Lecture 16:

Obesity & Overweight

Copyright Protection:

- **These two terms are commonly used synonymously by the public. However, they are different from each other in sports medicine and fitness.**

- **Obesity is a state of excess adipose tissue mass. Basically, it specifically refers to an excessive amount of fat tissue.**

- **Overweight specifically refers to an excessive amount of body weight that may come from muscles, fat tissues, bones, or water. It describes people with BMIs between 25 and 30.**

Body Mass Index (BMI):

$$BMI = \frac{\text{Weight (kg)}}{\text{Height (m)}^2}$$

or

$$BMI = \frac{\text{Weight (lbs) X 703}}{\text{Height (inches)}^2}$$

BMI	Obesity Class
<18.5	Underweight
18.5 – 24.9	Healthy weight
25.0 – 29.9	Overweight
30.0 – 34.90	Obesity, class I
35.0 – 39.90	Obesity, class II
≥40.0	Obesity, class III

Do You Know Your Body Mass Index (BMI)?

BMI	Nutritional Status
>30 kg/m^2	Obese
25 - 30 kg/m^2	Overweight
20 - 25 kg/m^2	Normal
<18.5 kg/m^2	Moderate malnutrition
<16 kg/m^2	Severe malnutrition
<13 kg/m^2	Lethal in males
<11 kg/m^2	Lethal in females

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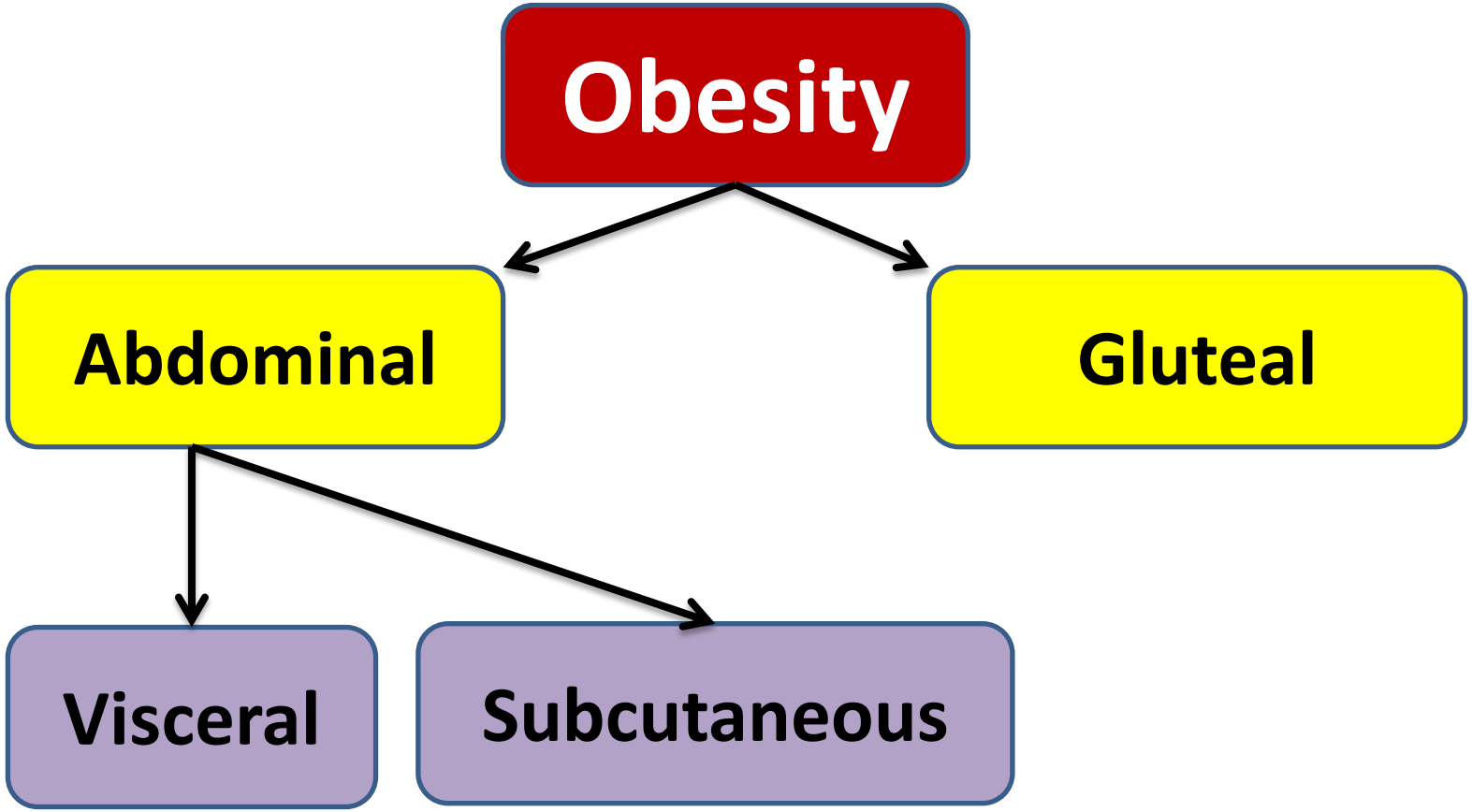
Limitations of BMI:

- 1) It fails to consider the percentage of body fat. A person with BMI between 25 and 30 is not necessarily over fat, because the person could have more muscle mass.

