METABOLISM II: METABOLIC RATE, DIET AND OVEREATING

4/29/82, rvsd 5/13/97, 2 May 05, 13 May09, 3May10
S&M 688-, Martini 966-977, 6th: 8th: 955-

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

Metabolic rate: energy expended by body per unit time, (p 955)
- direct measurement: **Calorimeter measures heat**, resting, fasting, no work done: heat liberated
- indirect measurement: **O_2 consumption**: 1 L O_2 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
- CH_2O 8%
- Lipid 8%

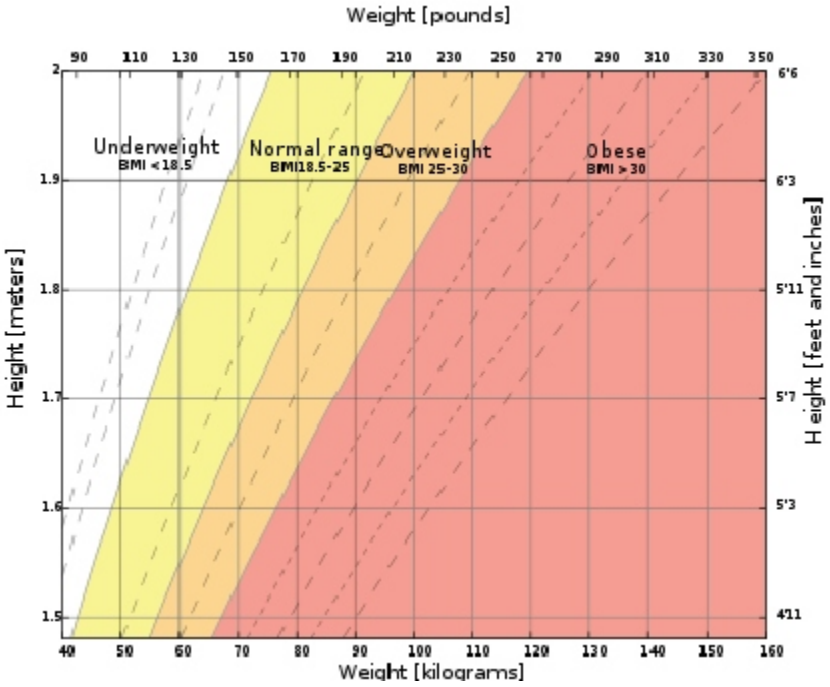
Strenuous exercise increases BMR 15x...

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)/(height in inches)^2]

Obesity: 20% over ideal weight associated with a 50% higher mortality rate .
In USA, % obese: 40% women
30 % men

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

BMI	weight
Below 18.5	underweight
18.5-24.9	normal
25-29.9	overweight
0ver 30	obese

Dietary saturated fats, cholesterol:

Cholesterol: (p 944) 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.