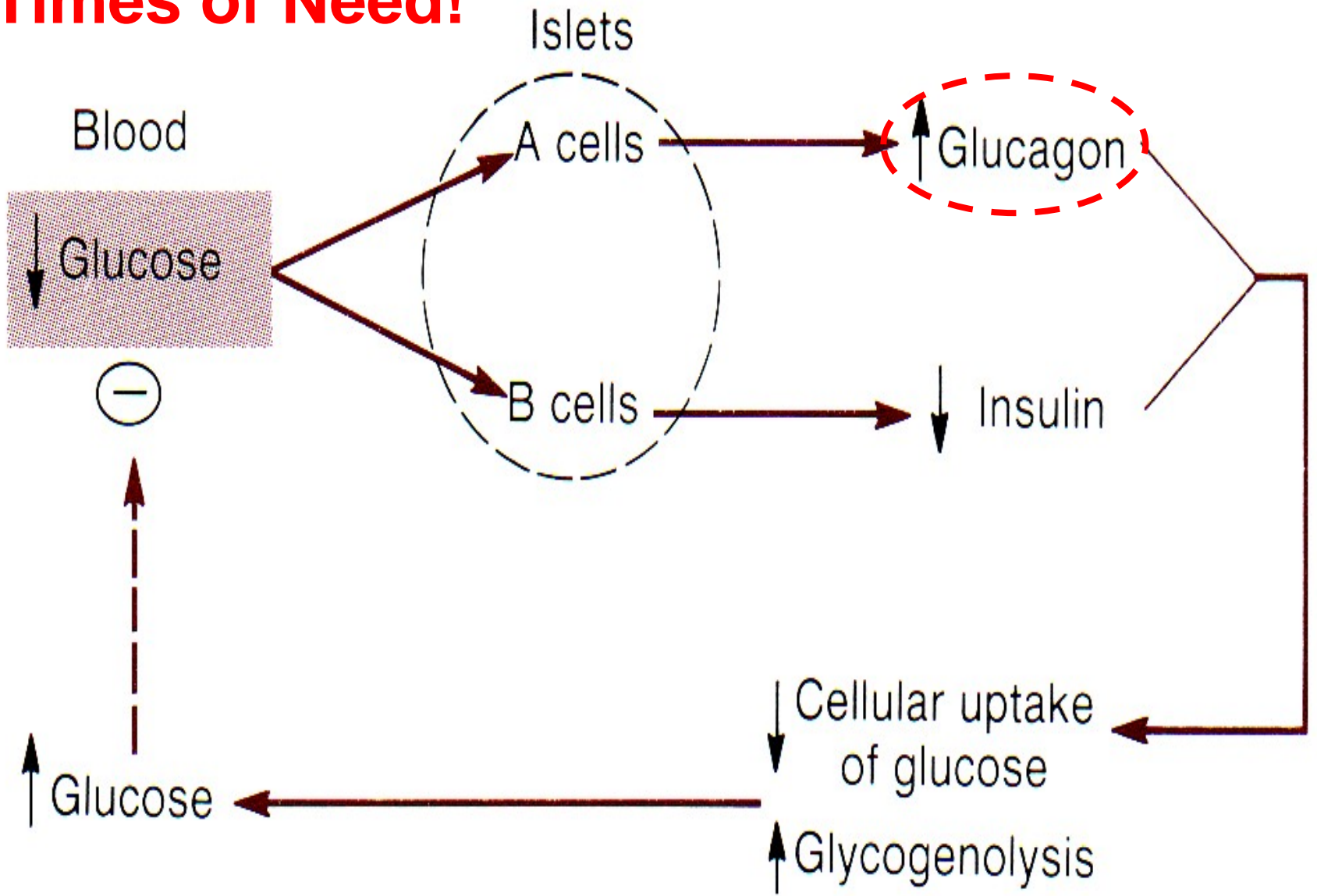
Endocrine Pancreas: Insulin (I) & Glucagon (G) See-Saw Hormones in Regulating Blood Glucose