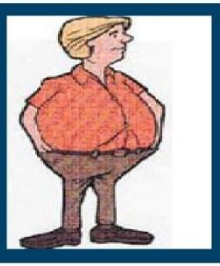
- 2) It fails to predict accurately the risk of cardiovascular disease and metabolic syndrome.

Types of Obesity:

- **Anatomical distribution of fat has a substantial implications for morbidity.**



Belly Fat vs Butt Fat:

	Belly Fat 	Butt Fat 
Type of Obesity	Visceral Obesity	Gluteal Obesity
Body Contour	Apple Shape (Android) 	Pear Shape (Gynoid) 
Cause: Increase in	Size of Fat Cells	Number of Fat Cells
Hormone(s) Involved	Cortisol	Estrogen
Risk: Diabetes & Heart Dis.	High	Low
Treatment	Easy	Difficult

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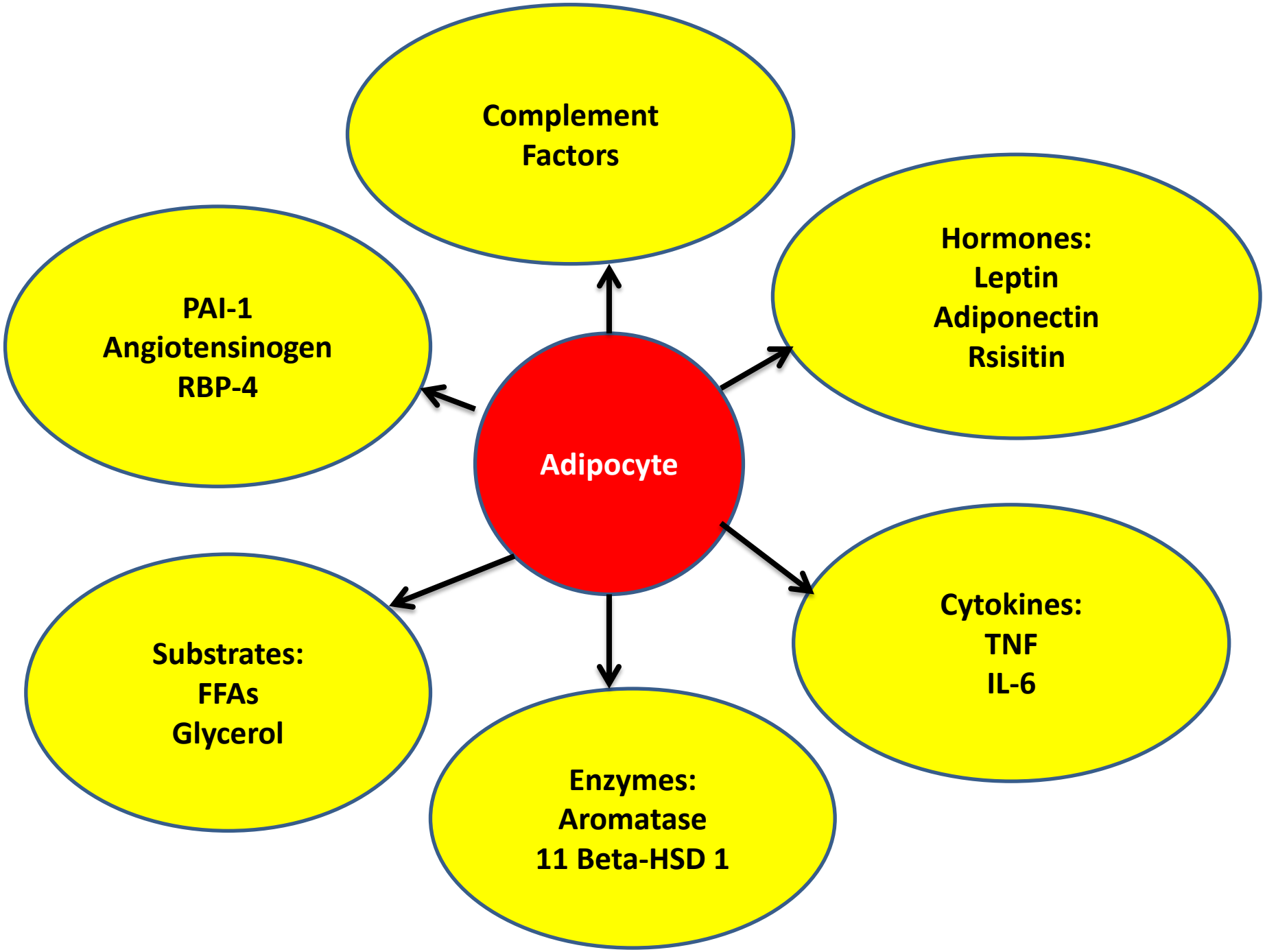
How To Distinct:

- By determining the waist-to-hip ratio:

- Women: >0.9 is abnormal.
- Men: >1.0 is abnormal.

