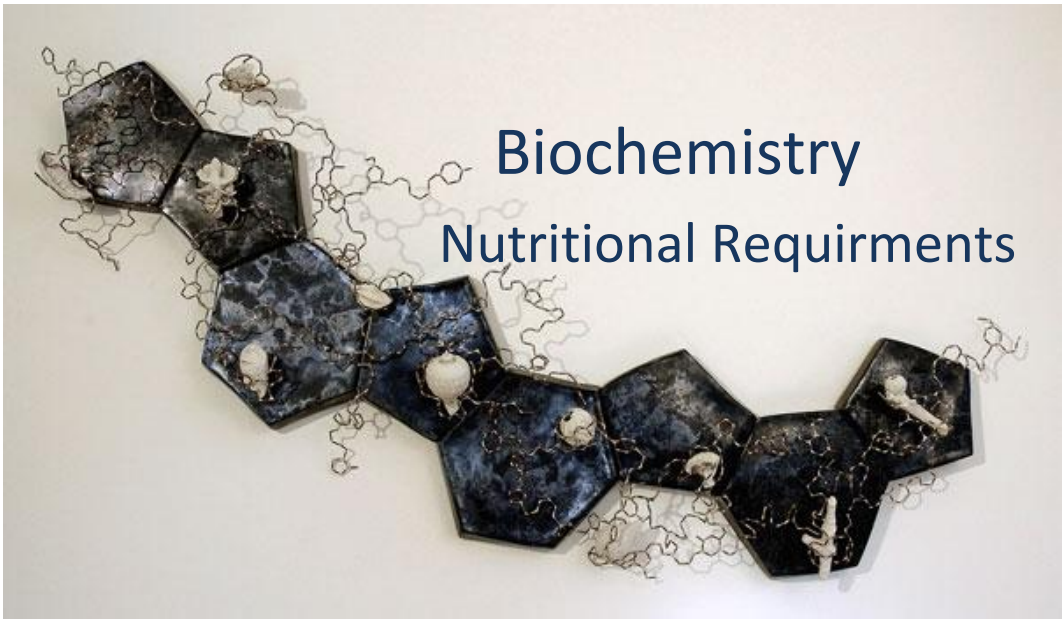

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What is nutrition?

- Composition and quantity of food intake by living organisms
- Biochemical utilization of food
- Human nutrition is divided into three areas:
  - Undernutrition (nutrient deficiency)
  - Overnutrition (excessive nutrient intake) → may lead to toxicity
  - Optimal nutrition (balanced nutrient intake)

- Energy sources : (Macronutrients)
1. Carbohydrates (the largest source).
2. Fats (the second one).
3. Proteins (the third one).
- (Micronutrients)
1. vitamins
2. minerals

Malnutrition : Malnutrition is the condition that develops when the body does not get the right amount of the vitamins, minerals, and other nutrients.

Assessment of malnutrition

- Malnutrition in humans is measured by:
- Dietary intake studies: identify people with deficient diets
- Biochemical studies: identify subclinical nutritional deficiencies → there is no symptoms. (we interfere here so not to progress to the next one)
- Clinical symptoms: identify clinical nutritional deficiencies → you start seeing symptoms.

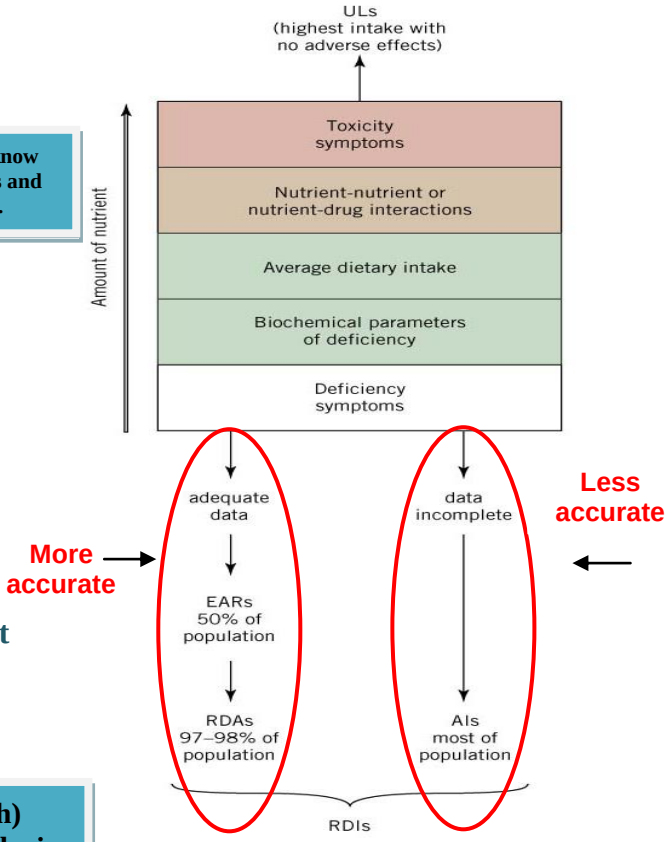
Dietary Reference Intakes (DRIs)