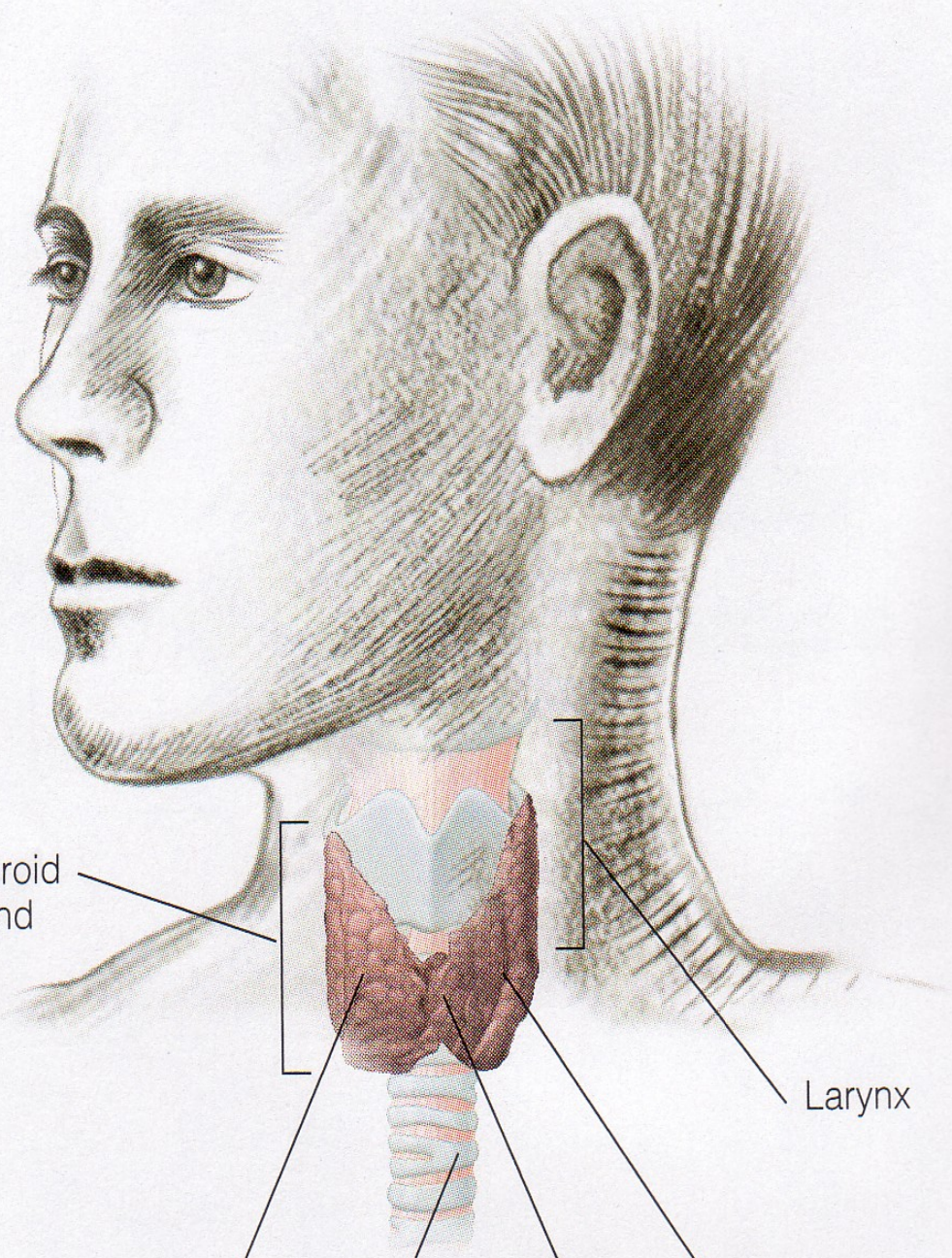


Times of Plenty!!



Times of Need!