- Insulin resistance, diabetes, hypertension, hyperlipidemia, and hyperandrogenism in women are linked strongly to visceral (intra-abdominal) fat than to overall adiposity…..Why?

- Intra-abdominal fat is metabolically more active.


Complement Factors
PAI-1
Angiotensinogen
RBP-4
Hormones:
Leptin
Adiponectin
Rsisitin
Adipocyte
Substrates:
FFAs
Glycerol
Cytokines:
TNF
IL-6
Enzymes:
Aromatase
11 Beta-HSD 1

Prevalence:

- **Obesity is more common among women and in the poor, and among blacks and hispanics.**
- **Worldwide prevalence is increasing.**
- **The prevalence in children is also rising at worrisome rate.**

Pathogenesis of Obesity:

- **Obesity results from:**
- **1) Increased energy intake.**
- **2) Decreased energy expenditure**
- **3) Both.**

Appetite **plays a key role in energy intake/expenditure.**

Factors That Affect Appetite:

- 1) Cultural factors.
- 2) Hormones: leptin, insulin, and cortisol.
- 3) Metabolites: glucose and ketones.
- 4) Gut peptides: CCK (cholecystokinin), ghrelin, and PYY.
- 5) Neural afferents (vagal).
- 6) Psychological factors.

Central Controllers of Appetite:

Increase

- NPY (neuropeptide Y)
- MCH (melanin-concentrating hormone)
- AgRP (Agouti-related peptide)
- Orexin
- Endocannabinoid

Decrease

- Alpha – MSH (melanocyte-stimulating hormone)
- CART (cocaine and amphetamine-related transcript)
- GLP – 1 (glucagon-related peptide)
- Serotonin

Etiology of Obesity:

Remember "4M":

1. **Mother**
2. **Motivation**
3. **Metabolism**
4. **Medicine**

Mother :

- Genetics plays an important role in obesity.
- Most overweight adults have some problems with their weight during childhood and adolescence.
- Family influences: eating patterns, food choices, self image within family, and psychosocial attitudes.
- Childhood obesity is increasing:
- American children : 52%
- European children: 38%
- Asian children: 20%

Motivation:

- **Lack of motivation results from:**

1) Higher failure rate of fad diets (Rebound: 80% to 90 %).

2) Sedentary life style.

3) Lack of exercise

4) Poor and unhealthy eating habits.

5) Stress

Metabolism:

- **Basal Metabolic Rate (BMR) or Resting Metabolic Rate (RMR) is the daily amount of energy expenditure by the body at rest.**

- **It is the minimum calories needed for the body to function properly at rest.**

Medicine:

Medical Conditions:

- Low function thyroid
- Liver and kidney diseases
- Diabetes
- Depression
- Cushing`s syndrome
- Insulinoma

Medications:

- Antidepressants
- Sedatives
- Anti-epilepsy
- Anti-anxiety
- Birth control pills
- Corticosteroids

Consequences of Obesity:

Obesity is not considered a disease, but it could lead to many diseases. This is why obesity is sometimes called "*mother of the diseases*".

Some obesity – related health conditions have been listed below:

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a) Cardiovascular:

- **1) Atherosclerosis.**
- **2) Hypertension.**
- **3) Congestive heart failure.**
- **4) Heart attack.**

b) Respiratory :

- 1) Asthma
- 2) Obstructive sleep apnea.
- 3) Pickwickian syndrome.

c) Endocrine:

- 1) Diabetes.
- 2) Metabolic syndrome.
- 3) High levels of LDL and triglyceride.
- 4) Polycystic ovarian syndrome (PCOS).

d) Gastrointestinal:

- 1) Gastroesophageal reflux disease (GERD).
- 2) Colon cancer.
- 3) Hernias.
- 4) Gallstones.
- 5) Fatty liver.
- 6) Liver cancer.
- 7) Pancreas cancer.

e) Musculoskeletal:

- 1) Low back pain.
- 2) Gout.
- 3) Osteoarthritis.
- 4) Carpal tunnel syndrome (CTS).

f) Genitourinary:

- 1) Breast cancer.
- 2) Uterine cancer.
- 3) Kidney diseases.
- 4) Infertility.
- 5) Urinary stress incontinence.

g) Neurologic:

- 1) Stroke.
- 2) Dementia.
- 3) Migraine.
- 4) Multiple sclerosis.

h) Dermatological:

- 1) Stretch mark.
- 2) Cellulitis.
- 3) Lymphedema.
- 4) Intertrigo.
- 5) Carbuncles.
- 6) Hidradenitis suppurativa.

i) Psychological:

- **1) Depression.**
- **2) Social stigmatization.**
- **3) Body image disorder.**

Homework:

- **1) Describe differences between belly fat and butt fat and why belly fat is more dangerous.**

- **2) Describe briefly the potential causes of obesity.**