Review Liver functions:  synthesis of plasma proteins  bilirubin excretion  bile synthesis  amino acid interconversion, deamination  Synthesis of clotting factors  urea synthesis  glycogen synthesis and storage  gluconeogenesis from broken down protein  fat breakdown, form ketone bodies

**Metabolic rate:** energy expended by body per unit time, ( p 963)
- direct measurement:  **Calorimeter measures heat**, resting, fasting, no work done: heat liberated
- indirect measurement:  **O₂ consumption**: 1 L O₂ is equivalent to 4.825 Kcal of heat

Measurement must be done resting in **post-absorptive state** (12 hr fast)

liver processing *increases* BMR 10-20 % (not due to cost of digestion):
- protein  30 % increase in BMR  
- CH₄O  8%
- Lipid  8%

Strenuous exercise increases BMR 15x...

**REGULATION OF ENERGY BALANCE:**
caloric intake must equal caloric requirements for work performed for stable condition

**CONTROL OF HUNGER:**

**Feeding center**  
hunger triggered in lateral hypothalamus,  
stimulated by low blood glucose, low temp

**Satiety center**  
(inhibits feeding center) in ventromedial hypothalamus, stimulated by:
- hi blood glucose
- increased body temp
- specific dynamic action

**PROBLEMS ASSOCIATED WITH DIET AND OVEREATING:**

| Body Mass Index - BMI = [( weight in lbs * 703) divided by (height in inches)²]  |
|-----------------------------|-----------------------------|
| **Obesity:** 20% over ideal weight associated with a 50% higher mortality rate. | BMI | weight |
| In USA, % obese: 40% women | Below 18.5 | underweight |
| 30 % men | 18.5-24.9 | normal |

Young obese have more adipose cells  
adult obese have enlarged adipose cells

| 25-29.9 | overweight |
| over 30 | obese |

**Dietary saturated fats, cholesterol:**

**Cholesterol:** () critical functions: cell membranes, bile salts, steroid hormones, vitamin D  
we make 80 % of cholesterol circulating in blood.

Cholesterol is carried in the blood:  
- HDL: fr periphery to liver should be over 35 mg/dL  
- LDL: fr GI to periphery should be below 130 mg/dL

Exercise raises HDL. Unsaturated fats as well

Dietary saturated fats turned into acetyl CoA, turn them into cholesterol.