- Quantitative estimates (a particular number) of nutrient intakes required to prevent deficiencies and maintain optimal health in populations
- Recommended by: Food and Nutrition Board of the National Research Council, USA

Dietary Reference Intakes (DRIs)

- DRIs have four standards:
- Estimated Average Requirement (EAR)
- Recommended Dietary Allowance (RDA)
- Adequate Intake (AI)
- Tolerable Upper Intake Level (UL)

You should know the full terms and the shortcuts.



❖ Estimated Average Requirement (EAR)

- The amount of nutrient intake estimated to meet the nutritional requirement of ***half of the healthy individuals*** in an age and gender group

❖ Recommended Dietary Allowance (RDA)

- The amount of nutrient intake that is sufficient to meet the nutritional requirement of ***nearly all (97-98%) healthy individuals*** in a group
- RDA is two SD above EAR
- RDA = EAR + 2 SD

RDA is more accurate than EAR.

RDIs (in the graph) Reference Daily Intake is the same as DRIs

You can calculate the DRIs of both.

Standard deviation means how much the data is varied. Let's say we have 3 students, one got 4 marks, the other 5 marks and the 3 rd 6 marks, the average would be 15/3= 5, so the standard deviation would be 5+1 (the maximum value) 5-1 (the minimum value) by this, we get the whole range.
Example: for carbohydrates, EAR= 30 (+/-15) EAR (+/-SD). 50% of the population and the standard deviation 15, so the range = from 30-15 to 30 +15 = 15 to 45.
RDA= 30 + (2X15) = 30 + 30 = 60

❖ Adequate Intake (AI)

- It is used instead of EAR and RDA if:
- A nutrient is considered essential but the experimental **data are inadequate** for determining EAR and RDA
- AI covers the nutritional requirement of all individuals in a group with approximation due to insufficient data

We use **AI** if the data is not complete (inadequate) ***only.***

❖ Tolerable Upper Intake Level (UL)

- The **highest level of daily nutrient intake** (the maximum amount an individual can take) that has **No** adverse health effects or toxicity in almost all individuals

Here, when the person increases the **nutrition amount,** he will reach the **toxicity level.**

❖ Acceptable Macronutrient Distribution Ranges (ADMR)

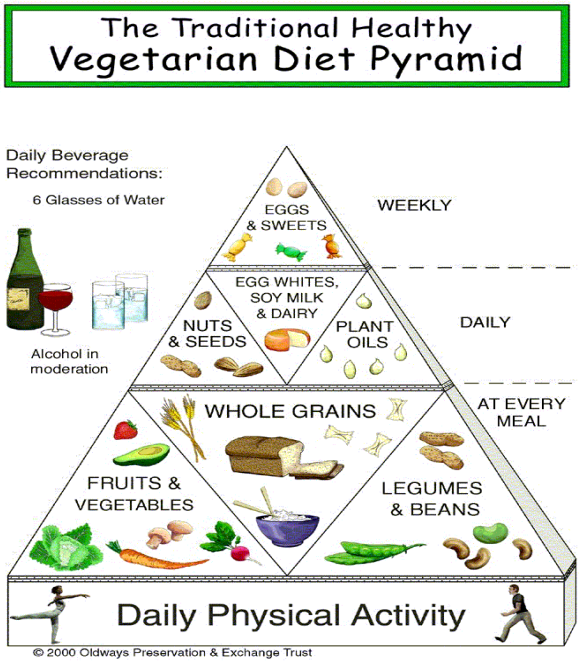
- Range of adequate intake of a macronutrient associated with reduced risk of chronic diseases
- ADMR for adults (% of total calories)
  - Carbohydrates 45-65
  - Fats 20-35
  - Proteins 10-35
  - Fiber >25 g

