



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

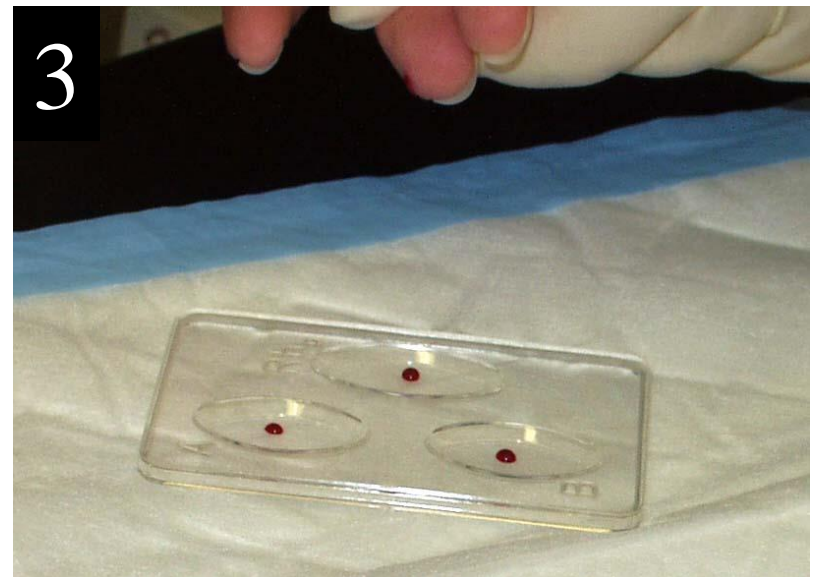
SAMPLE+TESTS



OBTAIN μ SAMPLE



BLOOD GLUCOSE



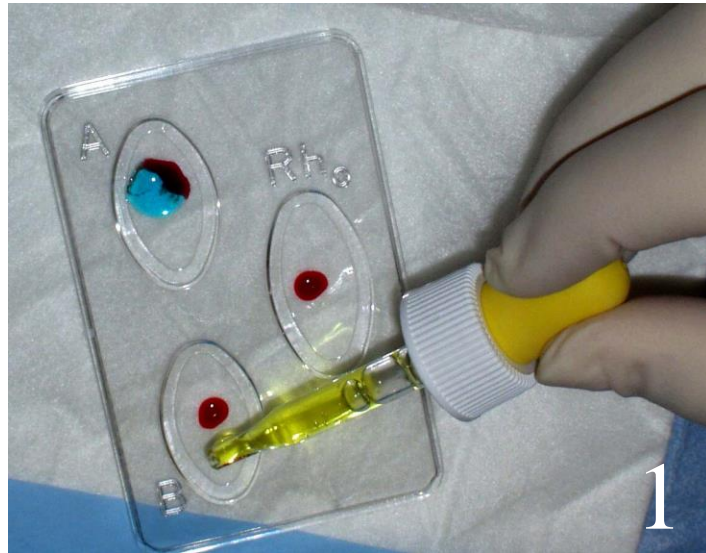
BLOOD TYPING

Glucose:
Sugar in Blood

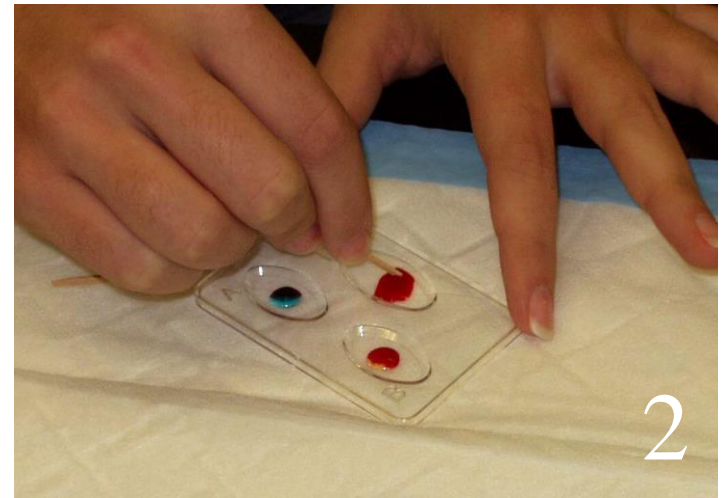


Normal: 70-99
Pre-Diabetes: 100-125
Diabetes: ≥ 126 mg/dL

BLOOD TYPING



ADD ANTISERA



MIX W/TOOTHPICKS

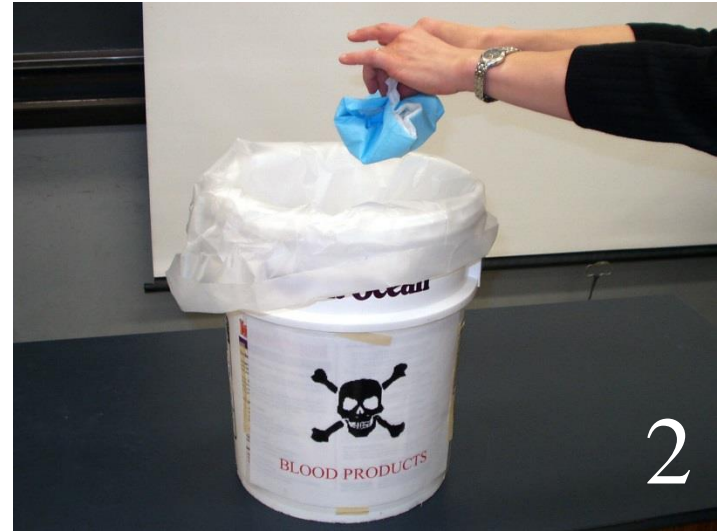


READ & RECORD!!

CLEAN-UP!



FOLD DIAPER



BLOOD PRODUCTS

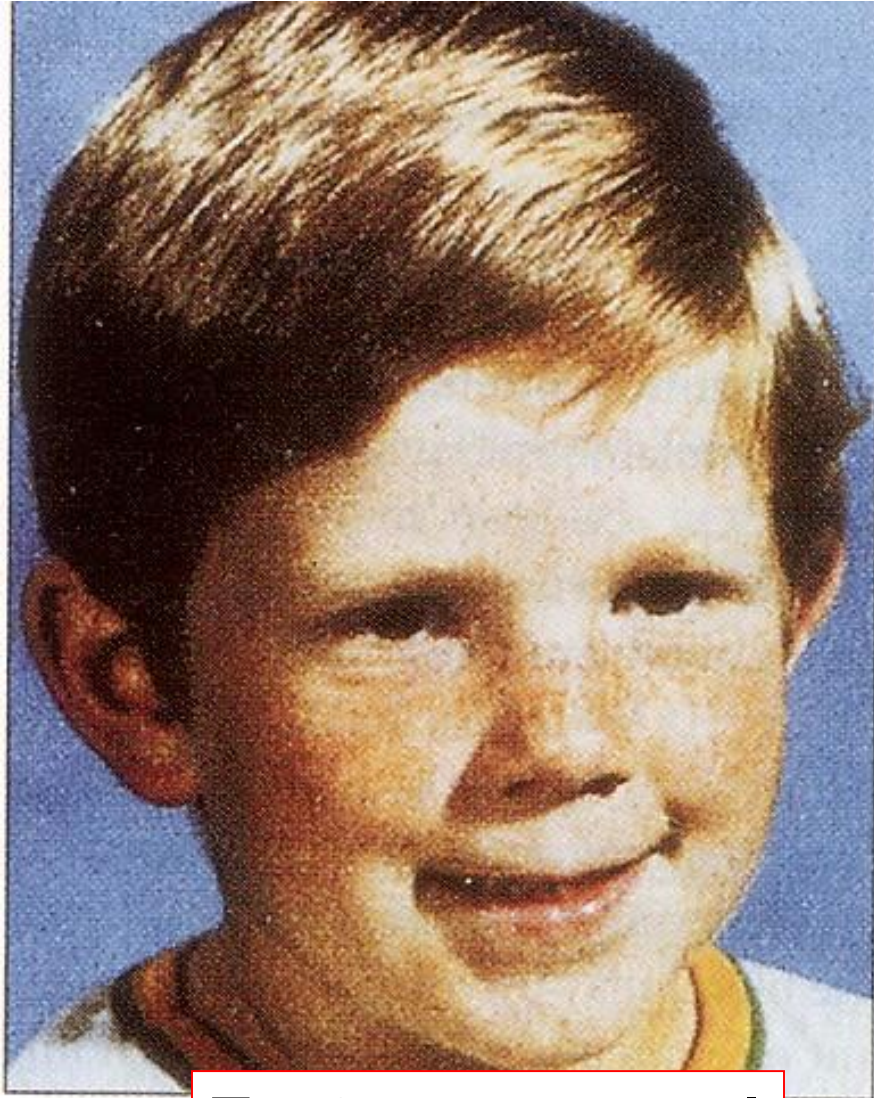


REWASH!!

Blood Chem Lab Q?



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



T = 0, near normal

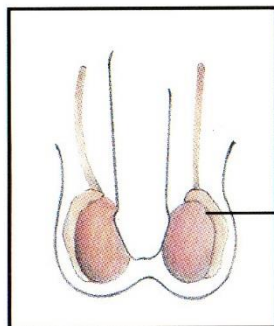


T = 4 months later

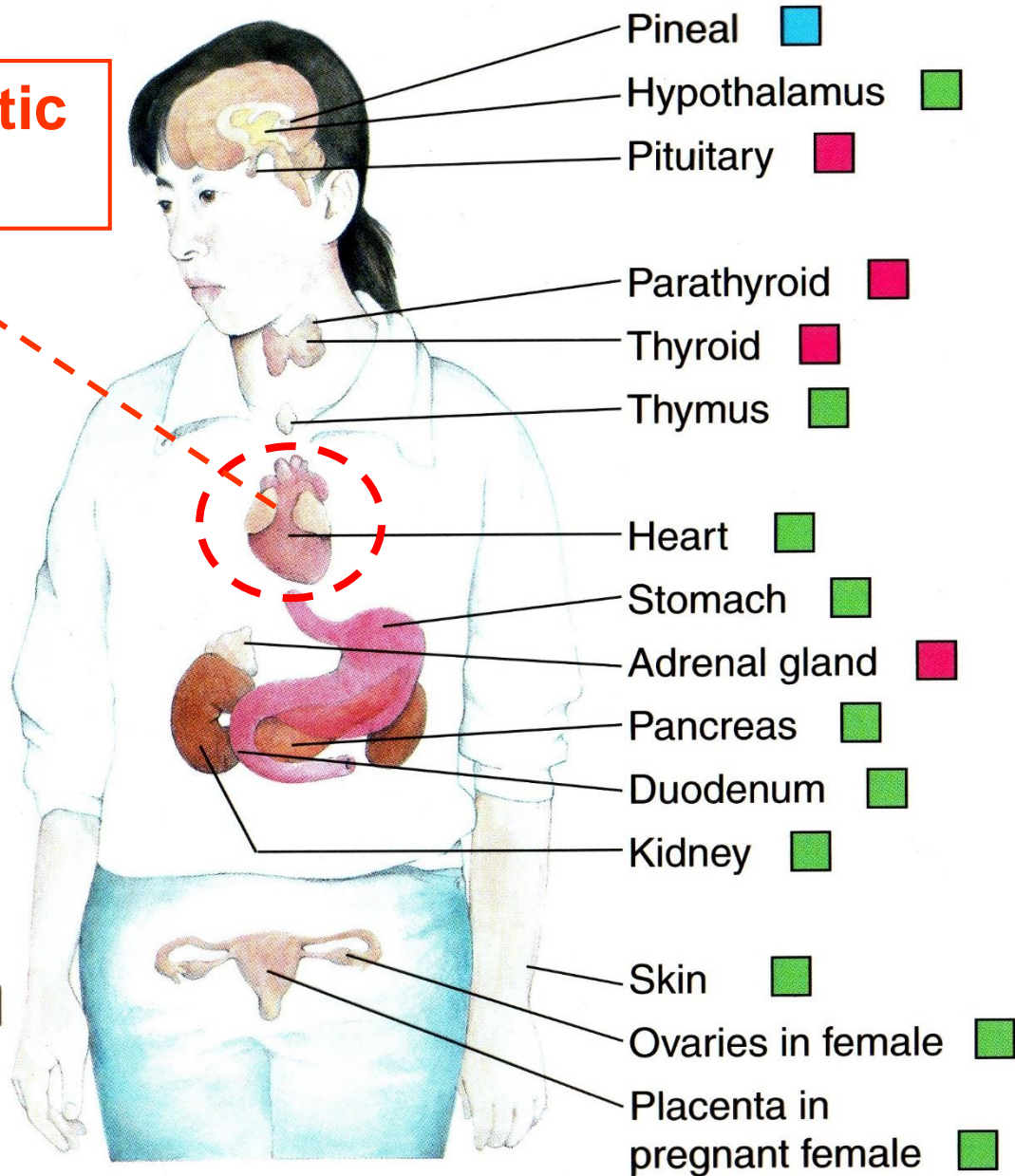
Endocrine System

ANP = Atrial Natriuretic Polypeptide

- Solely endocrine function
- Mixed function
- Complete function uncertain



Testes in male ■



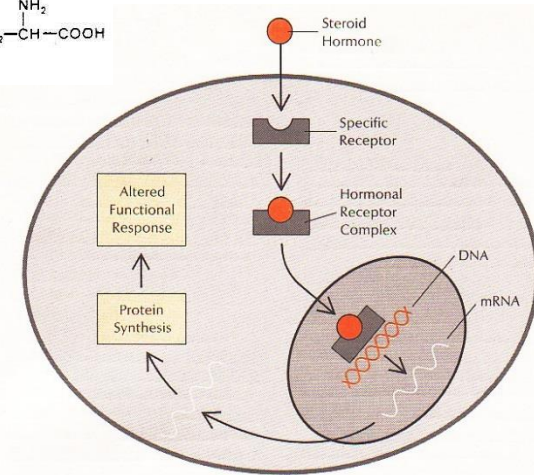
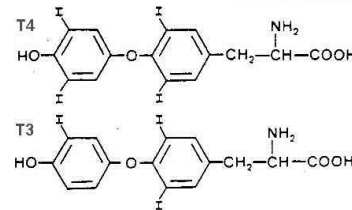
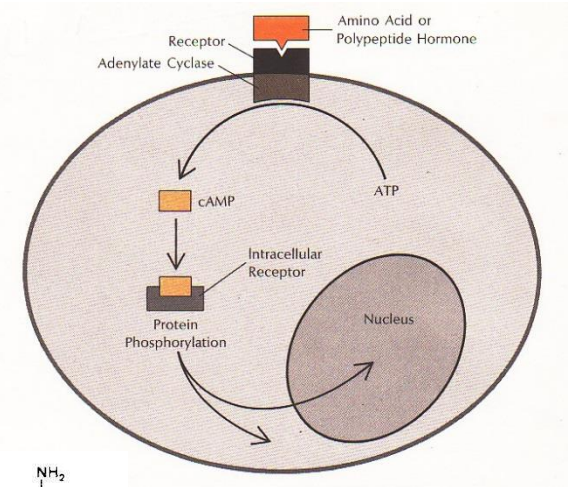
- Pineal ■
- Hypothalamus ■
- Pituitary ■
- Parathyroid ■
- Thyroid ■
- Thymus ■
- Heart ■
- Stomach ■
- Adrenal gland ■
- Pancreas ■
- Duodenum ■
- Kidney ■
- Skin ■
- Ovaries in female ■
- Placenta in pregnant female ■