Thyroid gland

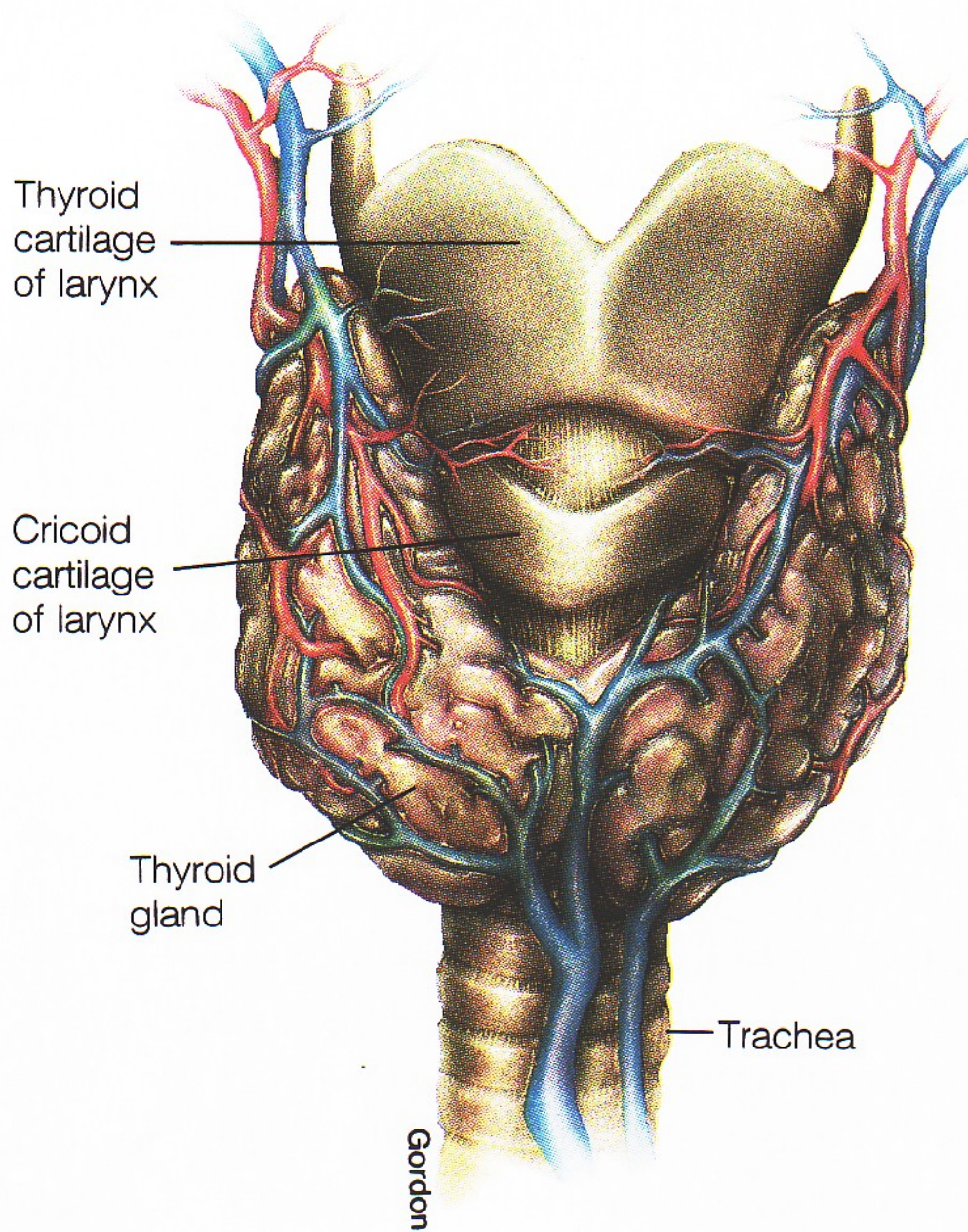
Larynx

Right lobe

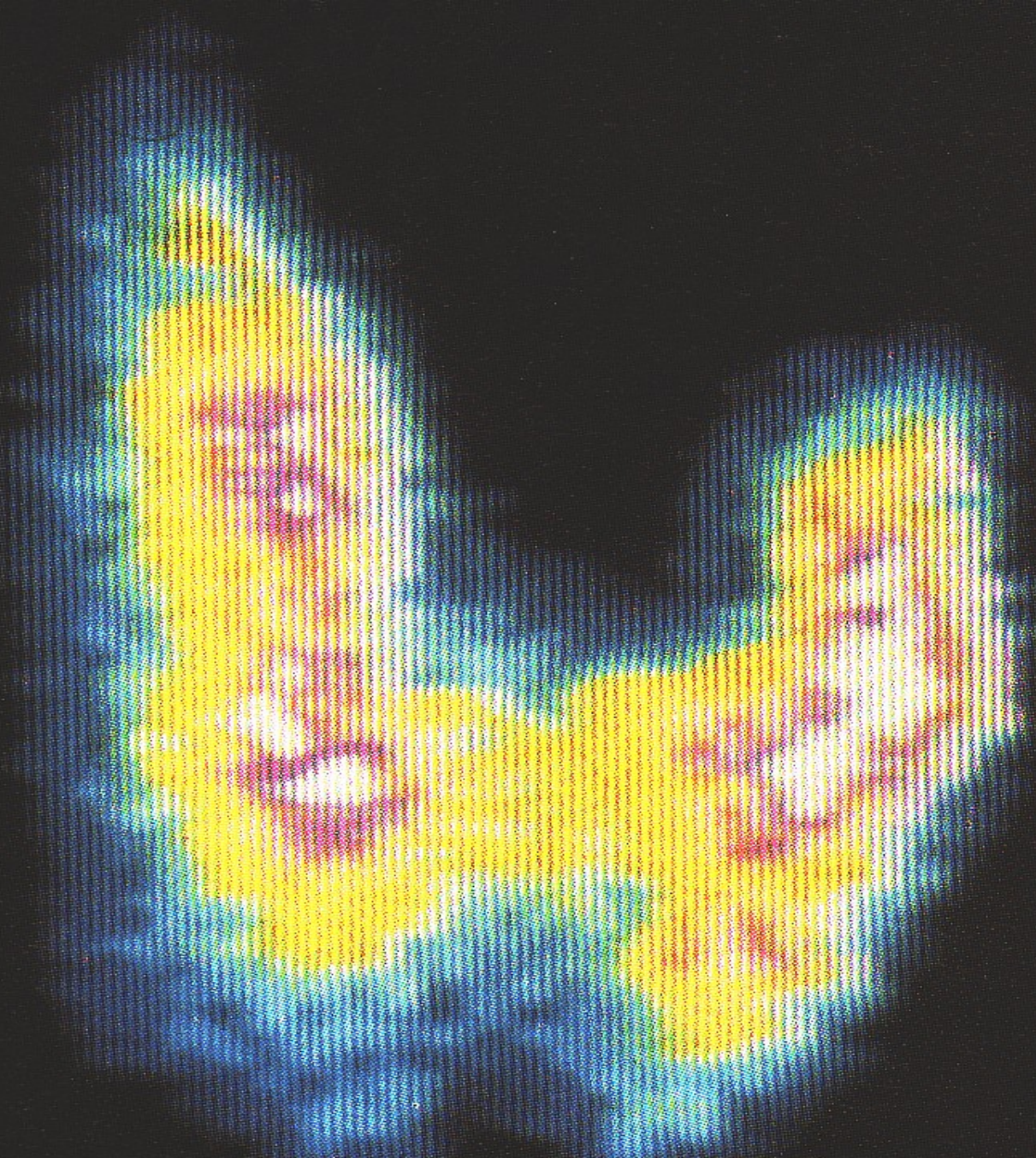
Trachea

Isthmus

Left lobe



(a)









