THERAPEUTIC NUTRITION

LECTURE 1

METABOLIC RATE (MR)

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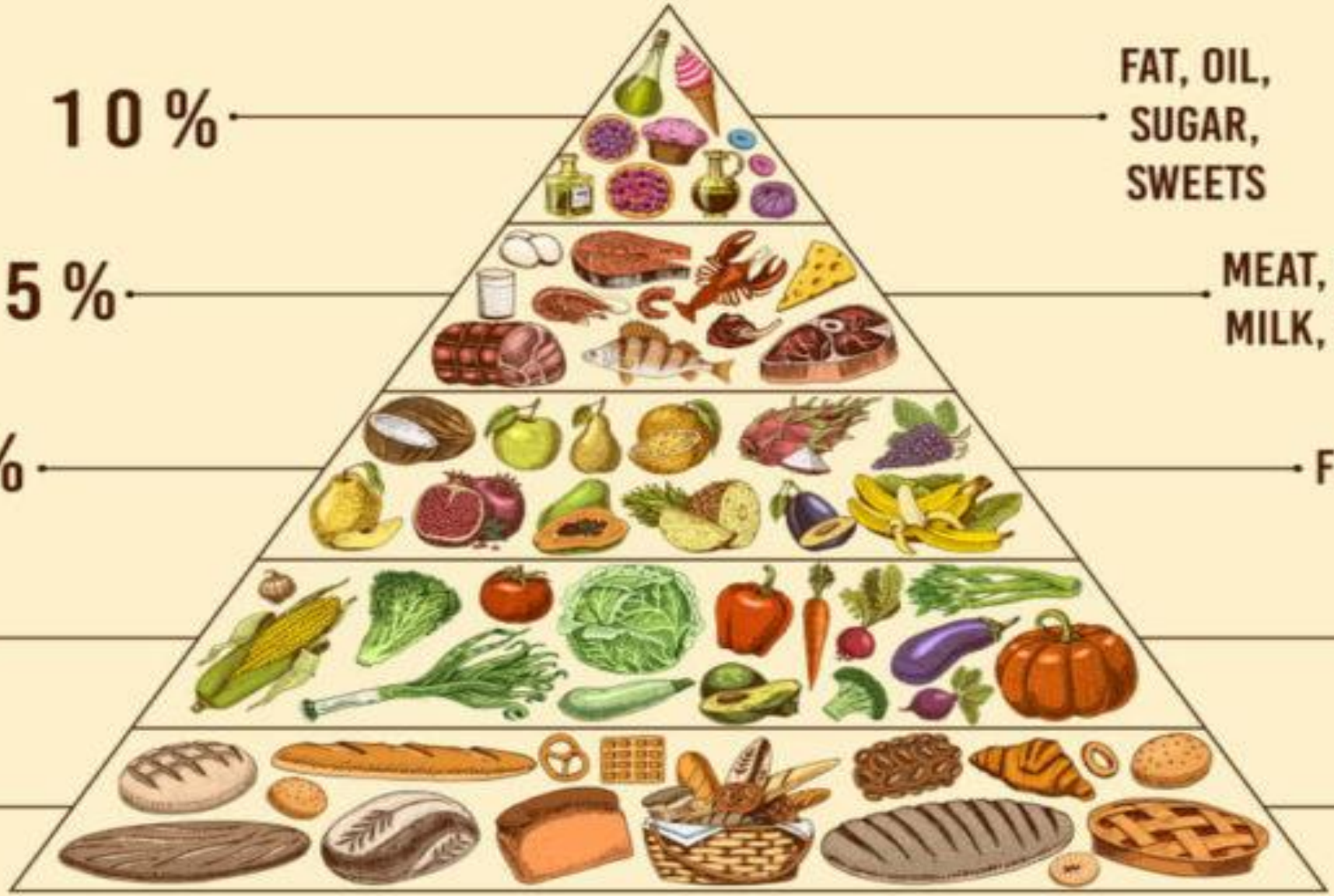
HEALTHY FOOD PYRAMID



10 % — FAT, OIL, SUGAR, SWEETS

15 % — MEAT, FISH, MILK, EGGS

20 % — FRUITS

25 % — VEGETABLES

30 % — BREAD, CEREALS, PASTA

METABOLIC RATE (MR)

The amount of energy expended by an HUMAN over a specific period of time is called its metabolic rate. Metabolic rate may be measured in joules, calories, or kilocalories per unit time. You may also see metabolic rate given as oxygen consumed (or carbon dioxide produced) per unit time.