Hormone/Endocrine Classifications

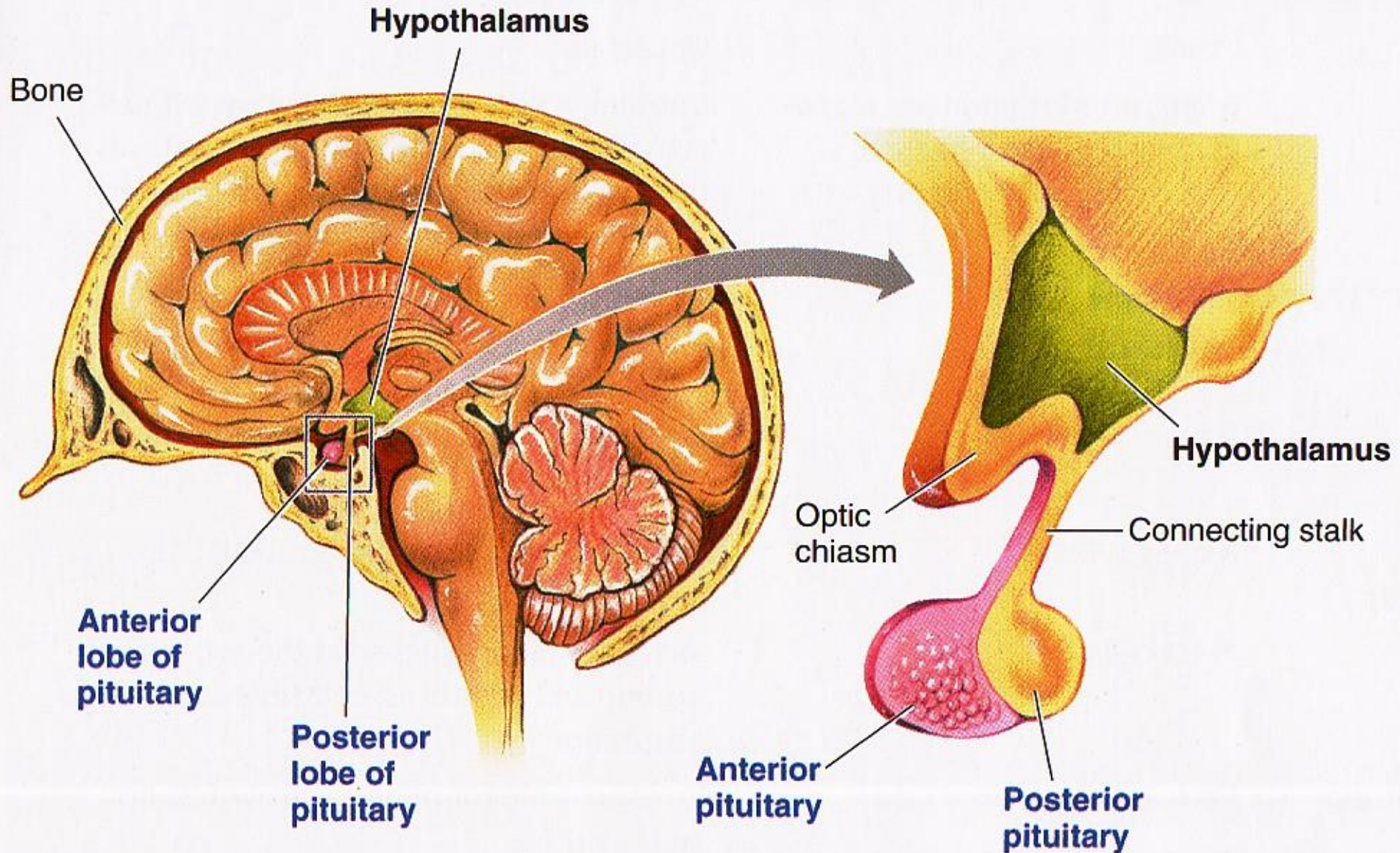
Exogenous



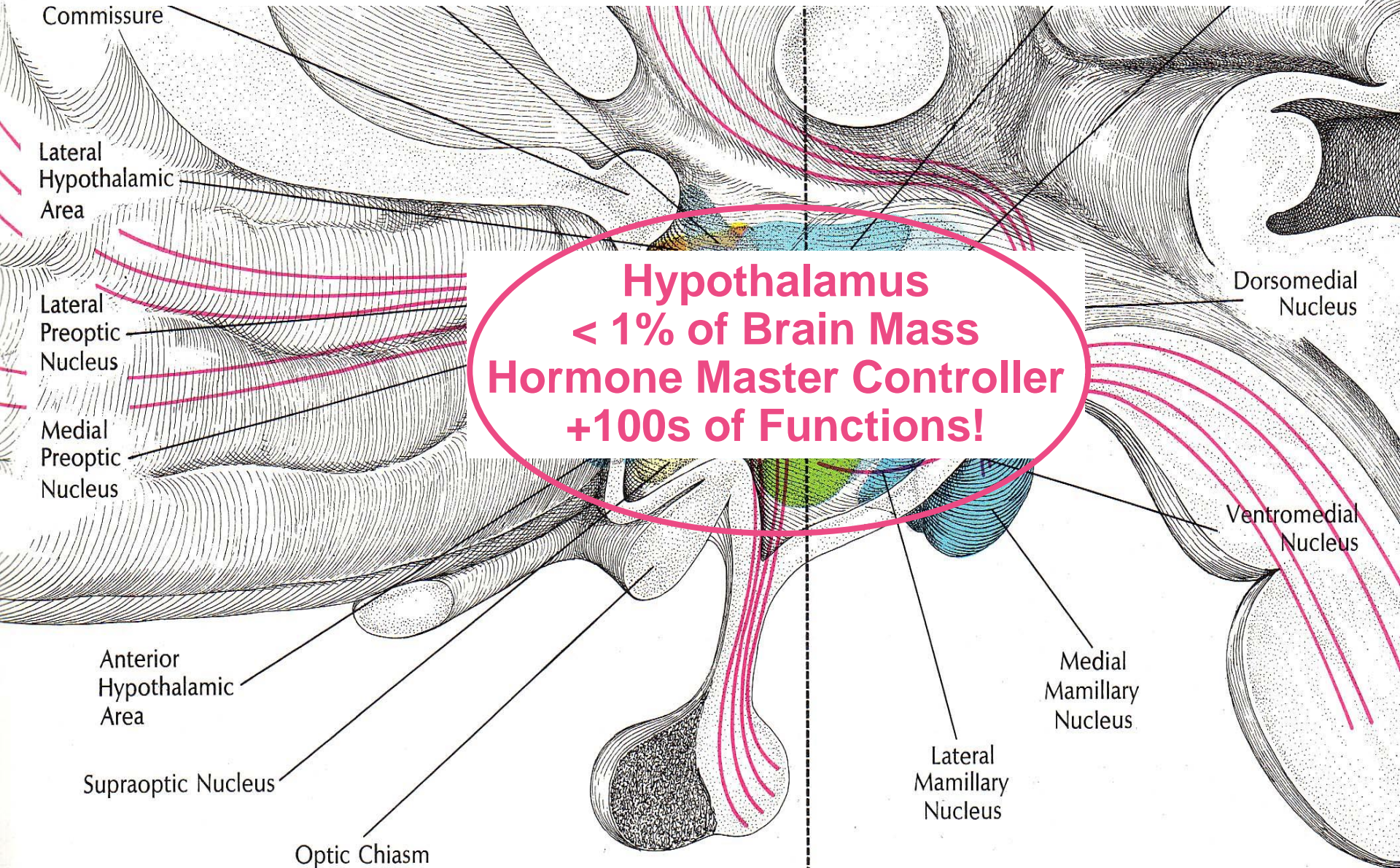
Endogenous

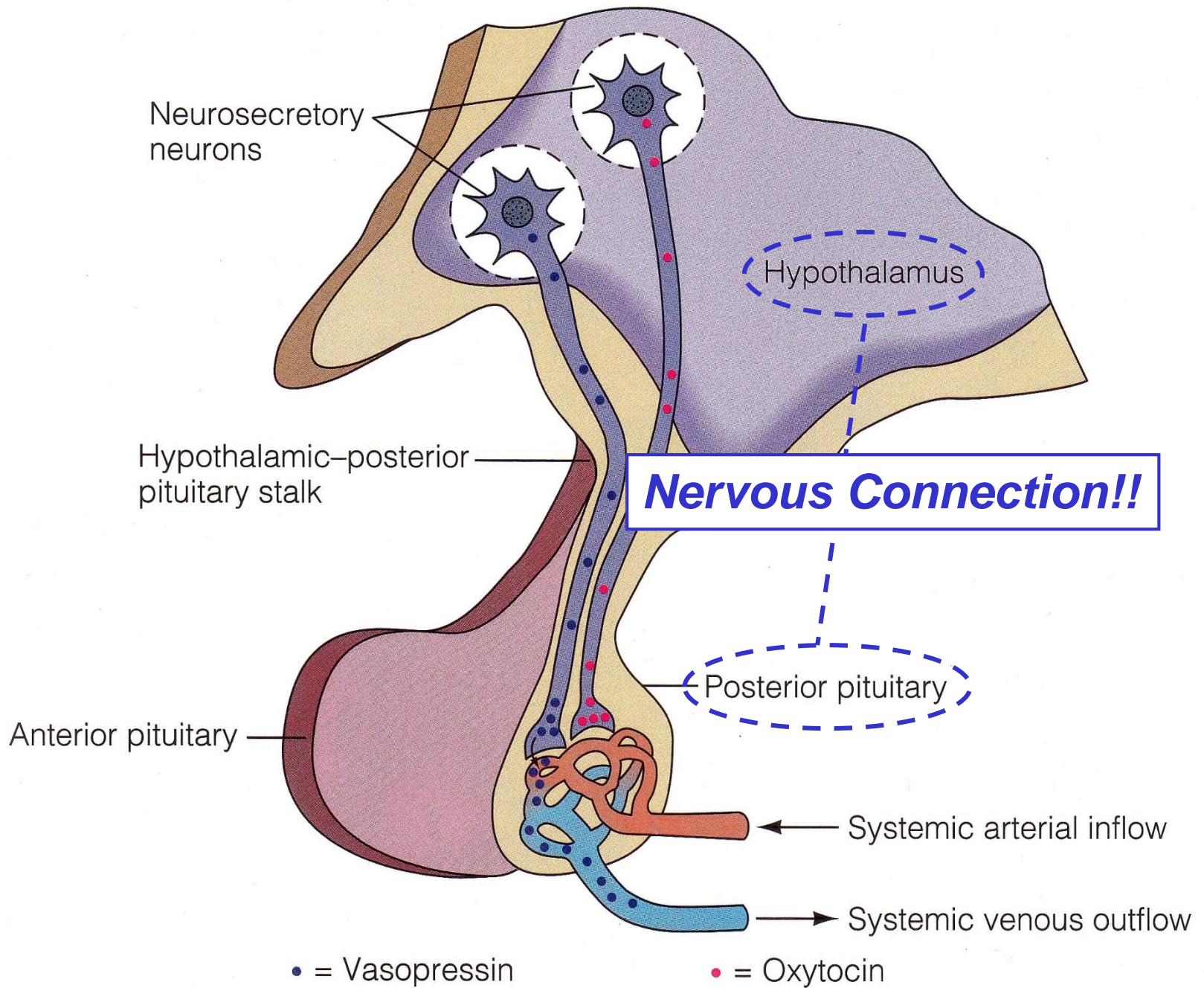


Hypothalamus & Pituitary: Intimate Relationship



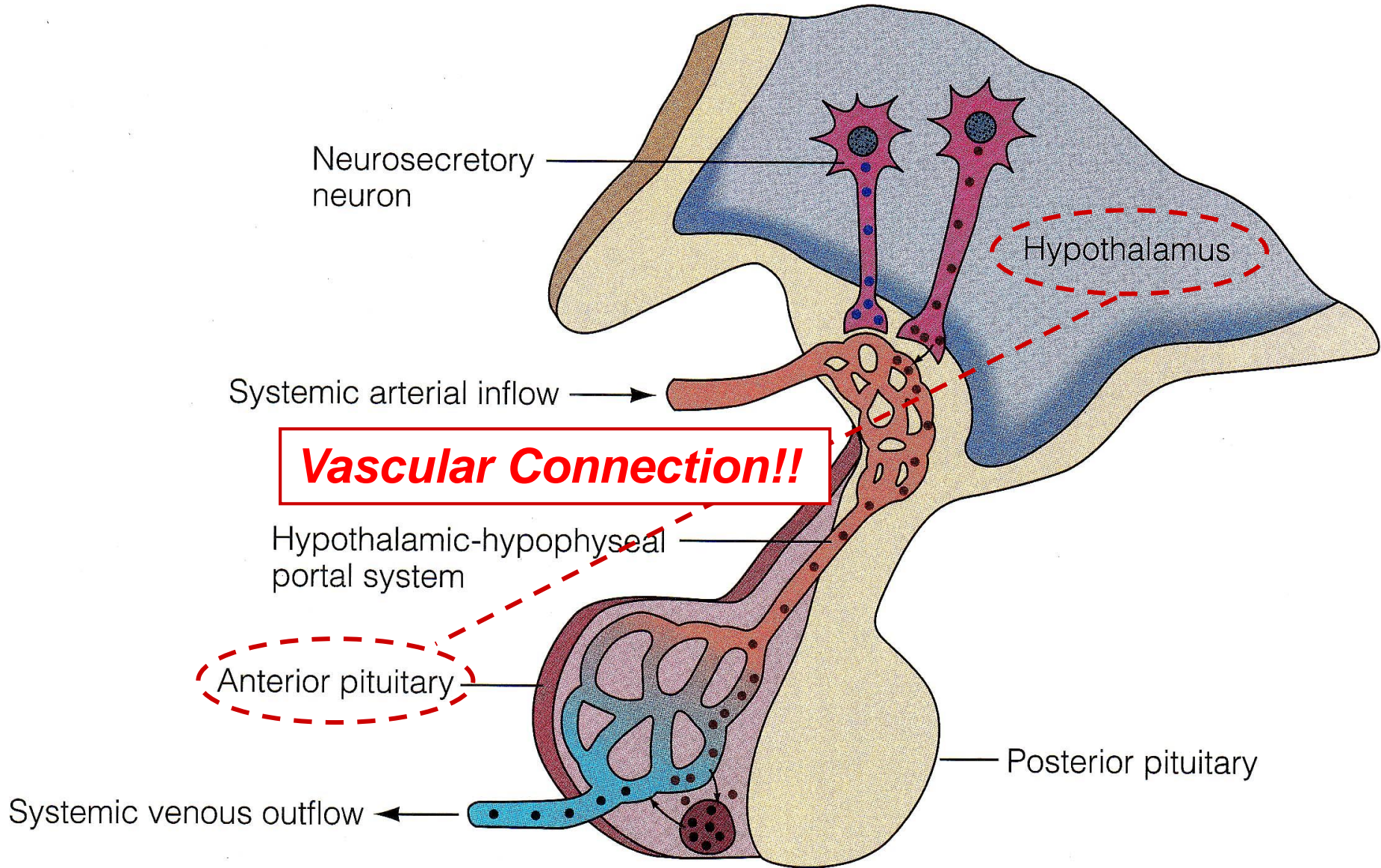
Good Things Come in Small Packages!