Adrenal gland

Adrenal cortex

Adrenal
medulla

Kidney

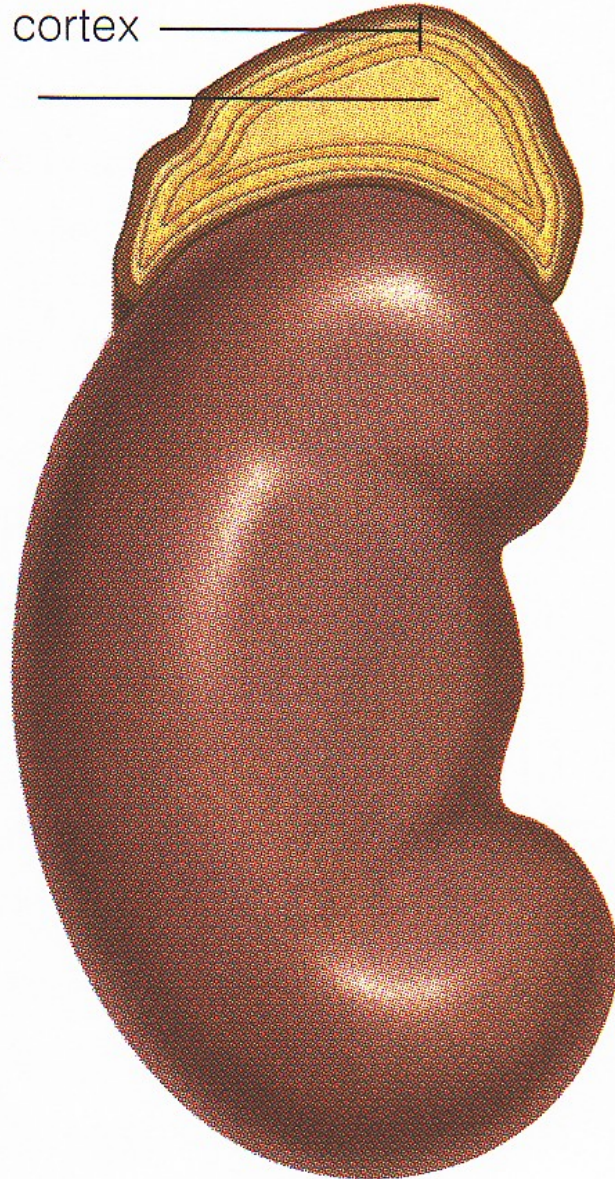


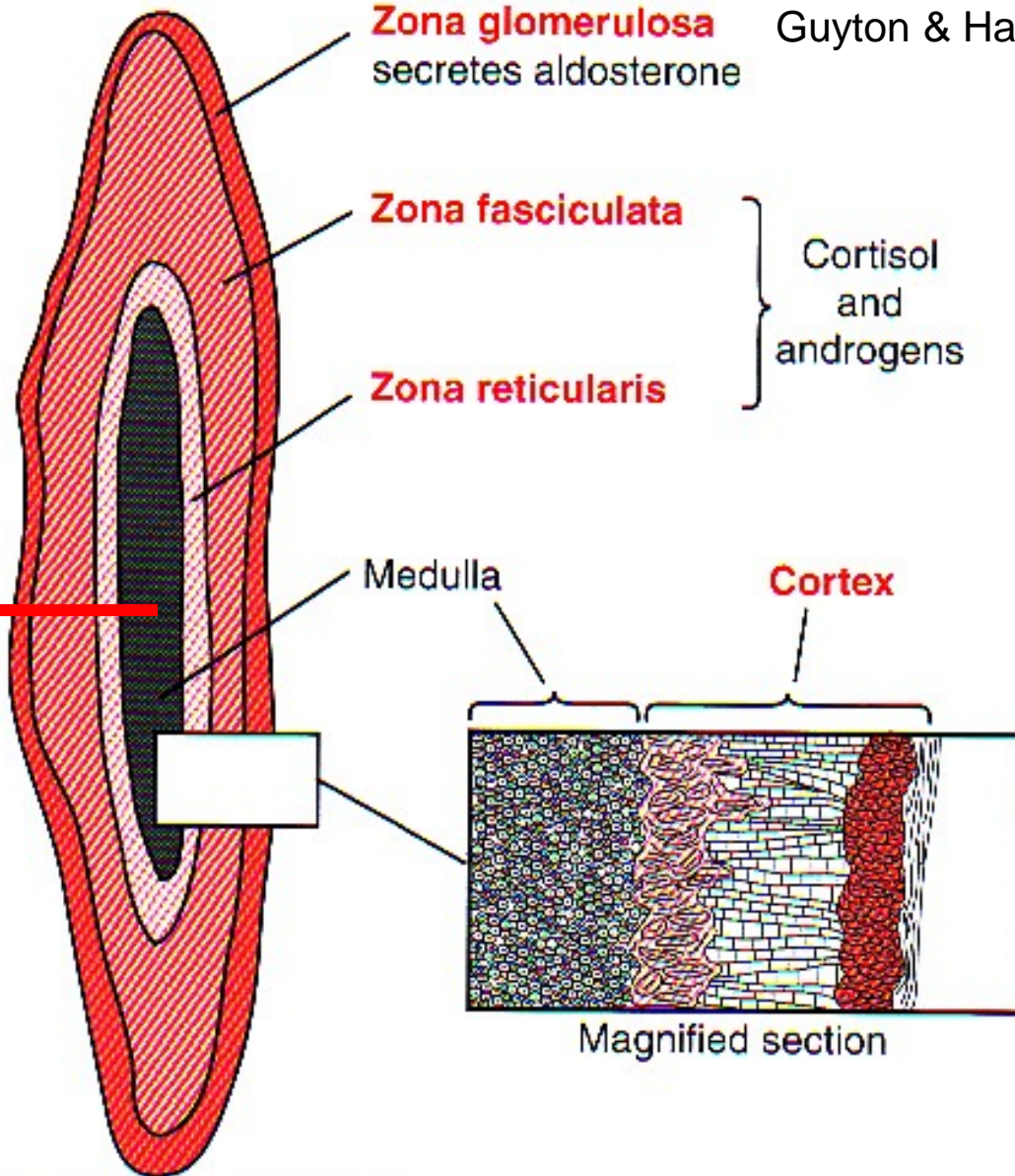
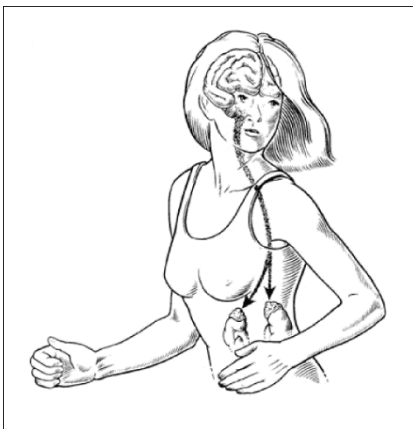
FIGURE 13-12

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.

BI 121!!



