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. **Physiology in Hollywood News?** Type I vs Type II diabetes

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

IV. **Endocrine Connections** LS ch 17, DC Module 13, SI Fox +…
   A. What’s an endocrine? + classes ~ LS pp 495 - 6
   B. Hypothalamus (Master) – Pituitary (Slave!)
      DC pp 104-6 + LS pp 499-506
   C. Posterior pituitary storage site DC p 108, LS fig 17-4 p 502
   D. Anterior pituitary hormones DC pp 105-7, LS pp 502-6
   E. Endocrine feedback + reflexes LS p 540 fig 17-7
   F. GH: Body builder's dream? Fountain of youth?
      LS pp 506-10, fig 17-10, 17-11
   G. Peripheral endocrine organs DC pp 109-13, LS pp 513-36
      1. Pancreas 2. Thyroid 3. Adrenals
No food, drink or gum in lab today! Thanks sincerely!

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

1. WASH & DRY

2. ALCOHOL

3.
OBTAIN μSAMPLE

BLOOD GLUCOSE

BLOOD TYPING
Glucose: Sugar in blood

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

Record in Notebook w/dominant hand!
BLOOD TYPING

1. ADD ANTISERA

2. MIX W/TOOTHPICKS

3. READ & RECORD!!
CLEAN-UP!

1. FOLD DIAPER

2. BLOOD PRODUCTS

3. REWASH!!
Blood Chem Lab Q?
Hormone/Endocrine Classifications?

Exogenous

Endogenous

Amino Acid/PP/Protein

Thyroid

Steroid

Endogenous

Altered Functional Response

Protein Synthesis

Hormonal Receptor Complex

DNA

mRNA

Specific Receptor

Protein Phosphorylation

Intracellular Receptor

ATP

CAMP

Nucleus

Adenylate Cyclase

Receptor

T4

T3
Hypothalamus & Pituitary: Intimate Relationship
Hypothalamus
< 1% of Brain Mass
Hormone Master Controller
+100s of Functions!

Kreiger & Hughes 1980
Hypothalamus-Posterior Pituitary Nervous Connection!

Neurosecretory neurons

Hypothalamic-posterior pituitary stalk

Anterior pituitary

Hypothalamus

Nervous Connection!!

Posterior pituitary

Systemic arterial inflow

Systemic venous outflow

● = Vasopressin

● = Oxytocin

LS 2007
Hypothalamus-Anterior Pituitary Vascular Connection!

- Neurosecretory neuron
- Systemic arterial inflow
- Hypothalamic-hypophyseal portal system
- Anterior pituitary
- Posterior pituitary

Systemic venous outflow

- ● = Hypophysiotropic hormones
- ● = Anterior pituitary hormone

LS 2007
Hypothalamus talks to Anterior Pituitary by way of RH & RIH!

- Neurosecretory neuron
- Systemic arterial inflow
- Hypothalamic-hypophyseal portal system
- RH + or RIH -
- Releasing or Release-Inhibiting Hormones

Pituitary Nourishing or Growth Hormones

Systemic venous outflow

- • = Hypophysiotropic hormones
- • = Anterior pituitary hormone

Hypophysis = Pituitary

LS 2007
Capillary-Venule-Capillary Intimate Circulation

Primary Plexus

Median Eminence

Superior Hypophyseal Artery

Artery of Trabecula

Efferent Dural Vein

Stalk

Long Hypophyseal Portal Veins

Short Portal Veins

Inferior Hypophyseal Artery

Secondary Plexus of Pituitary Portal System

Krieger & Hughes 1980
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!!

![Graph showing growth hormone levels over time]

- Growth hormone (ng/ml plasma)
- Time of day
- Sleep

Strenuous exercise

ng/ml = nanograms per milliliter
Endocrine Pancreas: Insulin (I) & Glucagon (G)

See-Saw Hormones in Regulating Blood Glucose

Duct cells secrete aqueous NaHCO₃ solution
Acinar cells secrete digestive enzymes
Exocrine portion of pancreas (Acinar and duct cells)
Endocrine portion of pancreas (Islets of Langerhans)

Hormones (insulin, glucagon)

The glandular portions of the pancreas are grossly exaggerated.
Inadequate Iodine Promotes Goiter!
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

- Adrenal medulla
- Adrenal cortex

- Mineralocorticoids (aldosterone)
- Glucocorticoids (cortisol) and sex hormones (dehydroepiandrosterone)
- Catecholamines (epinephrine and norepinephrine)

Connective tissue capsule
- Zona glomerulosa
- Zona fasciculata
- Zona reticularis

Medulla

LS 2012 fig 17-18
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)
Epinephrine 80%
Norepinephrine 20%

Figure 77-1
Secretion of adrenocortical hormones by the different zones of the adrenal cortex.