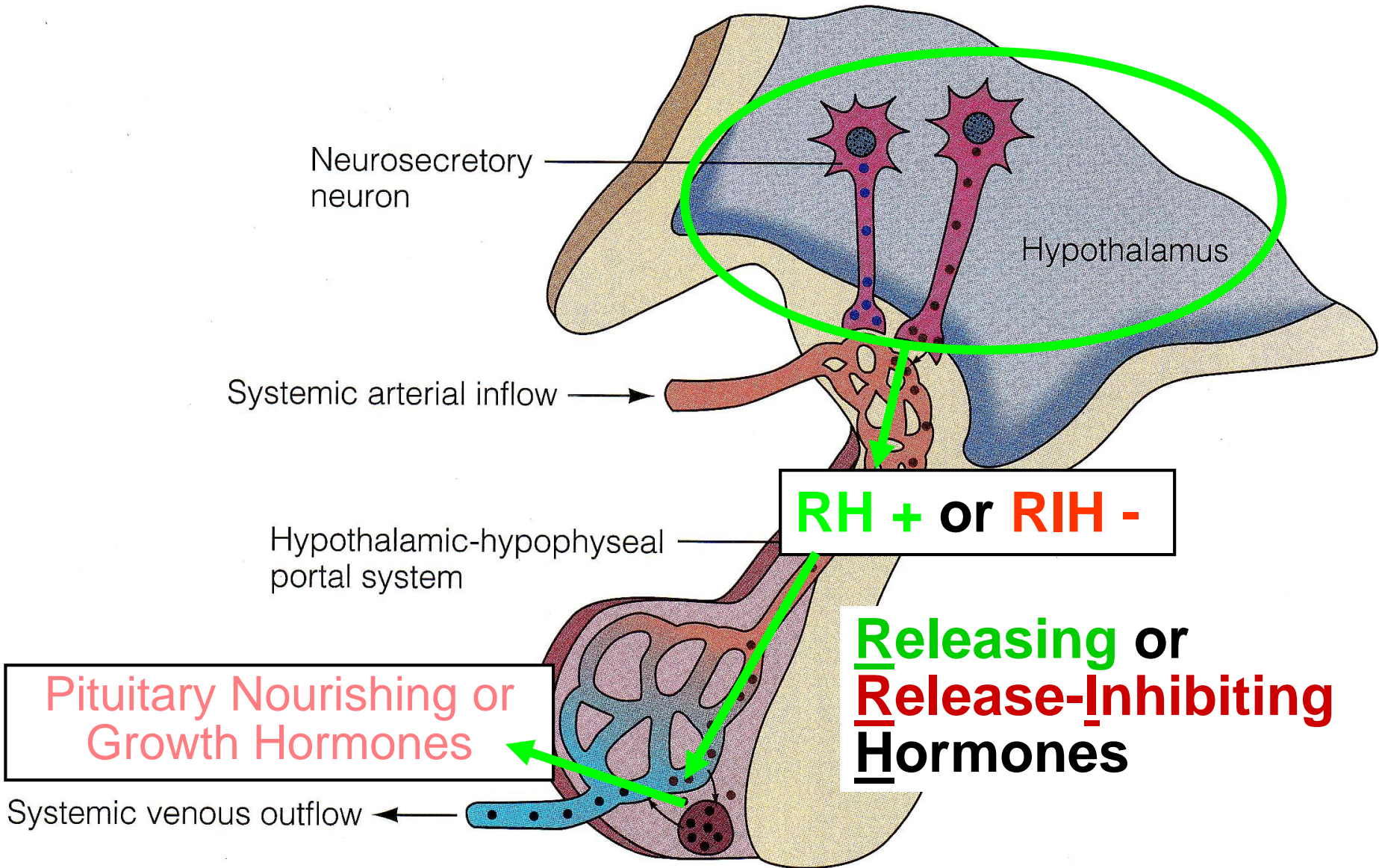
Nervous Connection!!

Hypothalamus-Anterior Pituitary Vascular Connection!



• = Hypophysiotropic hormones

• = Anterior pituitary hormone

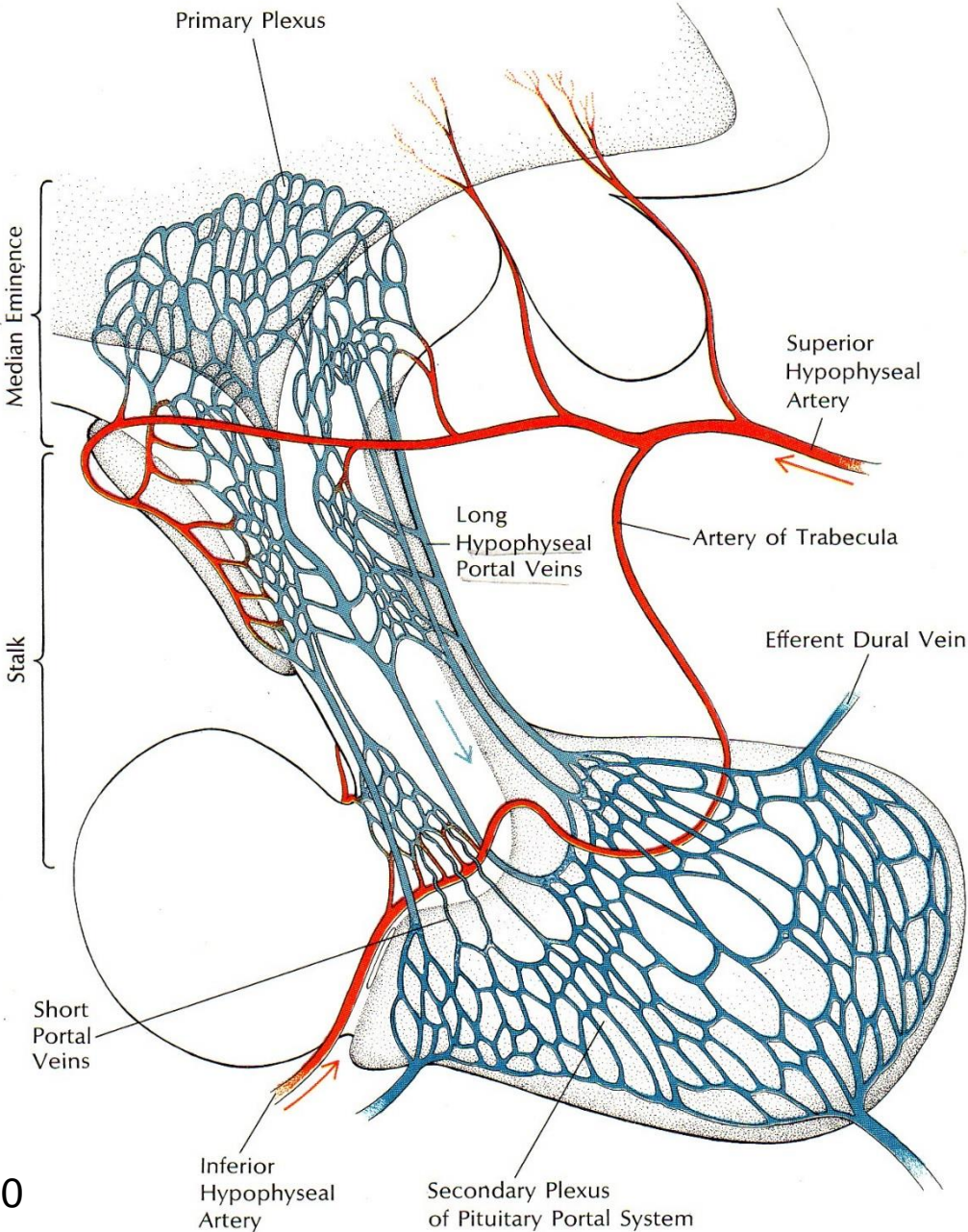


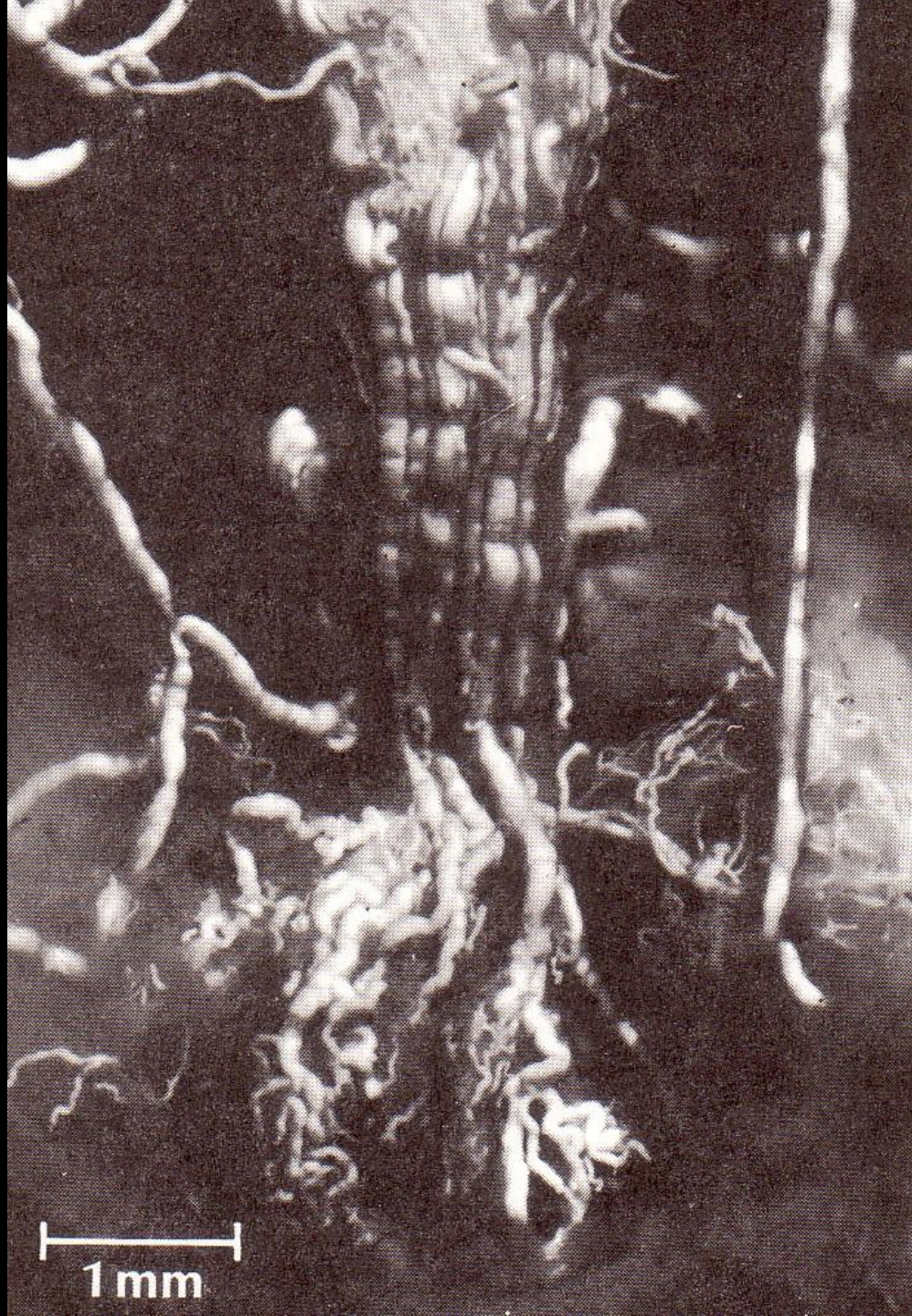
• • = Hypophysiotropic hormones

• = Anterior pituitary hormone

Hypophysis ≡ Pituitary

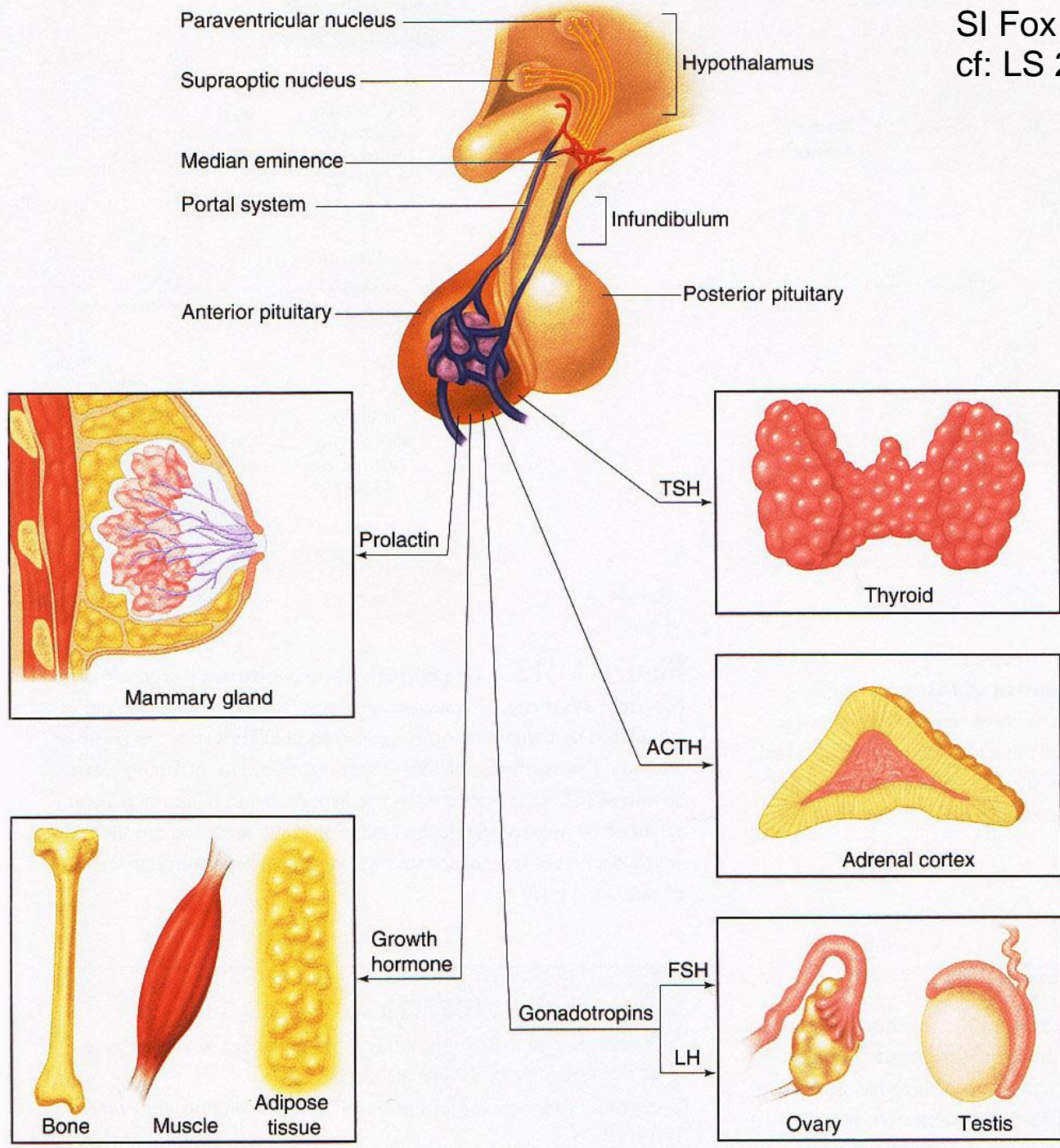
Capillary-Venule-Capillary Intimate Circulation