**Epinephrine
80%
Norepinephrine
20%**



Zona glomerulosa
secretes aldosterone

Guyton & Hall 2000

Zona fasciculata

Cortisol
and
androgens

Zona reticularis

Medulla

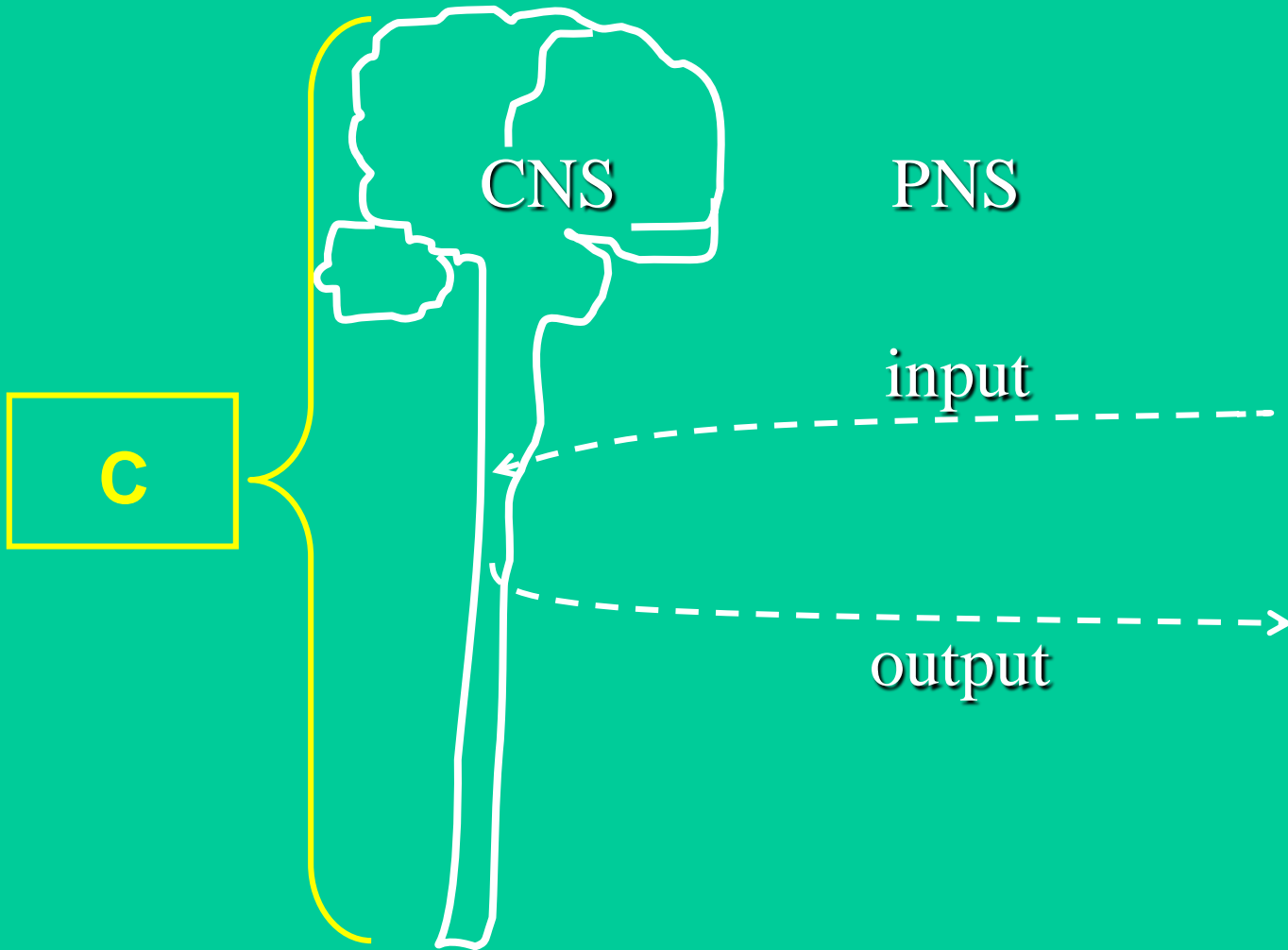
Cortex

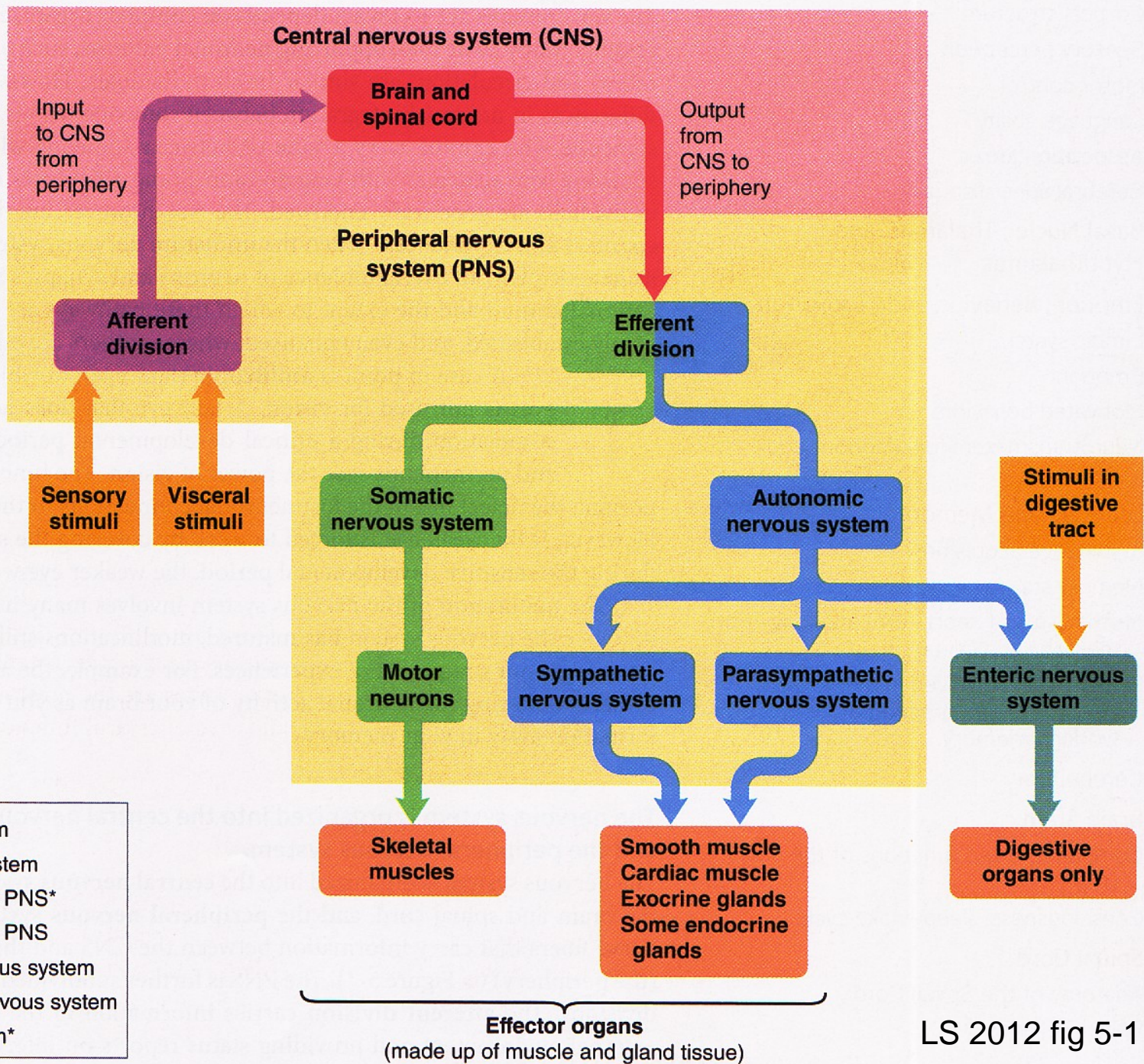
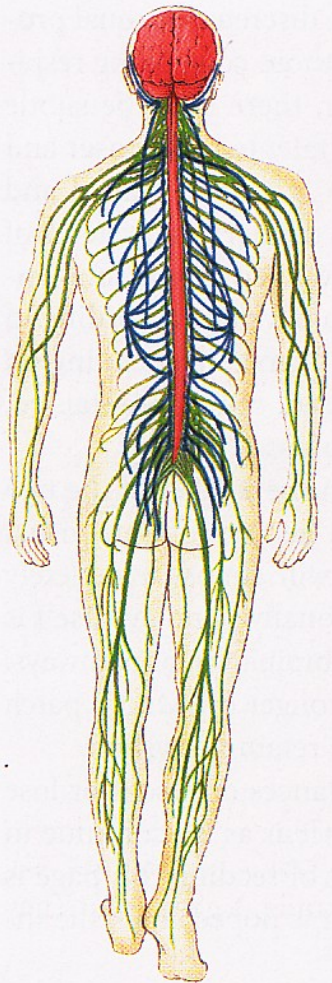
Magnified section

