

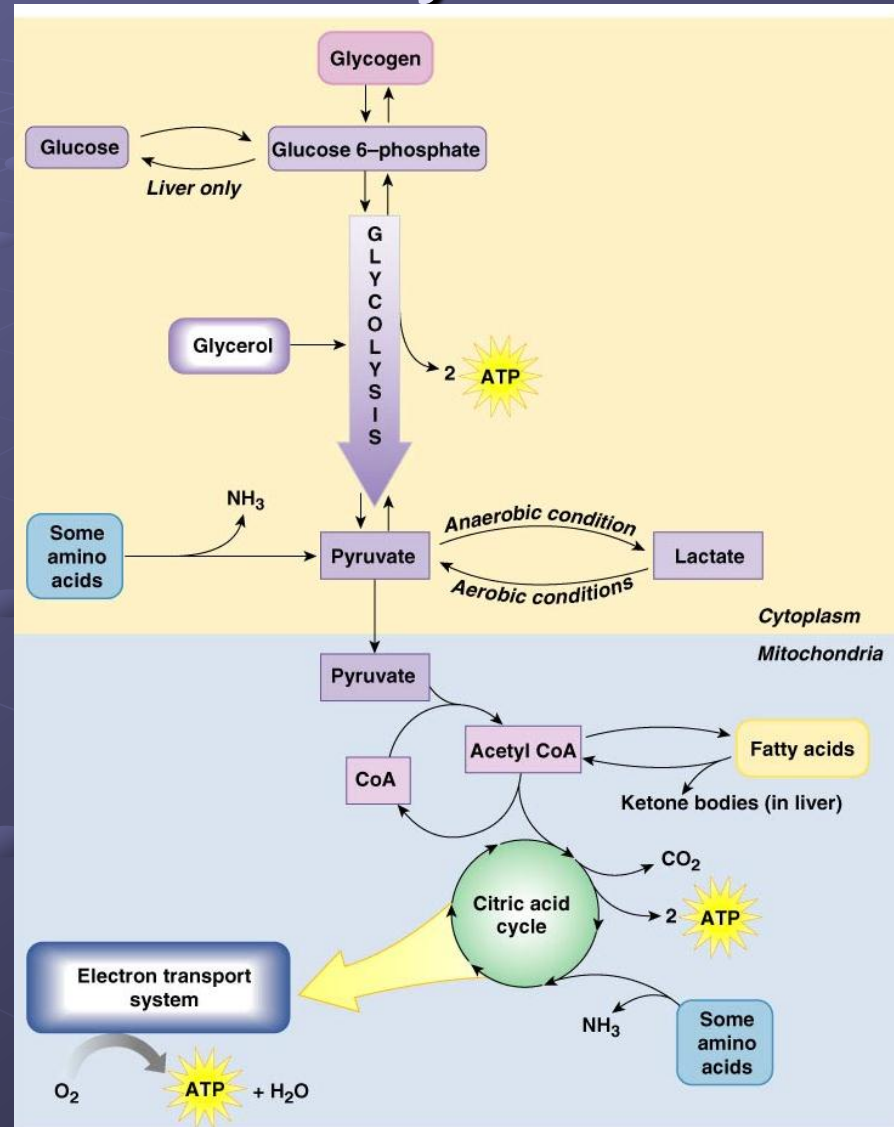
Chapters 22 and 23 Metabolism

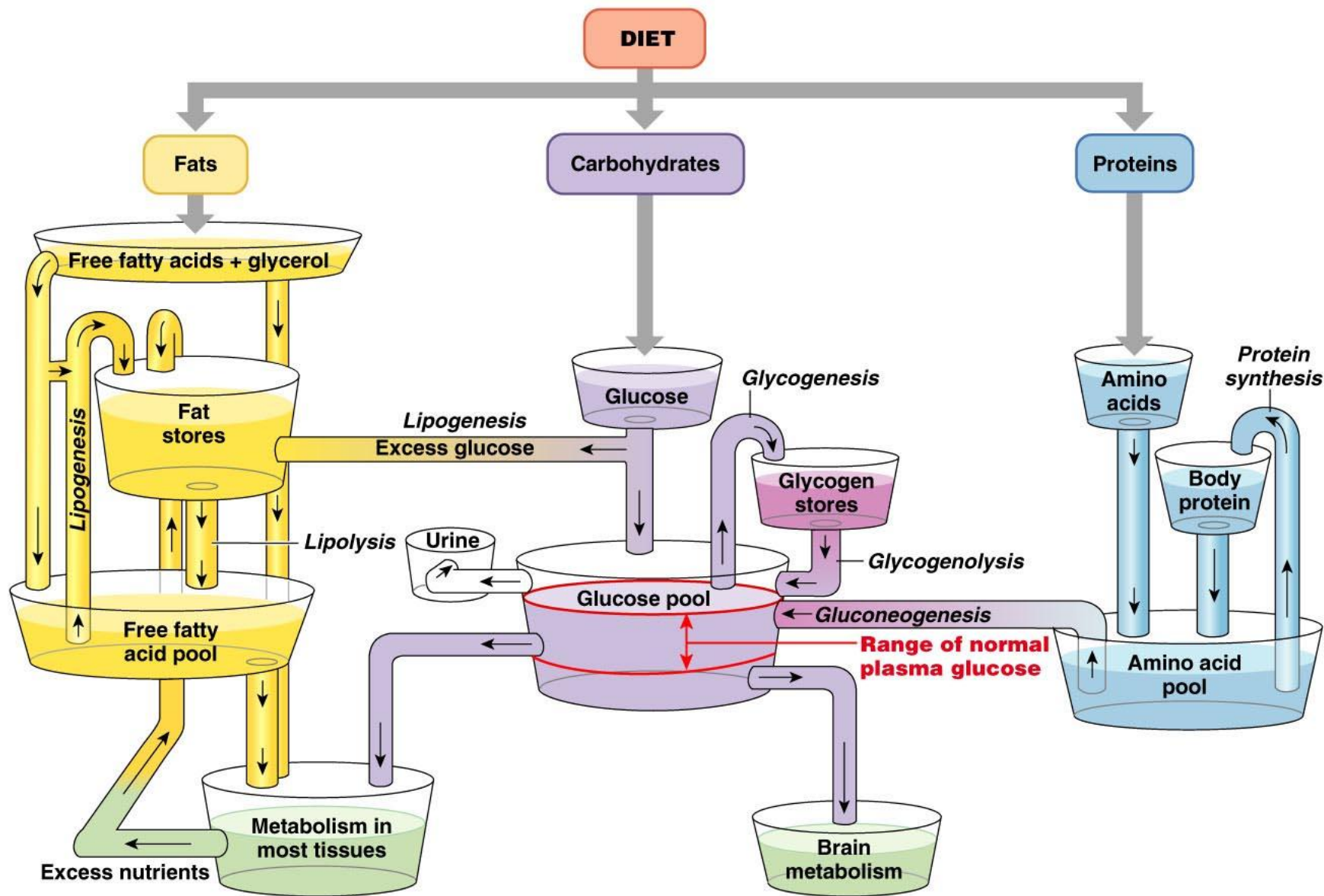
Energy Balance

- Based on First Law of Thermodynamics:
 - Energy input = Energy output (work)
 - Energy stored as glycogen and fat
- Work = transport, mechanical, chemical
- Unit of Measure: Kilocalorie (Calorie)
 - Raise 1 L of H₂O 1°C.
 - calorie = 1 gram of H₂O 1°C
- Basal Metabolic Rate (BMR) in kcal/day

Metabolism = sum of all chemical reactions in the body

- Anabolic vs. catabolic
- Absorptive vs. Postabsorptive
- Recall glycolysis and TCA cycle





Control of Metabolism

● Insulin and Glucagon

- Some consider that insulin is THE anabolic hormone
- Insulin:glucagon ratio

● Other Hormones (Chapter 23)

● NS

- Emotional factors (Running Problem)

Chapter 23: Endocrine Control of Metabolism

1. Adrenal Glands

1. Steroids (aldosterone and cortisol)

2. Thyroid

1. Accelerator Pedal?

3. Growth Hormone

1. Facilitates Growth and Development

4. PTH and Calcitonin

1. Control of $[Ca^{2+}]$

1) Adrenal Glands

● Adrenal medulla

- Catecholamines

● Adrenal Cortex

- Glucocorticoids (controlled by ACTH)
- Aldosterone
- Anabolic steroids?? DHEA??

2) Thyroid

- Precursor: thyroglobulin
- Add iodine to make T_3 and T_4
- Control by TSH
 - cTSH

3) Growth Hormone

- Anterior Pituitary
- Anabolic
- Recently synthesized
- Excess =
 - Acromegaly in adults
 - Gigantism in children
- Target = IGF (insulin-like growth factors)

4) Calcium

- PTH raises Ca^{2+}
- Calcitonin lowers it
- Calcitriol enhances absorption of Ca^{2+}
 - AKA Vit D₃
- Role of estrogen??
 - Osteoporosis and HRT