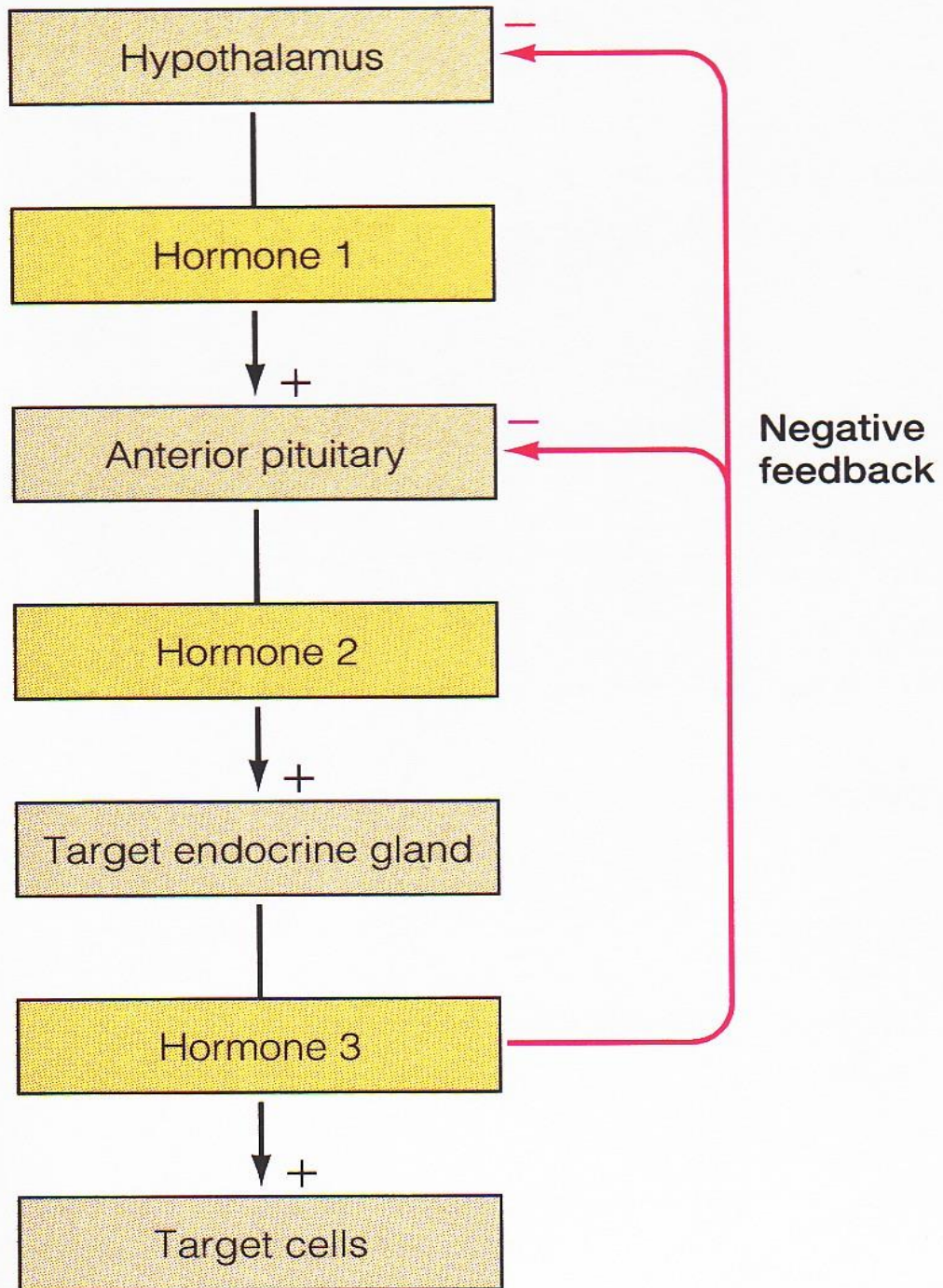




Krieger & Hughes 1980

1 mm



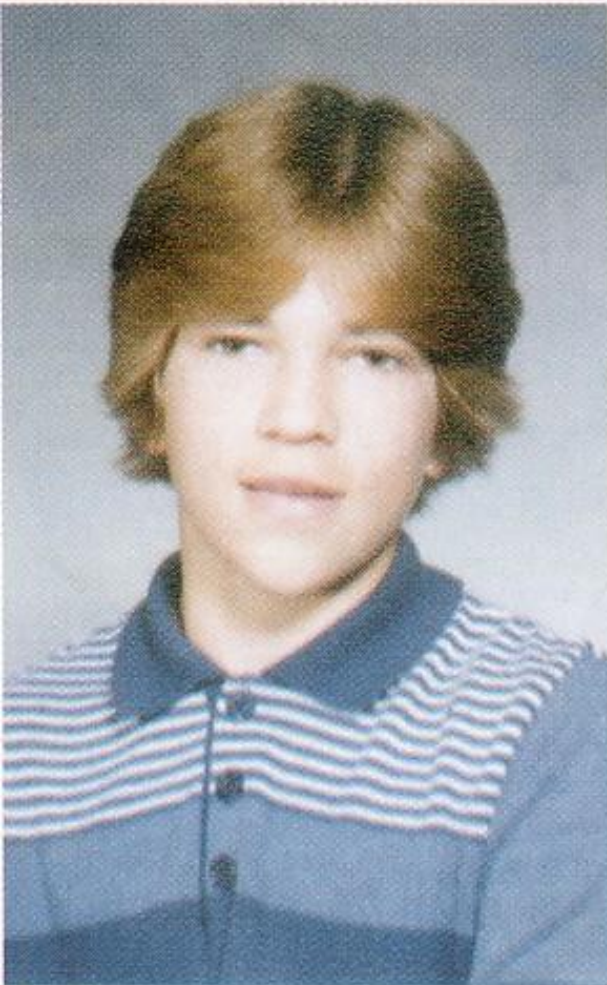




LS 2006, cf: LS 2012
fig 17-10

Progression & Development of Acromegaly

Age 13

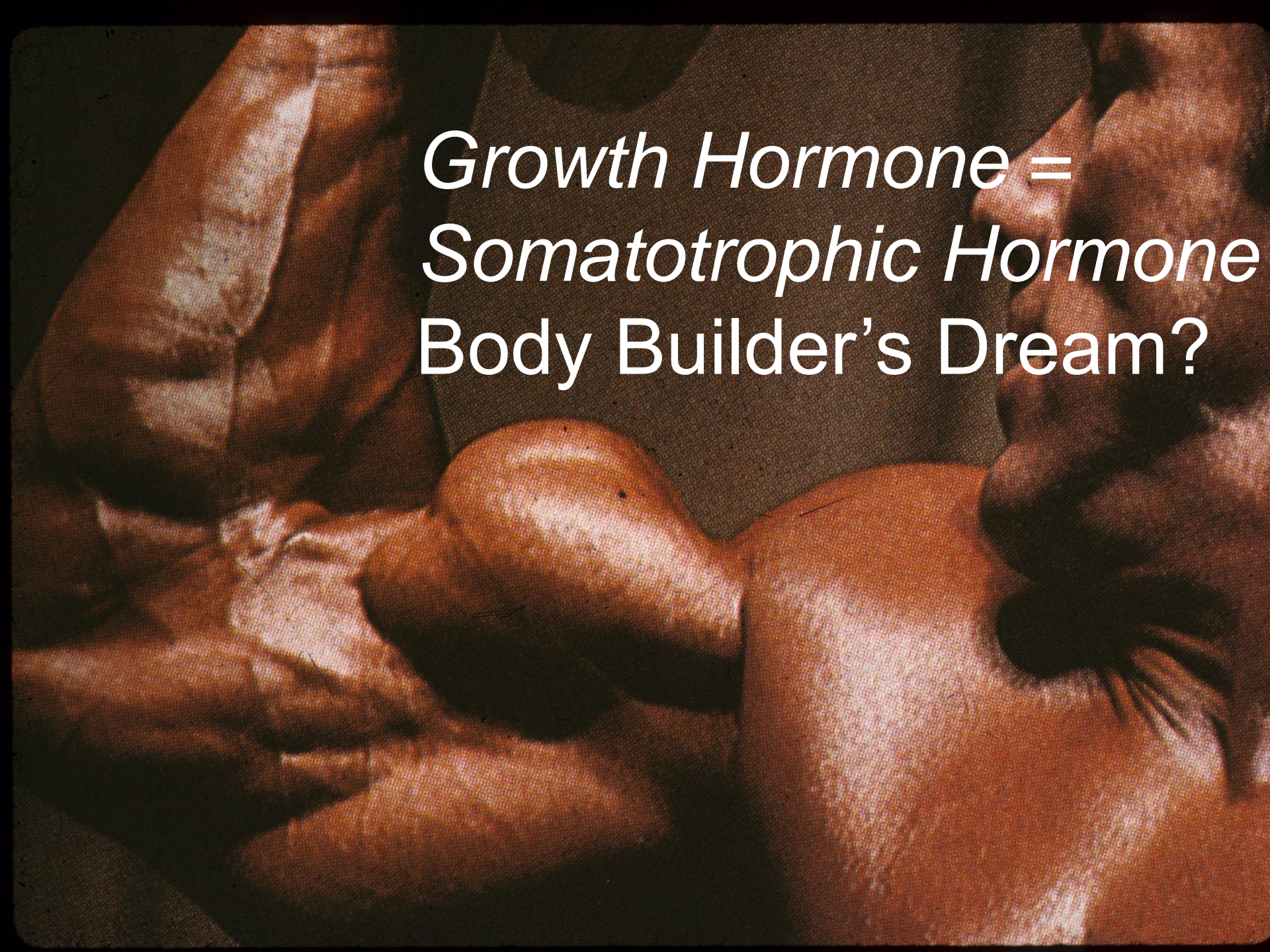


Age 21



Age 35





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

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

↑ Amino Acid uptake & Protein synthesis

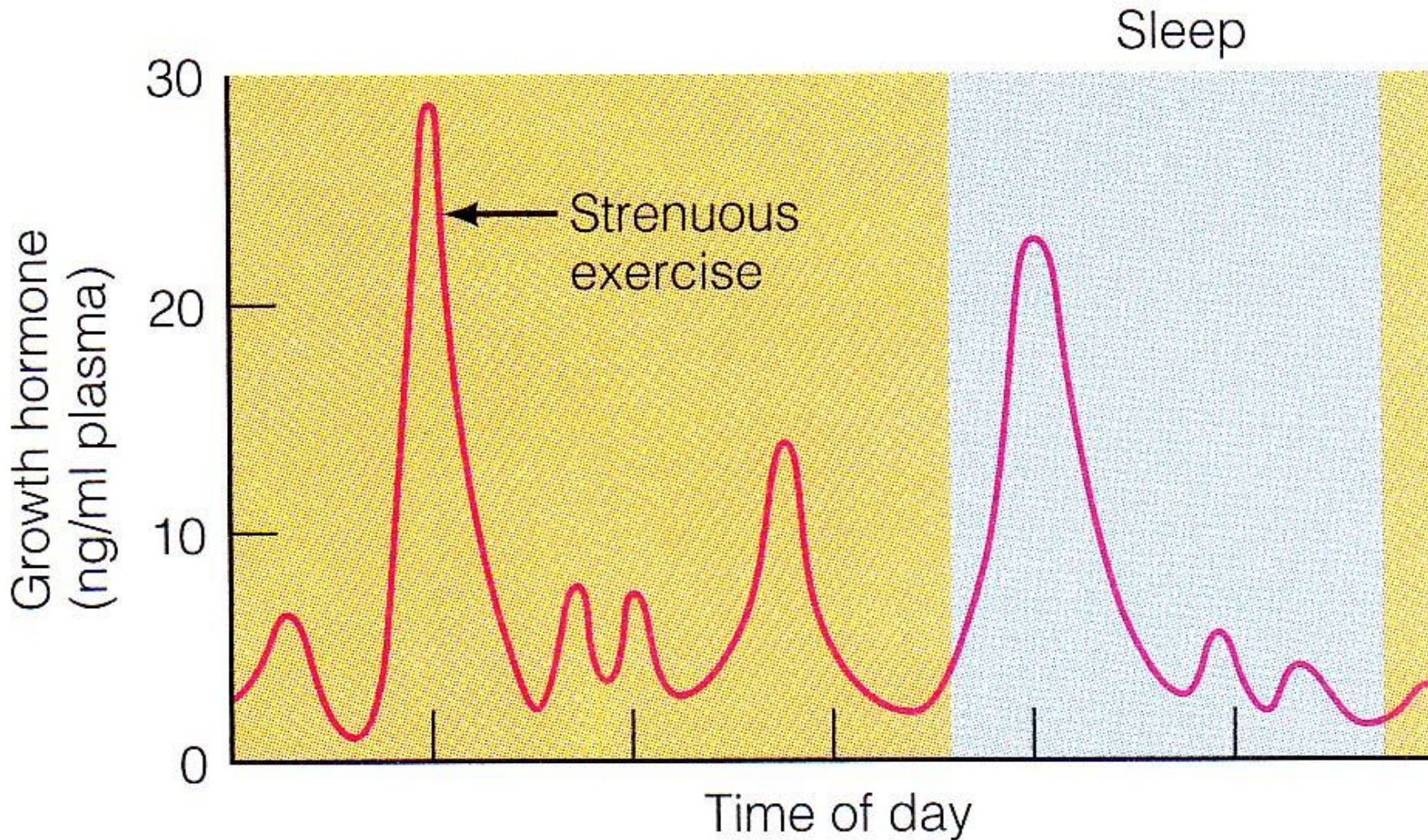
↑ Lipolysis & Fatty Acid mobilization

↓ Glucose uptake
(skeletal muscle & adipocytes)

↑ Glucose production
(liver glycogenolysis)

↑ Insulin secretion

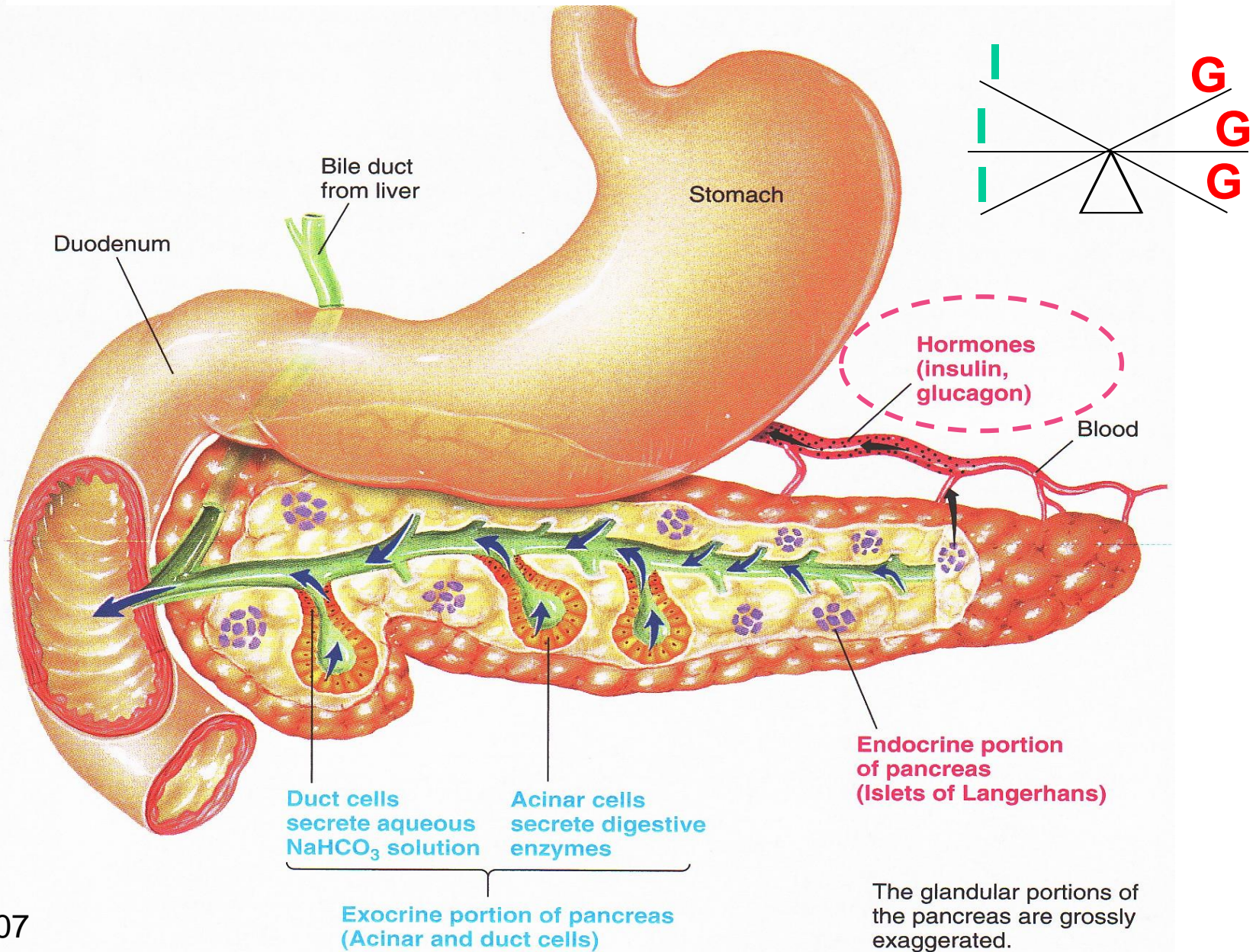
Increase GH naturally with exercise & sleep!!