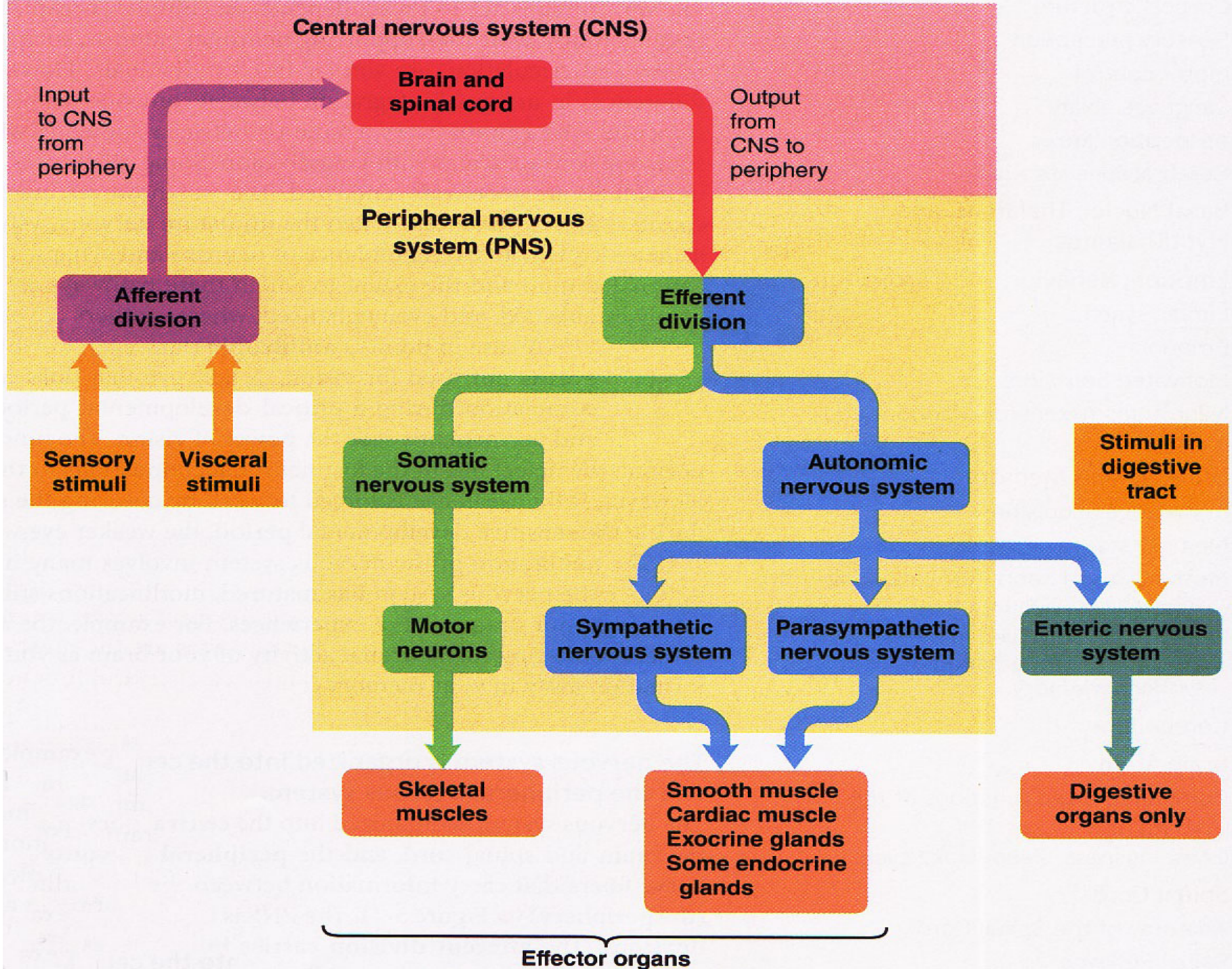
FIGURE 77 - 1

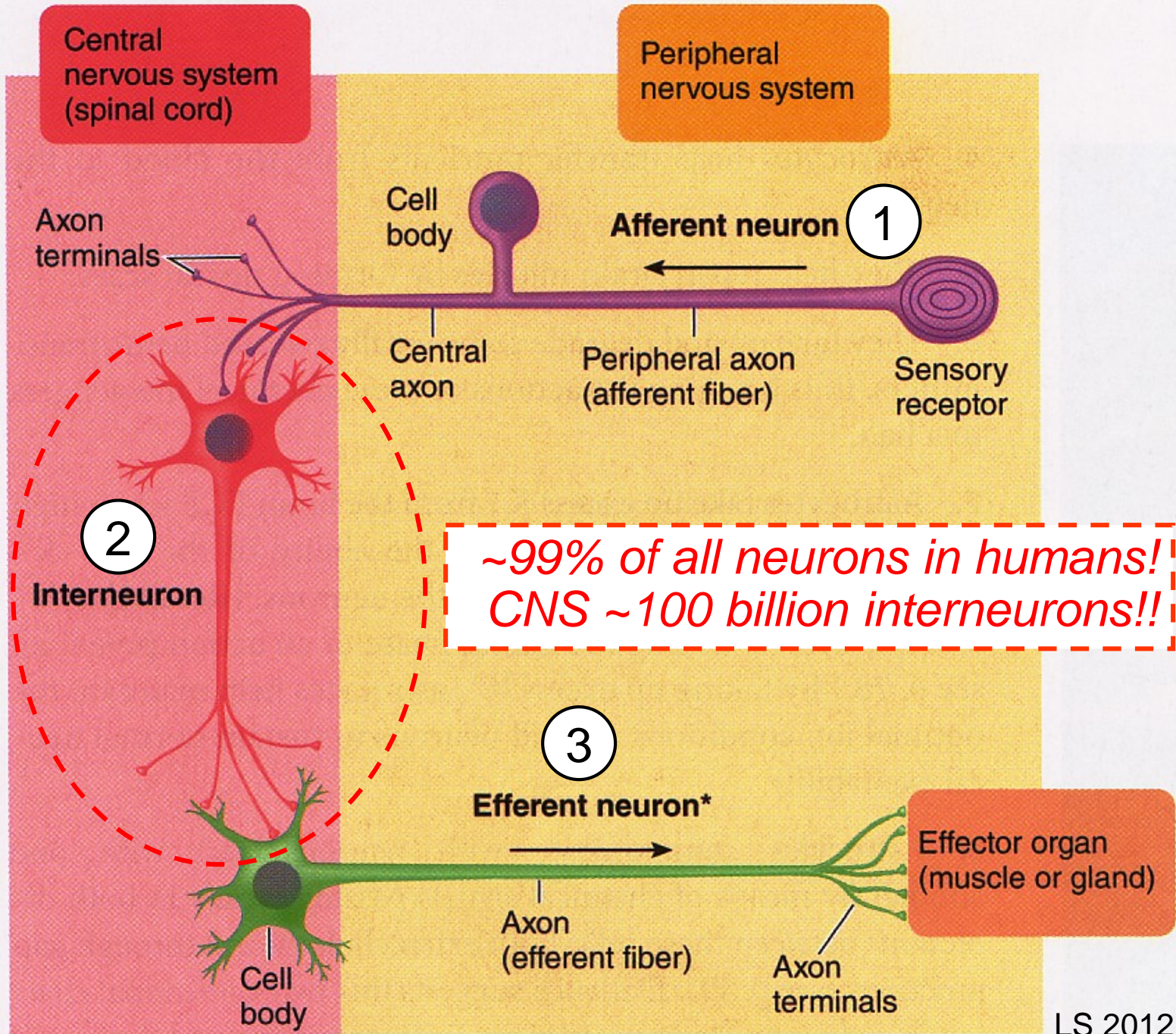
Secretion of adrenocortical hormones by the different zones of the adrenal cortex.