WHAT ARE CALORIES ?

A calorie is the quantity of heat required to raise the temperature of 1 gram of water 1^0 C, it is used to express the quantity of energy released from different foods or expended by different functional processes of the body.

BASEL METABOLIC RATE (BMR)

BMR Definition: Your Basal Metabolic Rate (BMR) is the number of calories you burn as your body performs basic (basal) life-sustaining function. Commonly also termed as Resting Metabolic Rate (RMR), which is the calories burned if you stayed in bed all day. Your BMR defines your basal metabolism rate which makes up about 60-70% of the calories we use ("burn" or expend).

This includes the energy your body uses to maintain the basic function of your living and breathing body, including:

- **The beating of our heart**
- **Cell production**
- **Respiration**
- **The maintenance of body temperature**
- **Circulation**
- **Nutrient processing**

Your unique metabolism rate, or BMR, is influenced by a number of factors including age, weight, height, gender, environmental temperature, dieting, and exercise habits.

BMR CALCULATOR

Mifflin-St Jeor Equation:

For men:

$$BMR = 10W + 6.25H - 5A + 5$$

For women:

$$BMR = 10W + 6.25H - 5A - 161$$

Revised Harris-Benedict Equation:

For men:

$$BMR = 13.397W + 4.799H - 5.677A + 88.362$$

For women:

$$BMR = 9.247W + 3.098H - 4.330A + 447.593$$

Katch-McArdle Formula:

$$BMR = 370 + 21.6(1 - F)W$$

where:

W is body weight in kg

H is body height in cm

A is age

F is body fat in percentage

ENERGY BALANCE EQUATION

Energy Input (calories in) – Energy Output (calories out) = Energy Balance

1 gram of carbohydrates = 4 Calories
1 gram of protein = 4 Calories
1 gram of Fat = 9 Calories

ENERGY BALANCE

What is Energy Balance?

•Energy going into the body > Energy leaving the body

= The body has positive energy balance.

•Energy going into the body < Energy leaving the body

= The body has negative energy balance.

•Energy going into the body = Energy leaving the body

= The body has equal energy balance.

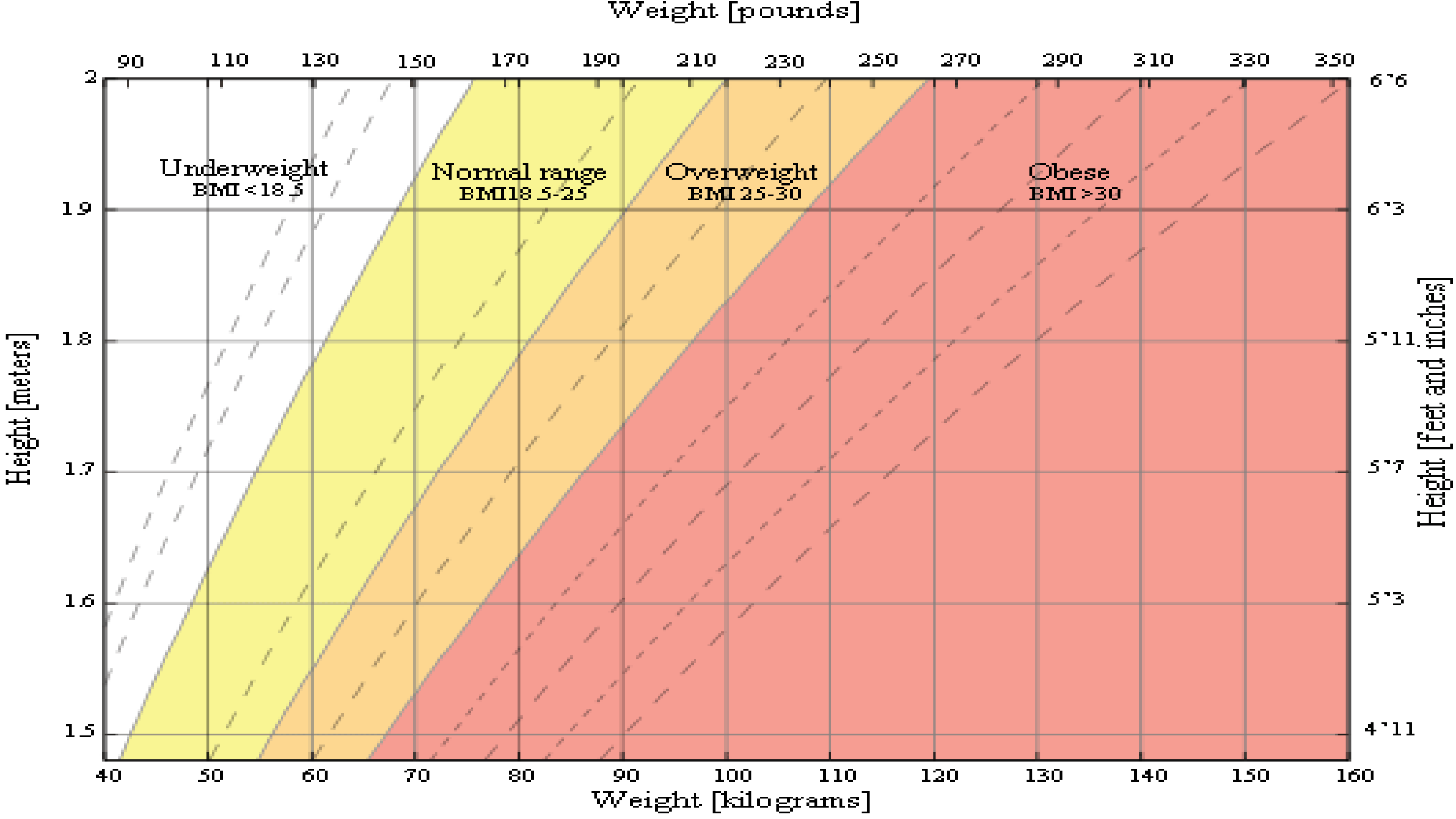
WHAT IS BODY MASS INDEX (BMI)