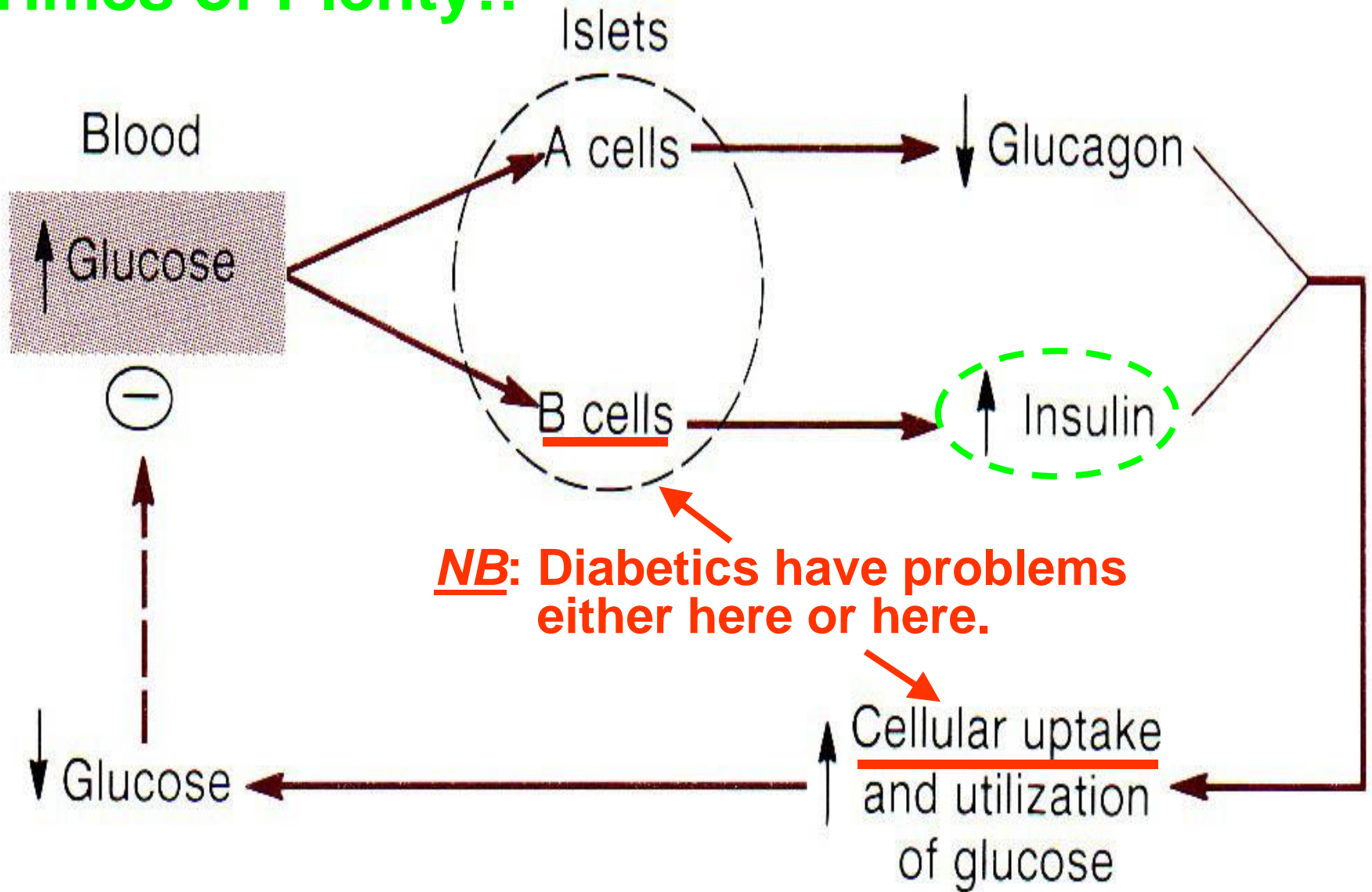
ng/ml = nanograms per milliliter

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

See-Saw Hormones in Regulating Blood Glucose



Times of Plenty!!



Times of Need!

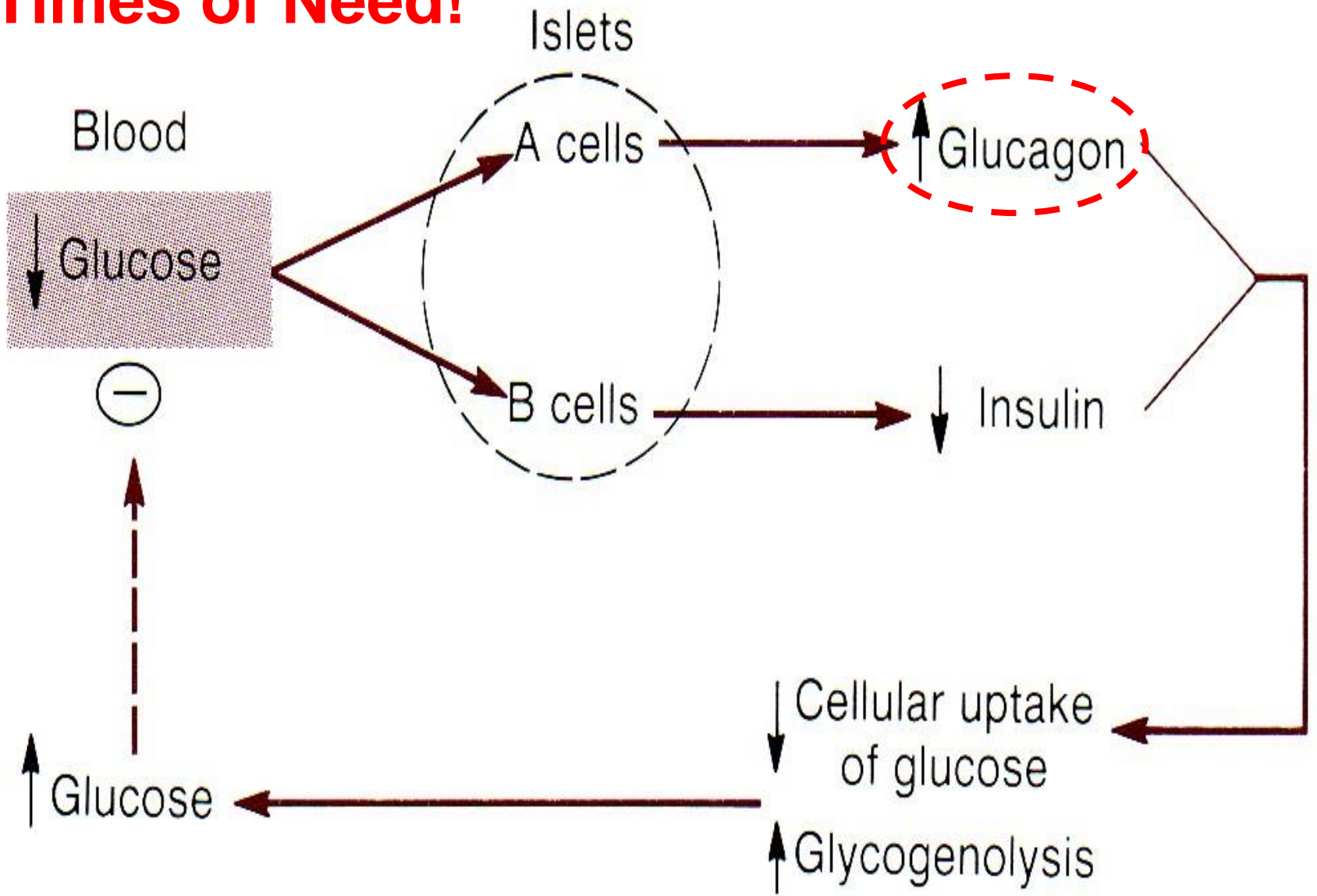


TABLE
4-7

Warning Signs of Diabetes

These signs appear reliably in type 1 diabetes and, often, in the later stages of type 2 diabetes.

- Excessive urination and thirst
- Glucose in the urine
- Weight loss with nausea, easy tiring, weakness, or irritability
- Cravings for food, especially for sweets
- Frequent infections of the skin, gums, vagina, or urinary tract
- Vision disturbances; blurred vision
- Pain in the legs, feet, or fingers
- Slow healing of cuts and bruises
- Itching
- Drowsiness
- Abnormally high glucose in the blood

Diabetics must constantly juggle diet, exercise & medication to control blood glucose!

Medication

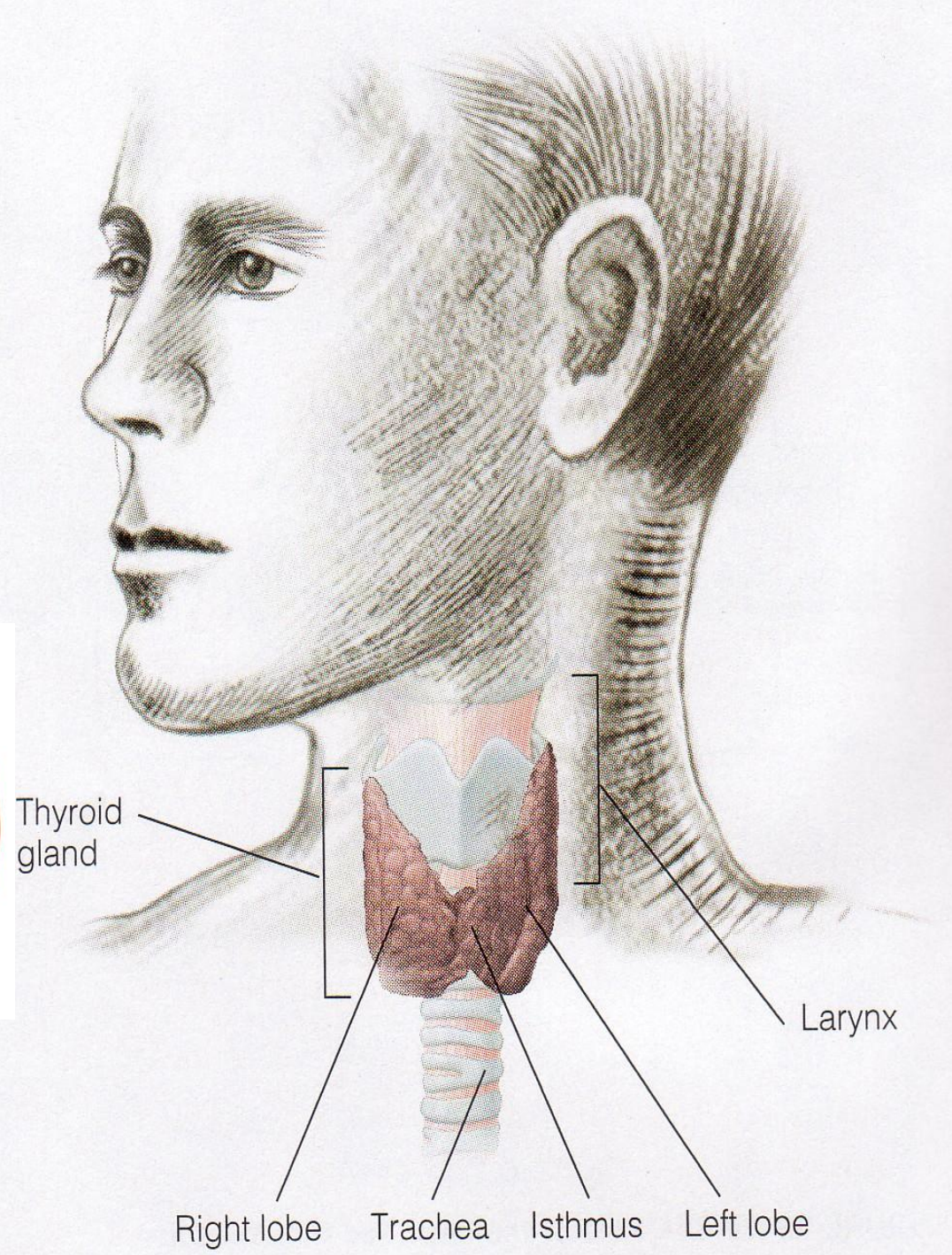


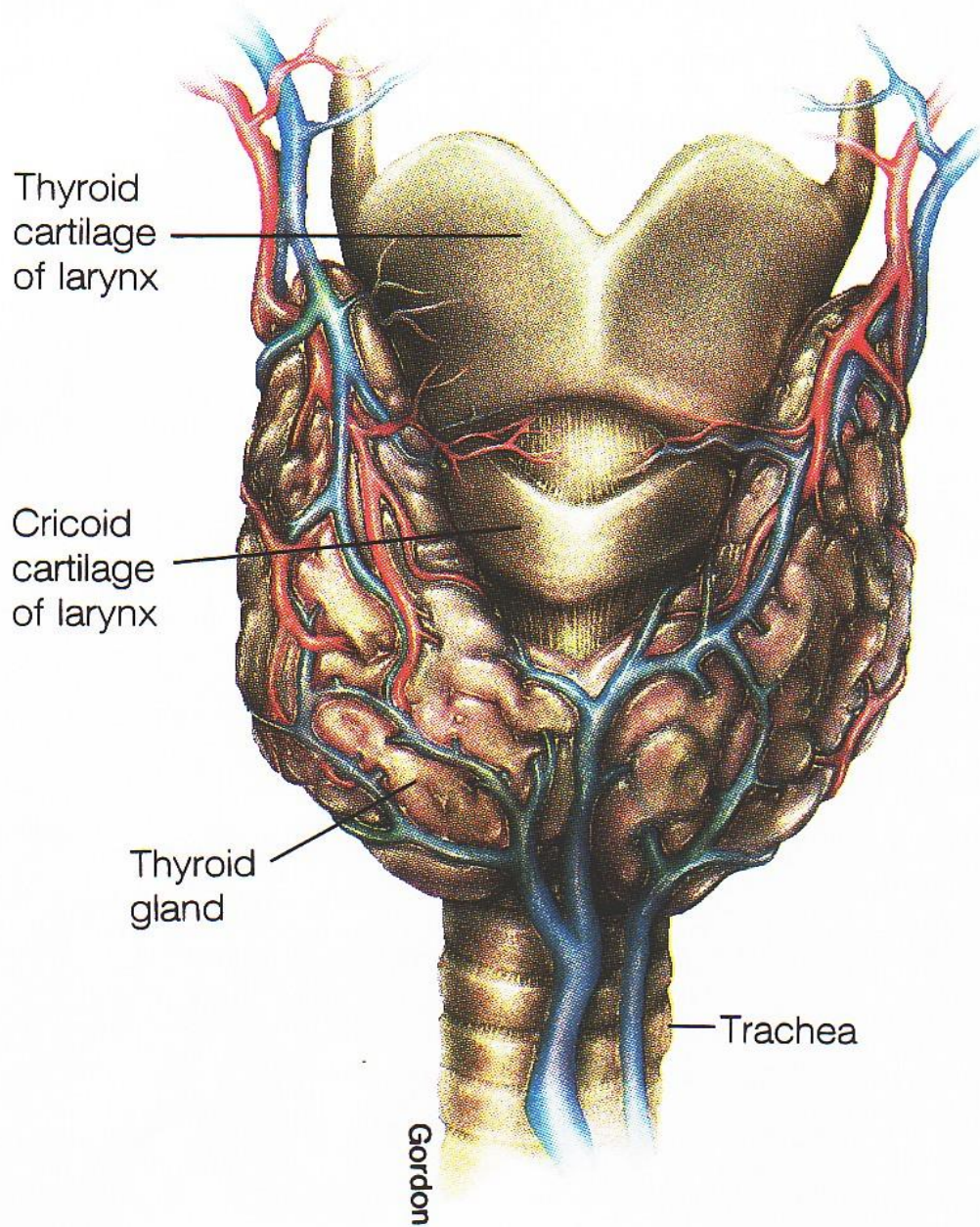
Exercise

Diet

Like others, diabetics benefit from whole grains, vegetables, fruits, legumes & non-/low-fat milk products!