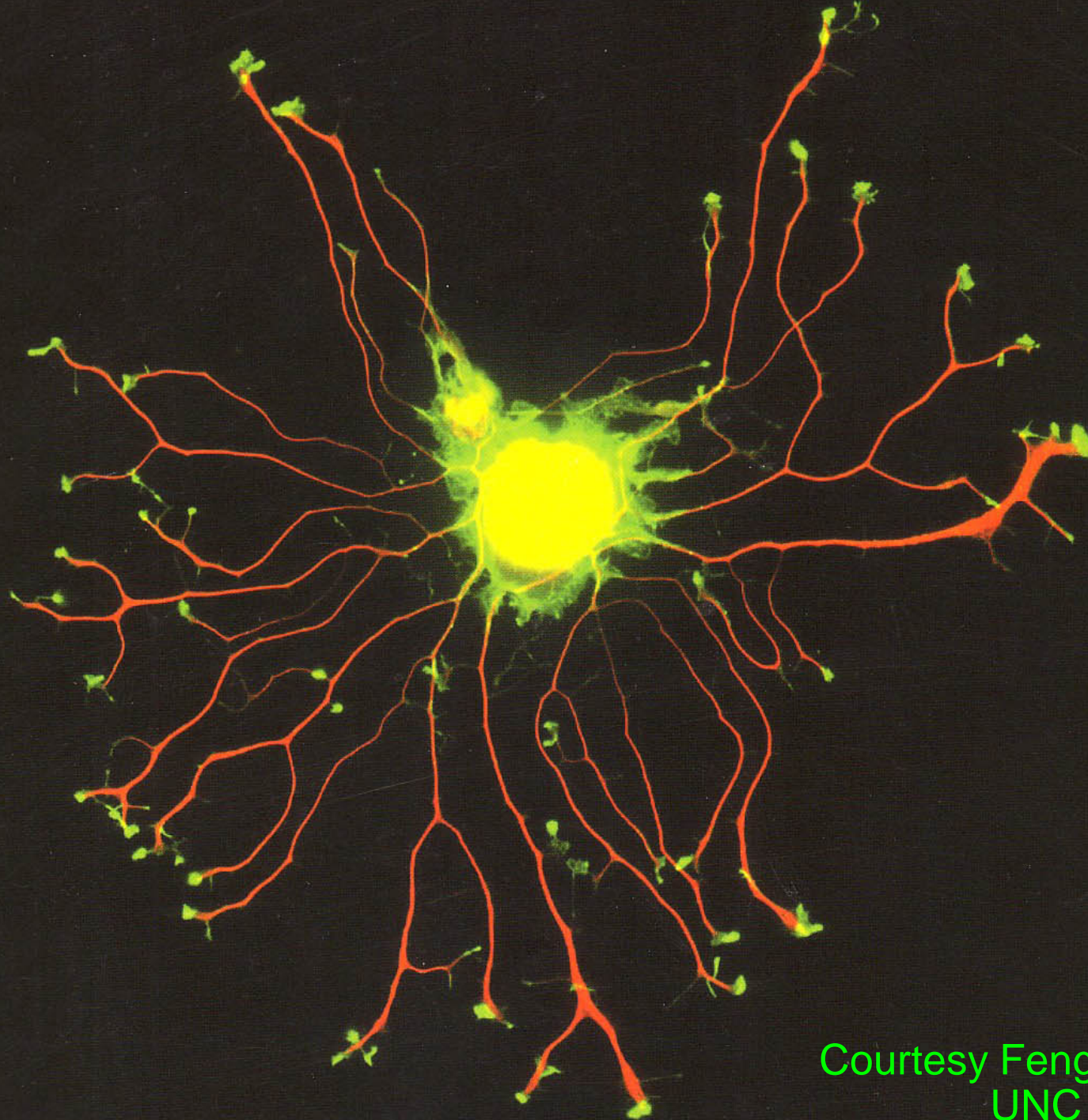
Nervous System



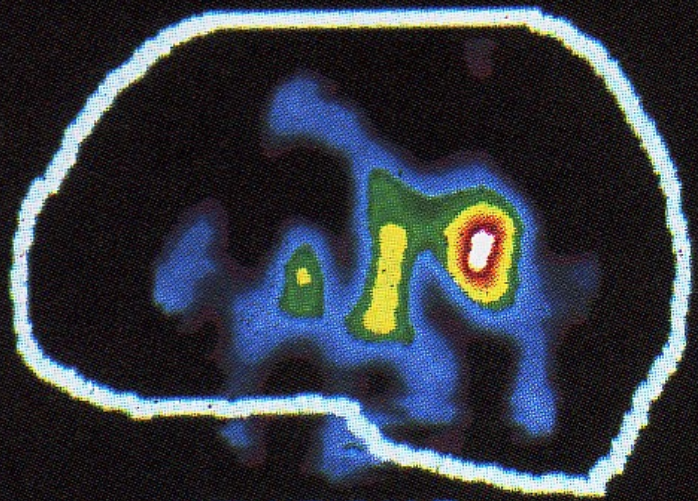




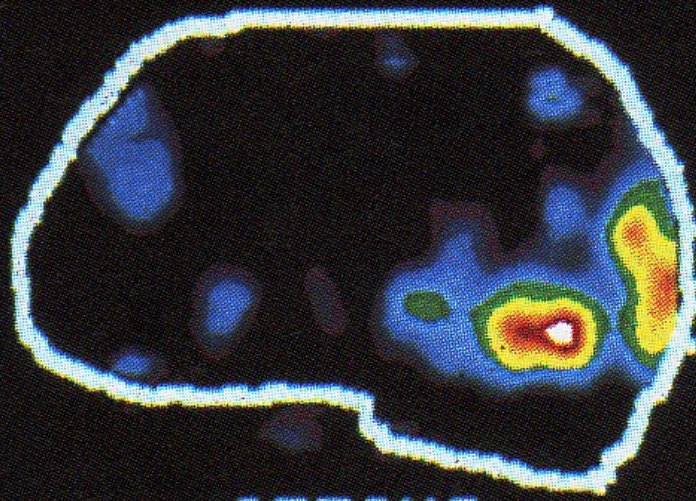




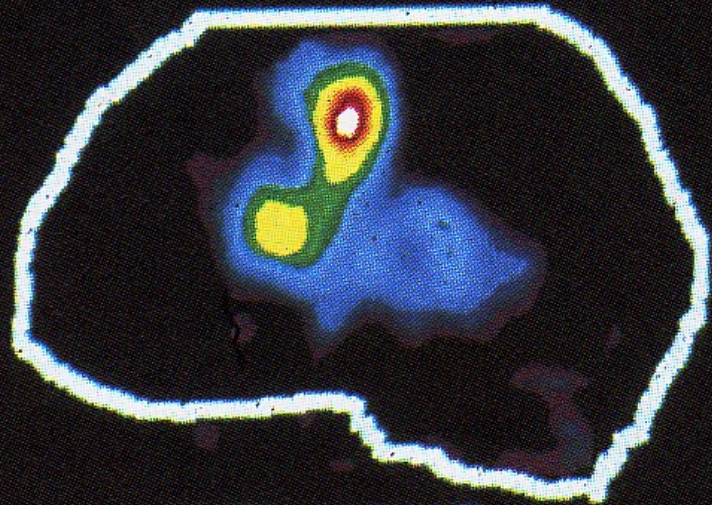
Courtesy Fengquan Zhou
UNC Chapel Hill



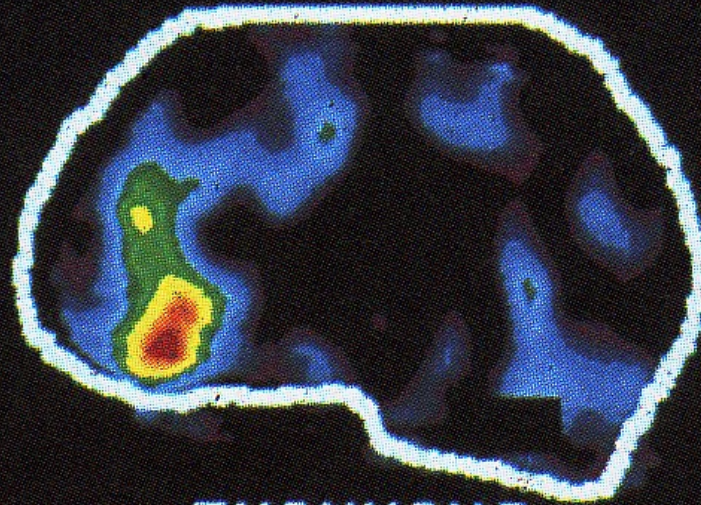
HEARING



SEEING

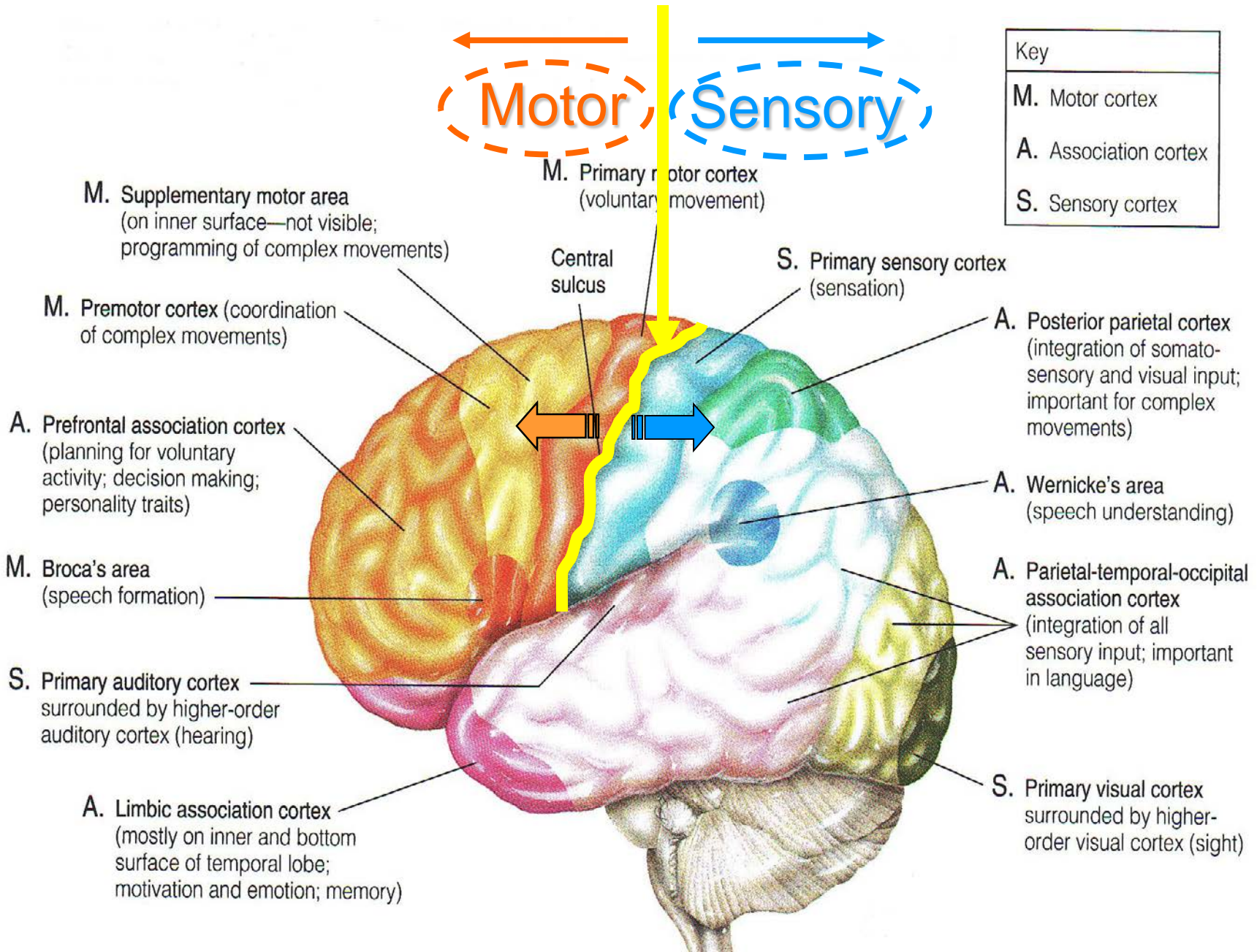


SPEAKING



THINKING







Helmets Cheap, Brains Expensive!! Use Your Head, Get a Helmet!!



<http://www-nrd.nhtsa.dot.gov/pubs/811156.pdf>

<http://www.bhsi.org/stats.htm>

~540,000 bicyclists/yr visit emergency rooms

67,000 head injuries, 1 in 8 brain injuries

716 cyclists died in 2008 \equiv 2% of all traffic fatalities

1/2 of deaths children < 15 yr

53,000 cyclists have died since 1932

that's more than the population of

Springfield, OR 52,864

Bend, OR 52,029

Corvallis, OR 49,322



Bicycle crashes & injuries are under reported,
since majority not serious enough for ER visits.

Helmets may prevent 45-88% of brain injuries!

~\$81 million/yr = direct injury costs from not using helmets!

The "typical" bicyclist killed on our roads is a sober male over 16 not wearing a helmet riding on a major road between intersections in an urban area on a summer evening when hit by a car. Please wear a helmet – it can make the difference between life and death.