Body Mass Index (BMI) is a person's weight in kilograms (or pounds) divided by the square of height in meters (or feet). A high BMI can indicate high body fatness. BMI screens for weight categories that may lead to health problems, but it does not diagnose the sickness or health of an individual.

BMI table for adults

It is used for both men and women, age 20 or older.

Category	BMI range - kg/m²
Severe Thinness	16 >
Moderate Thinness	17 - 16
Mild Thinness	18.5 - 17
Normal	25 - 18.5
Overweight	30 - 25
Obese Class I	35 - 30
Obese Class II	40 - 35
Obese Class III	40 <


Weight [pounds]
90
110
130
150
170
190
210
230
250
270
290
310
330
350
Underweight
BMI<18.5
Normal range
BMI18.5-25
Overweight
BMI25-30
Obese
BMI>30
2
1.9
1.8
1.7
1.6
1.5
Height [meters]
6'6
6'3
5'11
5'7
5'3
4'11
Height [feet and inches]
40
50
60
70
80
90
100
110
120
130
140
150
160
Weight [kilograms]

HOW DETERMINE CALORIC NEEDS?

Calculating Your Daily Calories

1.For women

BMR = 655.1 + (9.563 x weight in kg) + (1.850 x height in cm) - (4.676 x age in years)

1.For men

BMR = 66.47 + (13.75 x weight in kg) + (5.003 x height in cm) - (6.755 x age in years)

HOW MANY CALORIES DO I BURN A DAY?

According to the U.S. Department of Health and Human Services, the average adult woman expends roughly 1,600 to 2,400 calories per day, and the average adult man uses 2,000 to 3,000 calories per day.

METABOLISM

the chemical processes by which nutritive material is built up into living matter, or by which complex molecules are broken down into simpler substances during the performance of special functions’. The various reactions which involve the synthesis of complex molecules can be grouped under the heading of *anabolism*,

whereas the breakdown of complex molecules is known as *catabolism*. As might be expected, both anabolic and catabolic processes include a vast number of different chemical reactions, but there are a number of common features. Most of the metabolic processes occur inside the cells of the body, mainly in the cytoplasm, but also inside intracellular organelles such as the mitochondria. Anabolic and catabolic reactions involve the action of enzymes and the utilization of energy. In some cases the metabolic processes are regulated locally, i.e. by the cell itself, but often the metabolism of the whole body is controlled in an integrated fashion by the action of hormones and/or the nervous system.

Thank you for Listening!