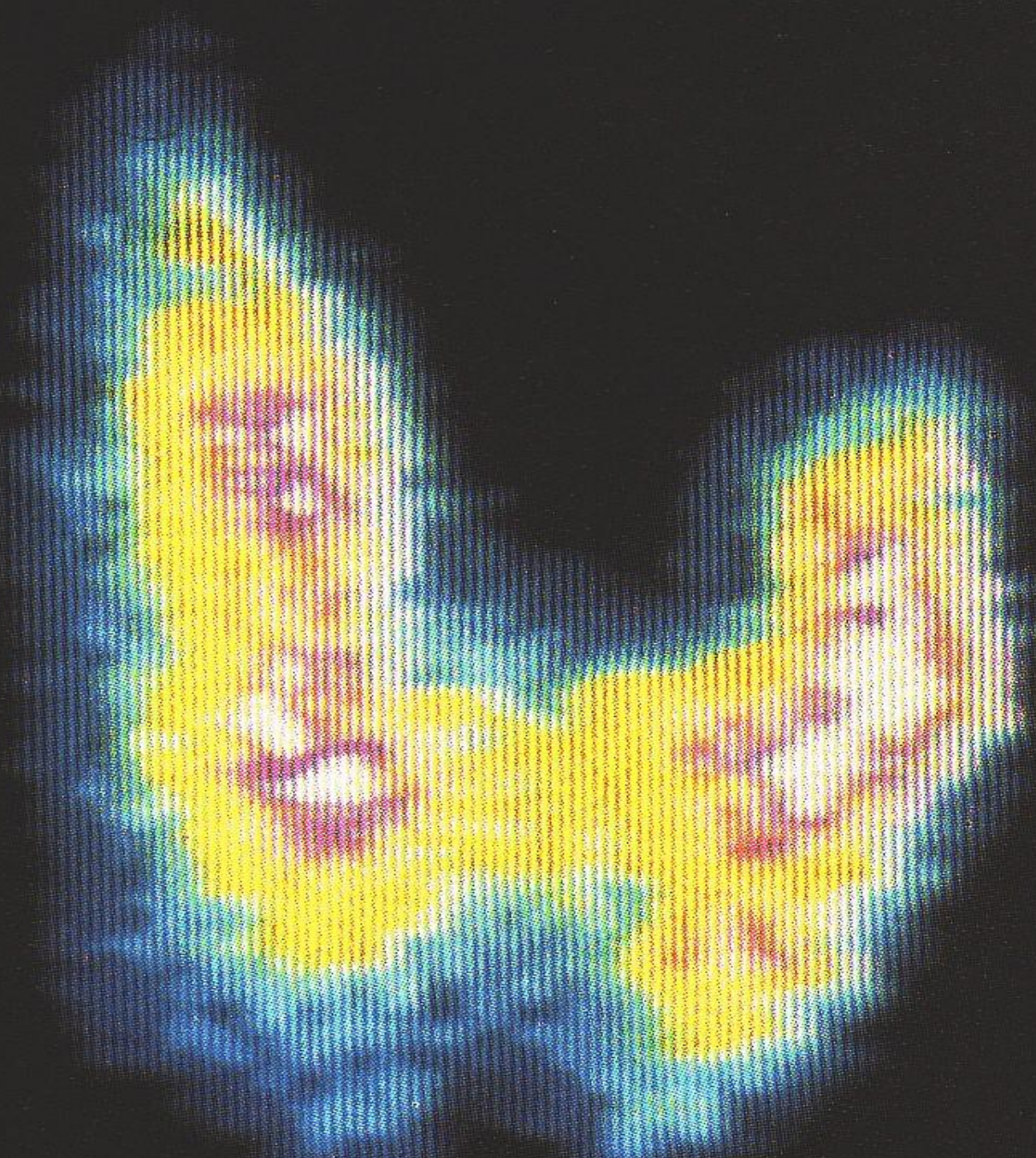






(a)

Gordon









Adrenal gland

Adrenal cortex

Adrenal
medulla

Kidney

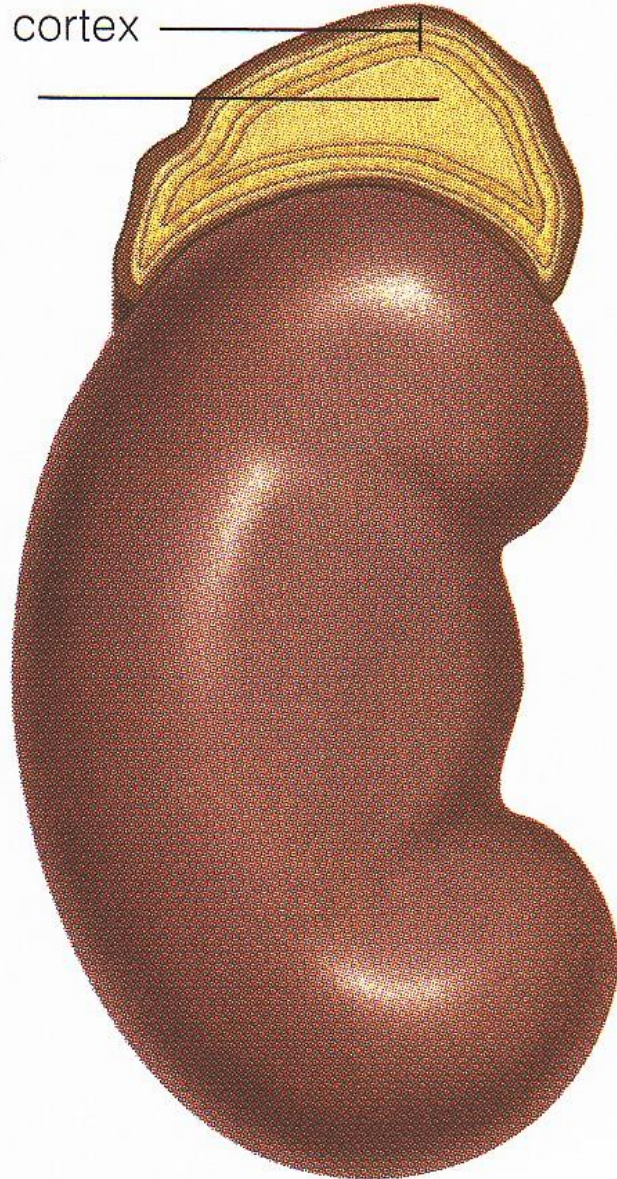


FIGURE 13-12

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%

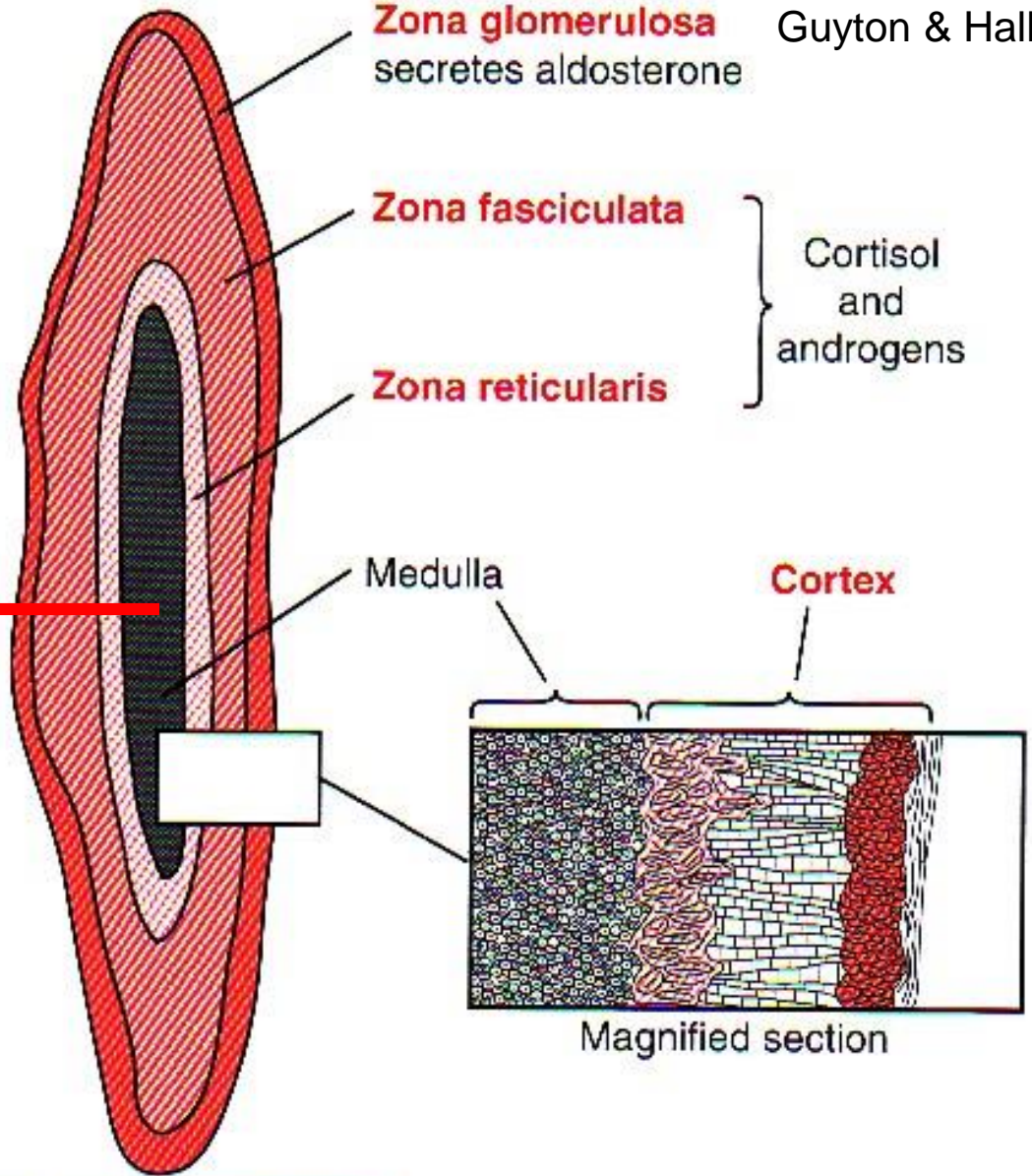
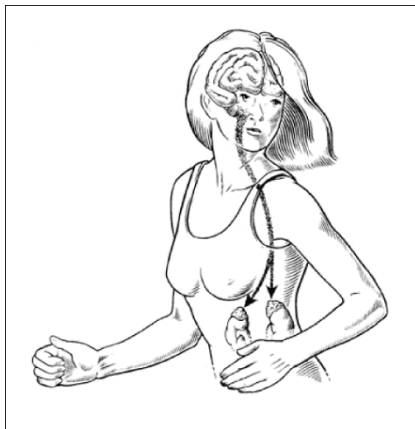
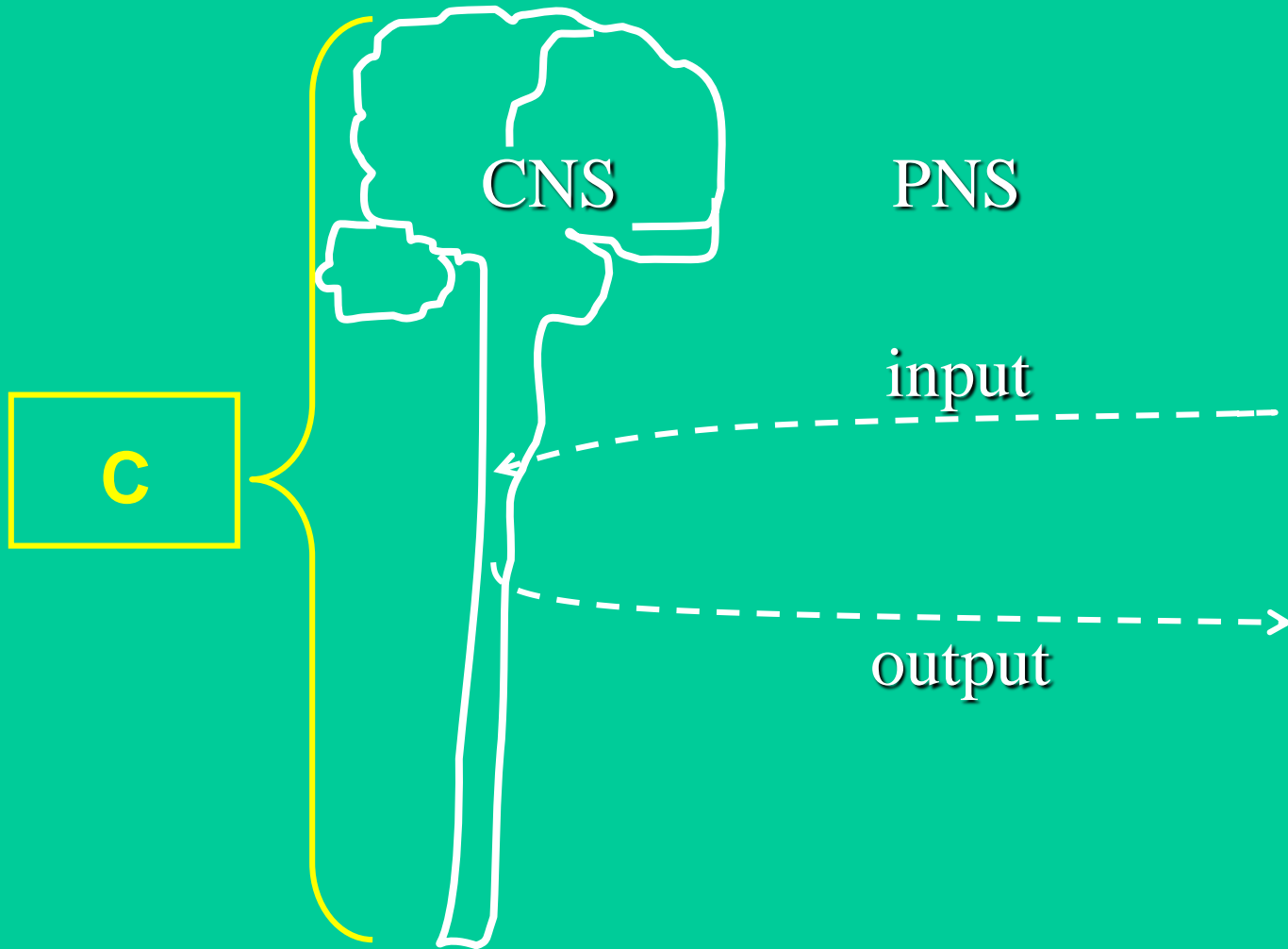
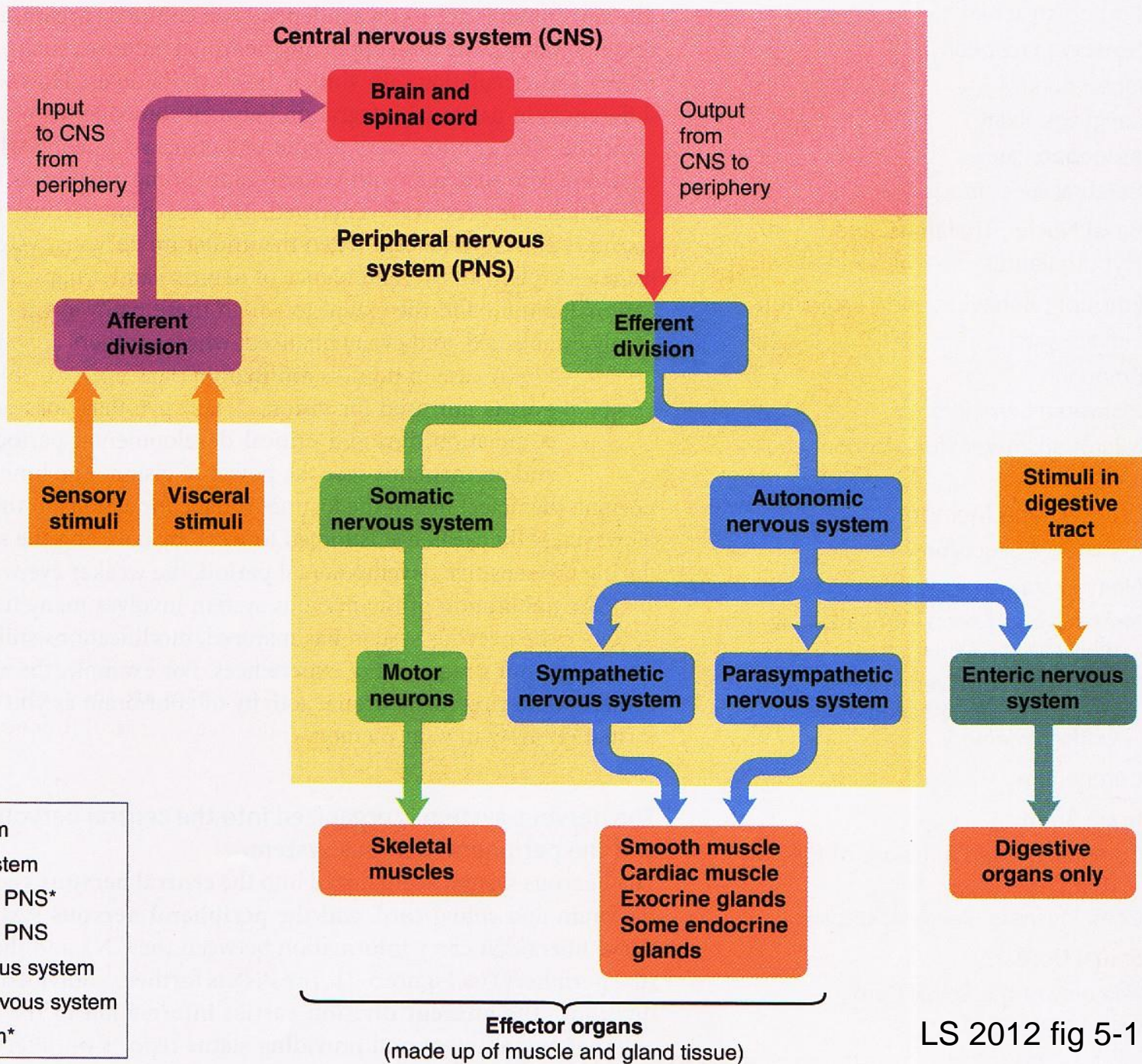
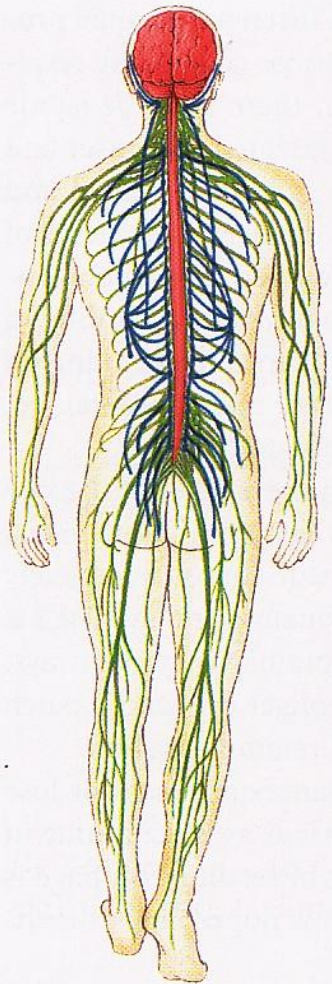


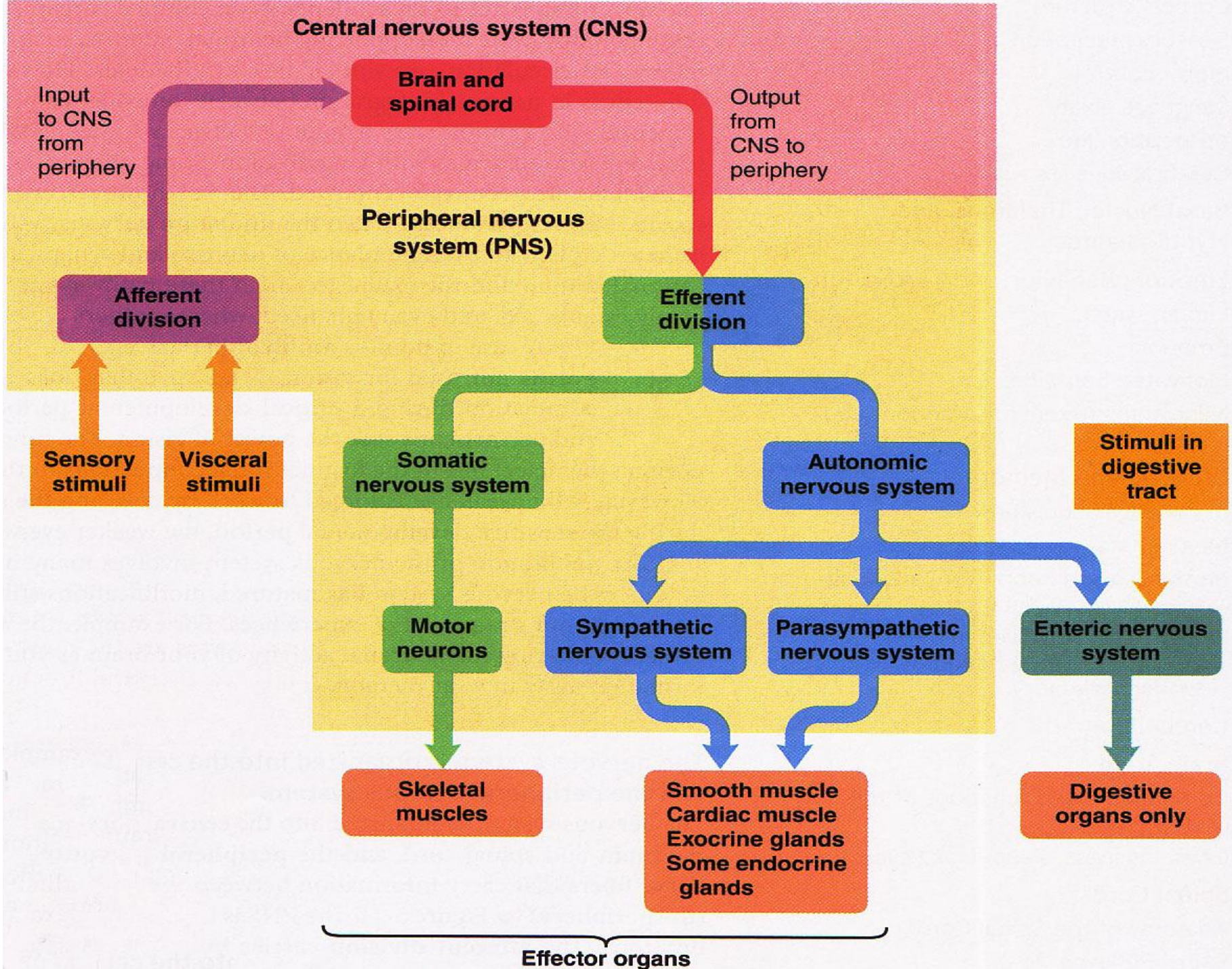
FIGURE 77 - 1

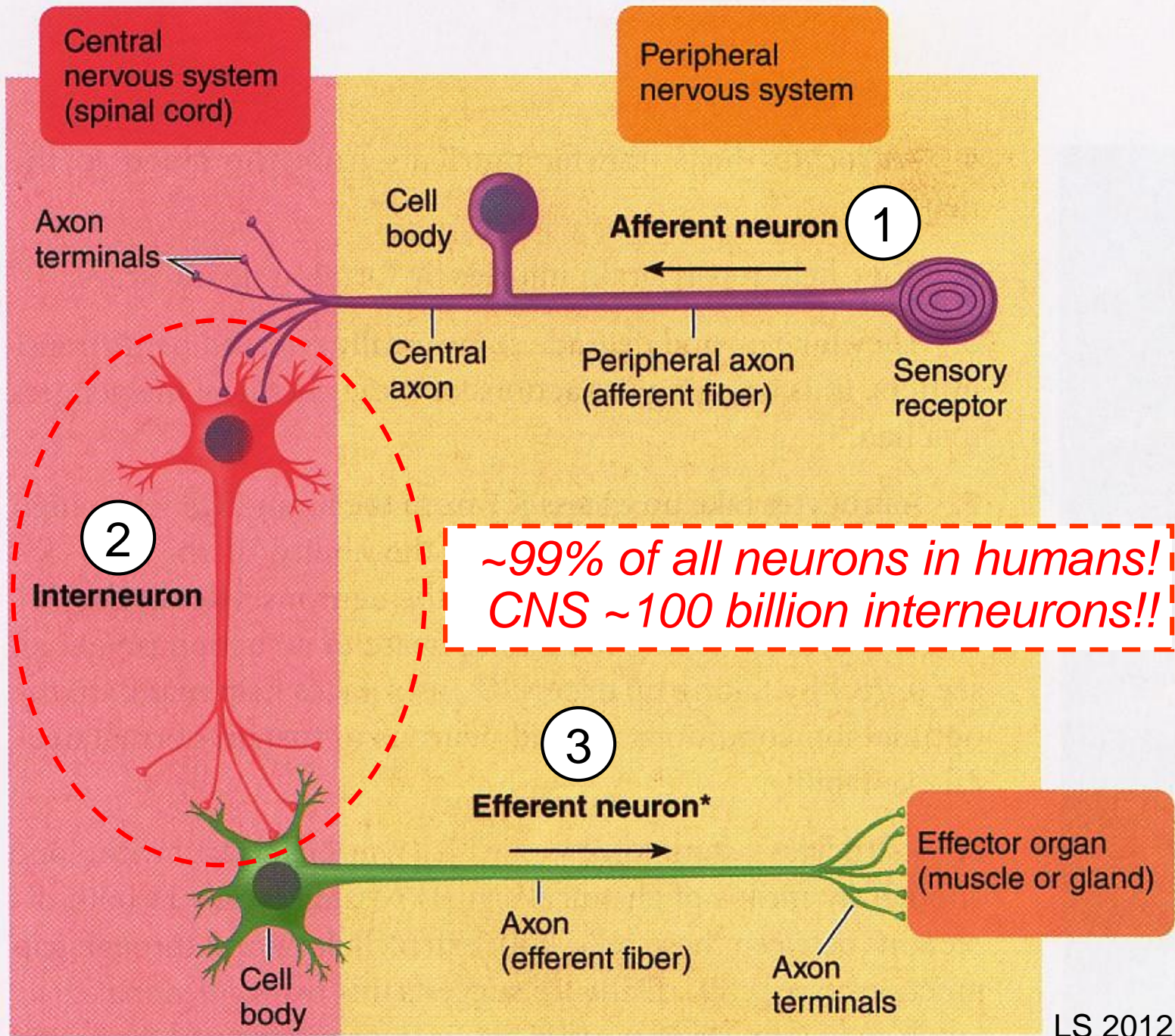
Secretion of adrenocortical hormones by the different zones of the adrenal cortex.

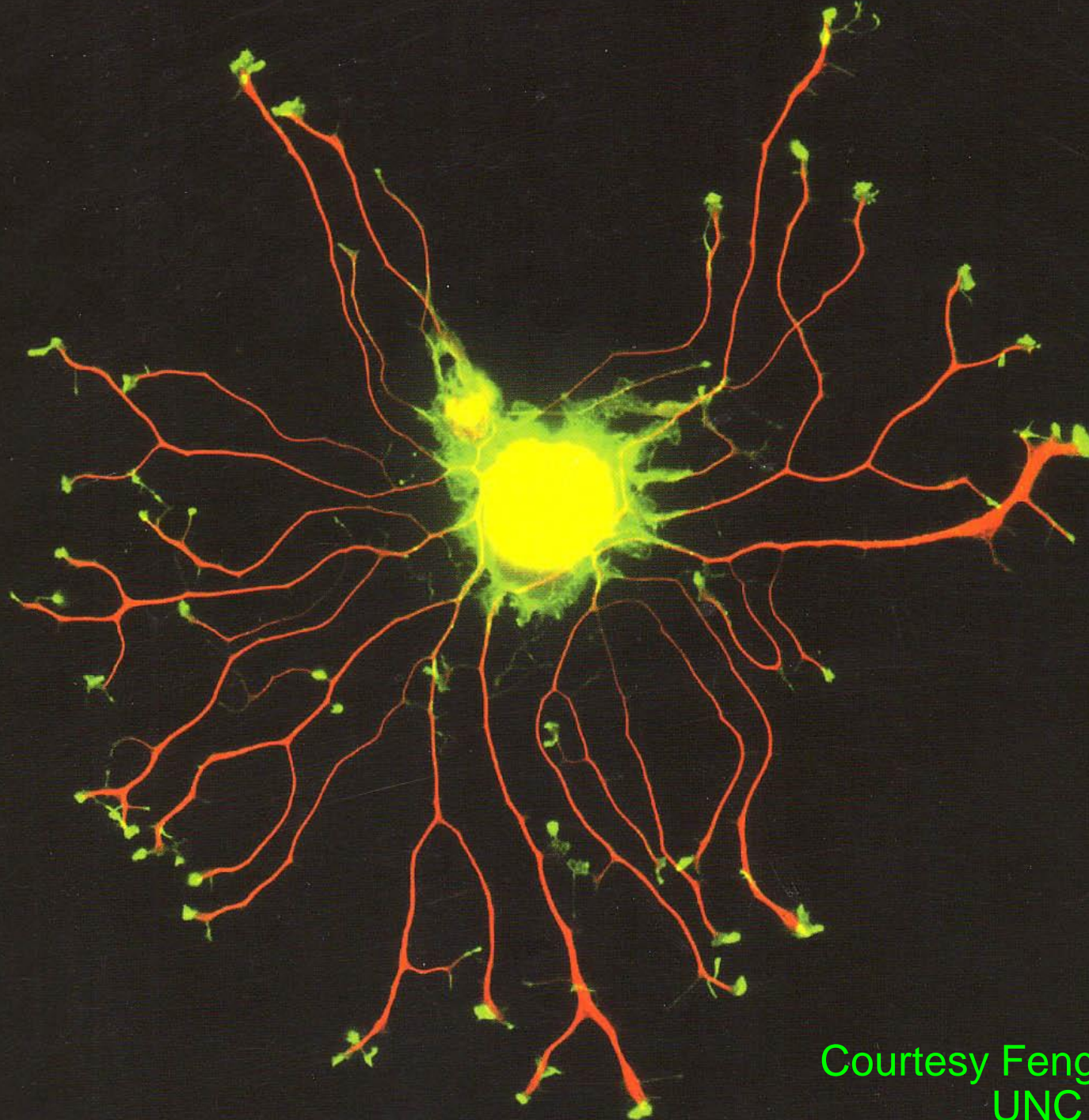
Nervous System



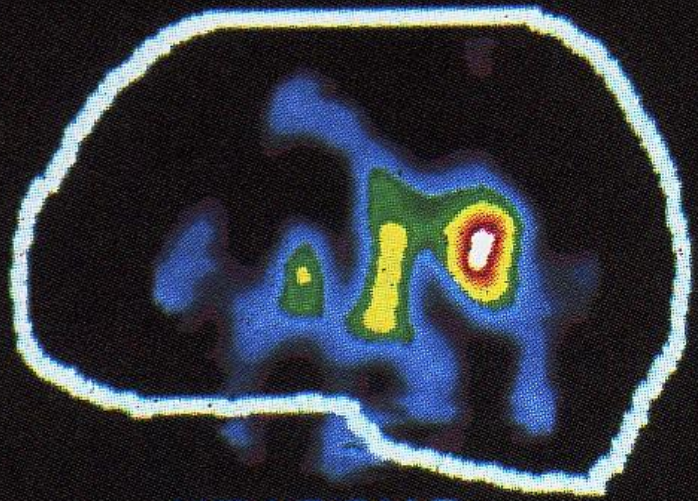




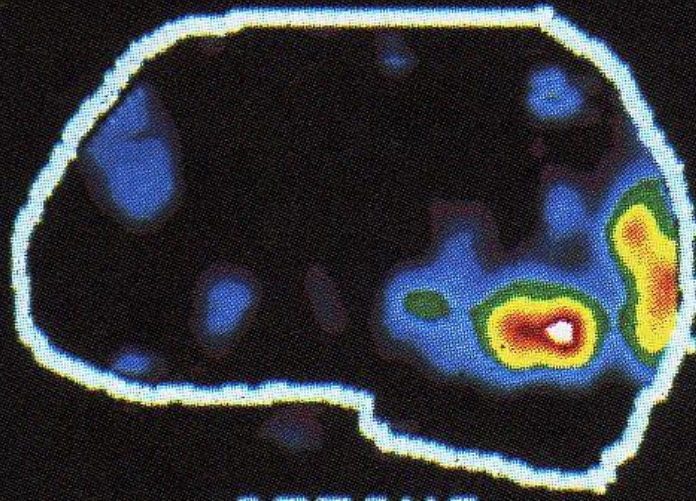




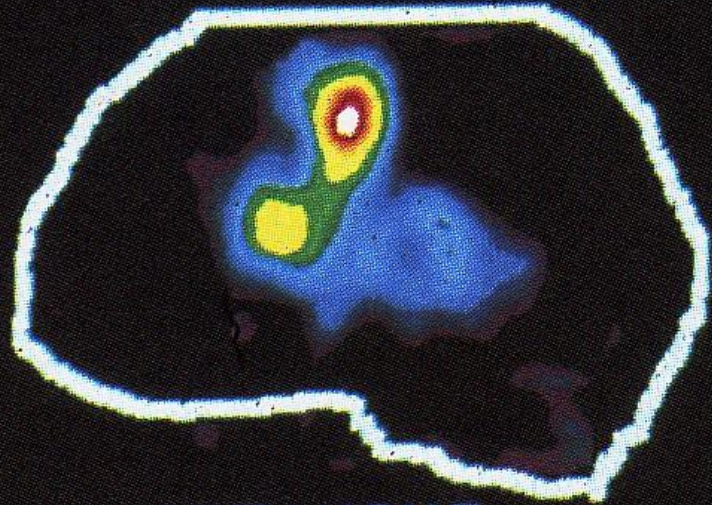
Courtesy Fengquan Zhou
UNC Chapel Hill



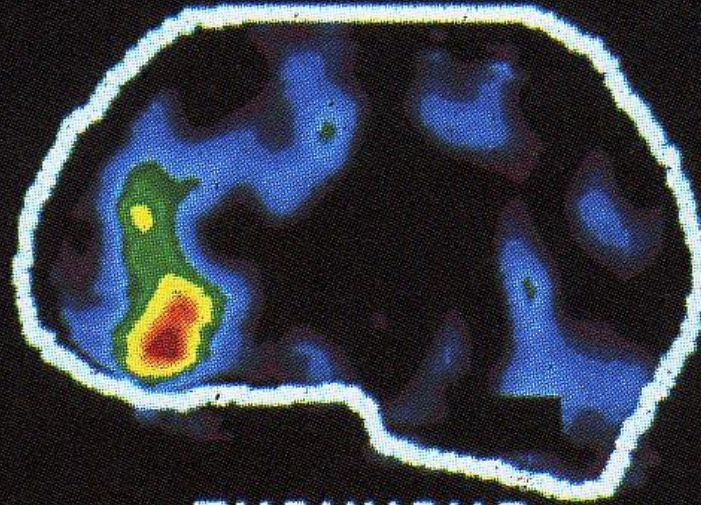
HEARING



SEEING



SPEAKING

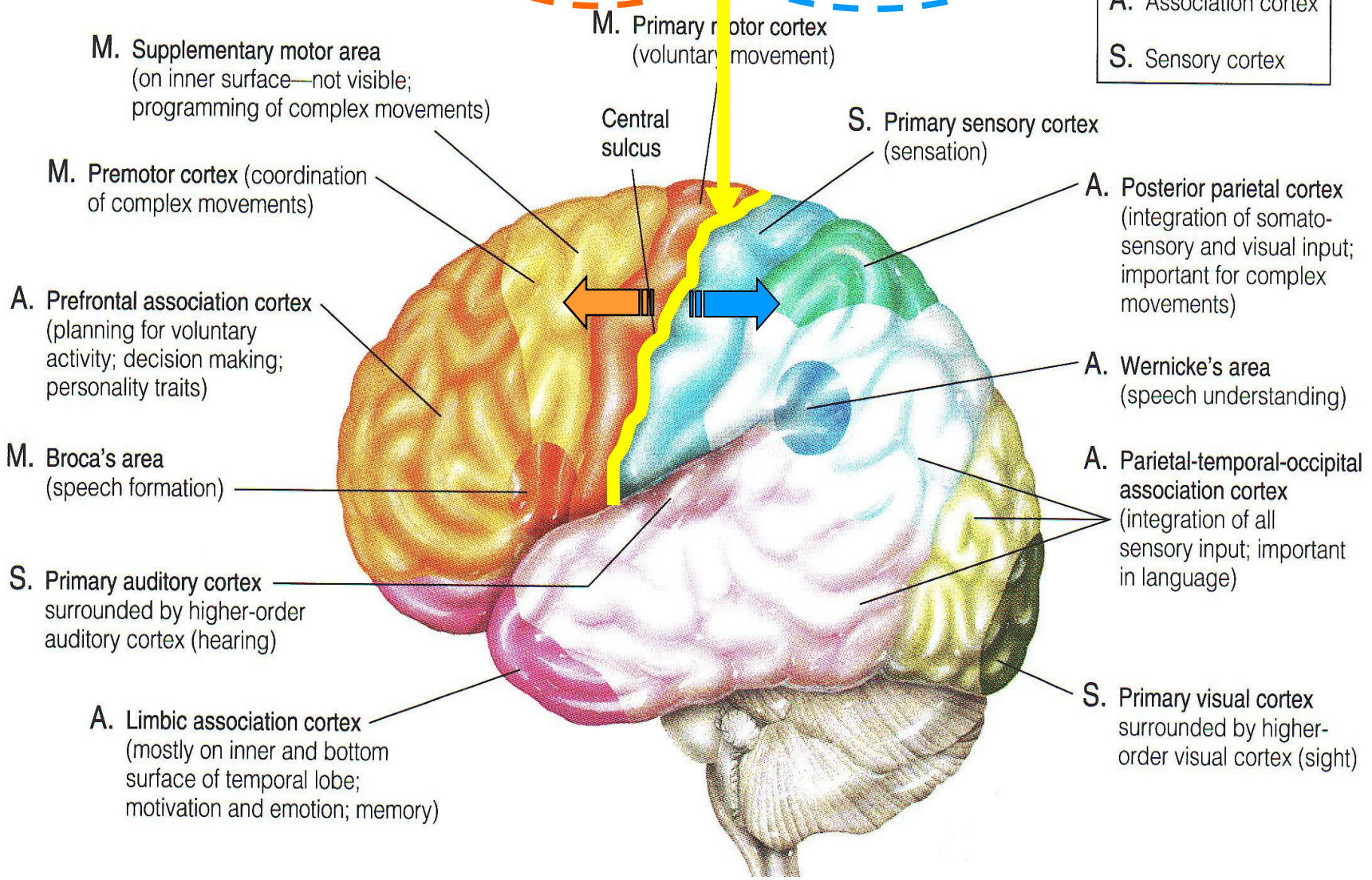


THINKING





Key	
M.	Motor cortex
A.	Association cortex
S.	Sensory cortex





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



<http://www-nrd.nhtsa.dot.gov/Pubs/812018.pdf>
<http://www.bhsi.org/stats.htm>

~ 500,000 bicyclists/yr visit emergency rooms

As of 2014, the population estimate of

State of Wyoming 584,153

Albany OR 51,980

Corvallis OR 54,953

Springfield OR 60,263



~ 26,000 traumatic brain injuries

743 of ~900 cyclist deaths, 2013 \equiv ~ 2% of all traffic fatalities

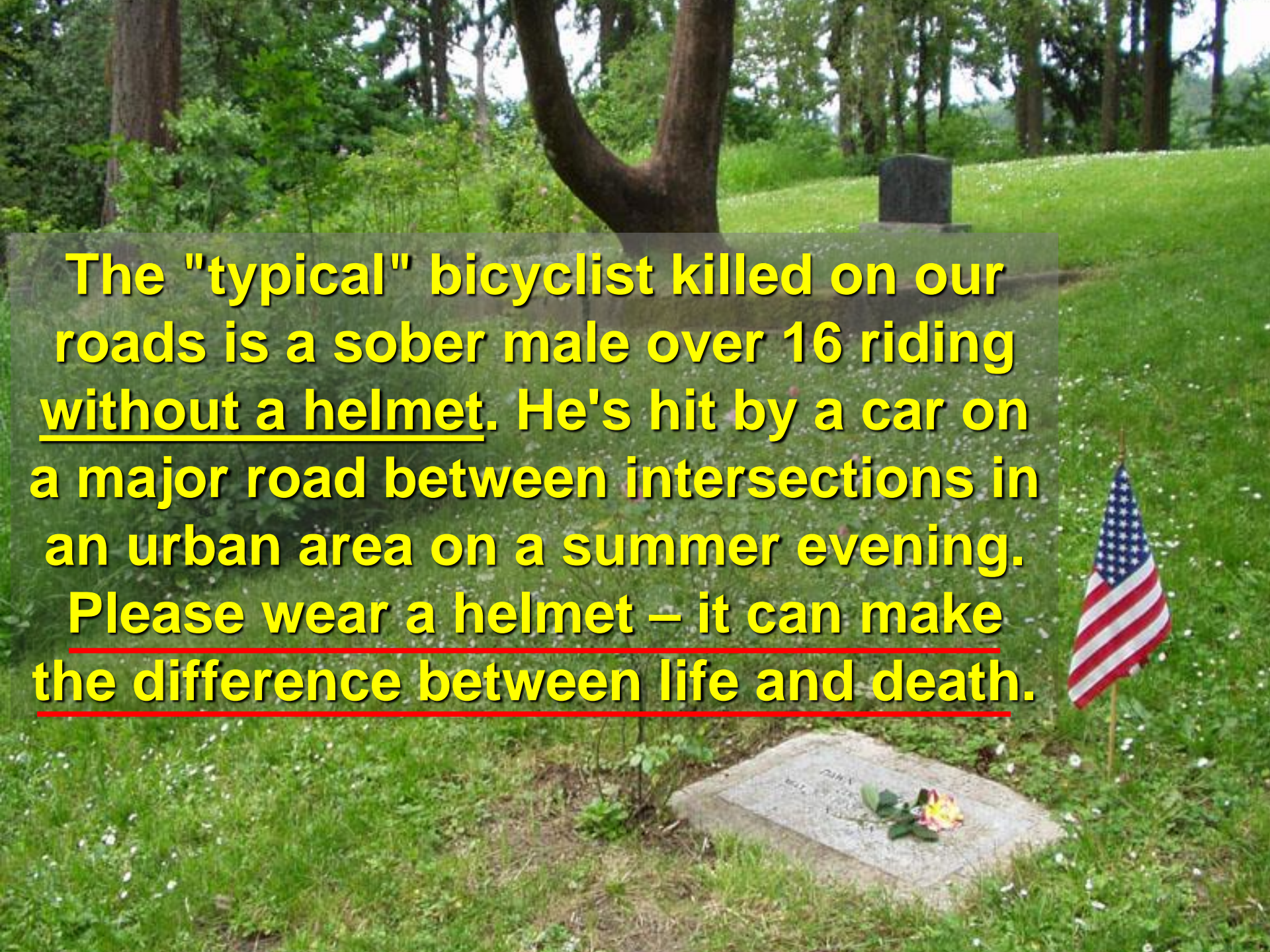
13% of deaths children \leq 14 yr, 87% σ

11% involved wrong-way riding!

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

Helmets may reduce head & brain injury risk by 85%!

~\$2.3 billion/yr = indirect injury costs from not using helmets!

A photograph of a cemetery. In the foreground, a large, dark tree trunk is on the left. To the right, a dark, rectangular gravestone stands on a grassy slope. In the lower right foreground, a small American flag is planted in the grass. A flat, rectangular gravestone lies on the ground in the lower center, with a single colorful rose placed on it. The background is filled with green grass and more trees under a bright sky.

The "typical" bicyclist killed on our roads is a sober male over 16 riding without a helmet. He's hit by a car on a major road between intersections in an urban area on a summer evening. Please wear a helmet – it can make the difference between life and death.

Hey, I'm alive because I wore a helmet!!



Stories, Discussion, Questions or Comments!