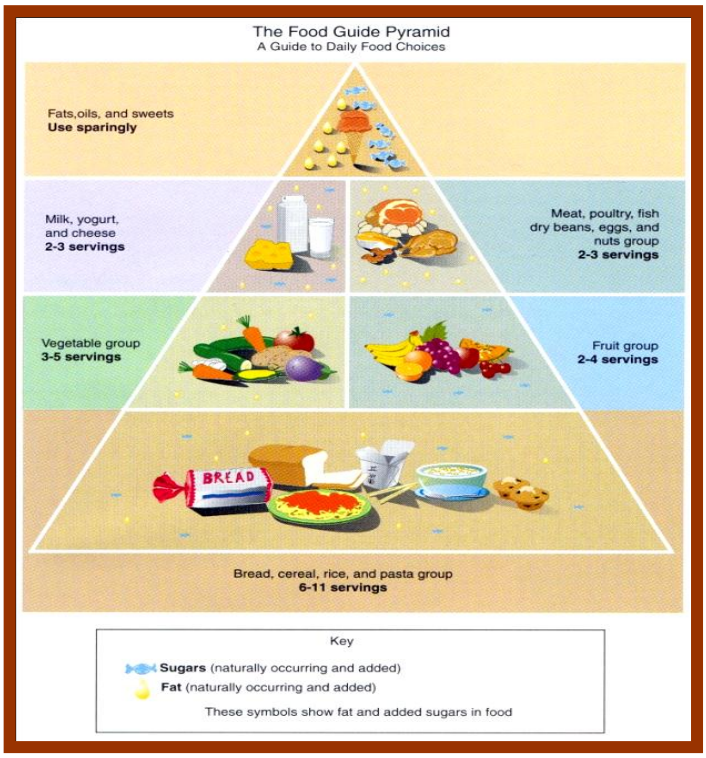
When your meals include **these components in this ranges,** you will be a healthy person.

You should know the accurate numbers.

❖ Food Pyramid (United States Department of Agriculture ,Center for Nutrition Policy and Promotion)

- Public educational tool established in 1992
- Recommends size of daily servings
- Pyramid shape
- Fats, oils and sweets have small serving size





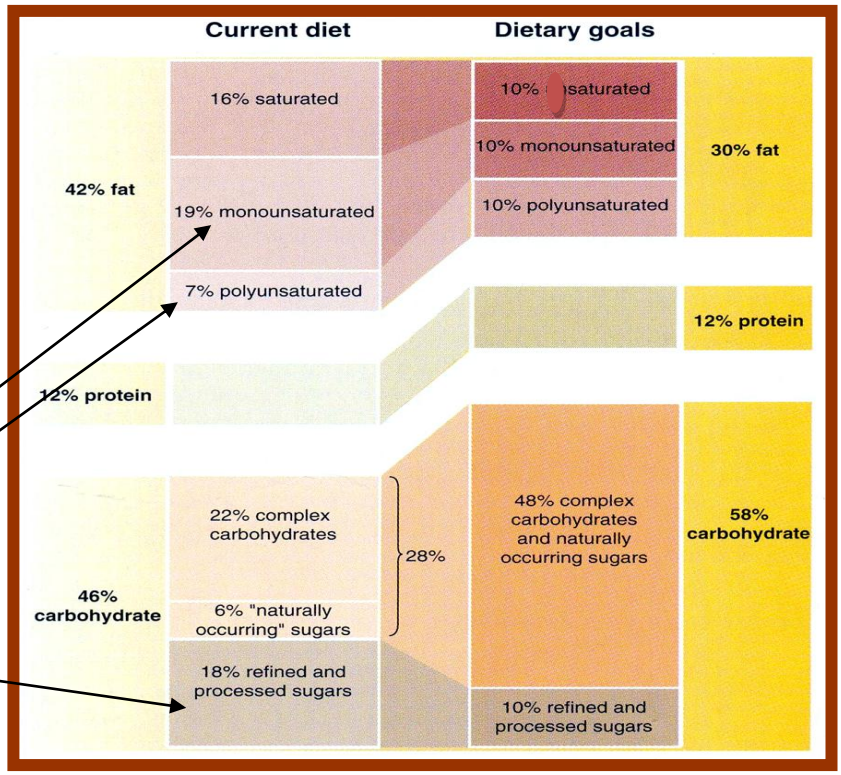
The doctor said that mypyramid.gov has the latest food pyramid for whoever is interested.

❖ Dietary guidelines and goals

- Consume a variety of foods from the basic food groups
- Control calorie intake to manage body weight
- Be physically active everyday
- Choose fats and CHOs wisely for good health
- Increase daily intake of fruits, vegetables, whole grains,
  and non-fat or low-fat milk and milk products
- Choose and prepare foods with little salt

This picture helps you to improve your eating habits.
By :

- **Reducing monounsaturated fats.**
- **Increasing polyunsaturated fats.**
- **Reducing refined & processed sugars.**



❖ Energy requirement in humans

- The dietary energy intake required to maintain energy balance in a healthy individual
- Energy balance is maintained by calorie intake and energy expenditure (burning)
- Energy content of food is measured in calories or kilocalories (heat energy)

Polyunsaturated fat and complex carbohydrates are the healthiest of their food group and therefor should have the highest amounts in our diet

Sex	Age	Weight (Kg)	Avg. Energy Needs (kcal)
Men	23–50	70	upto 2900
Women	23–50	55	upto 2200
Pregnant	-	-	+300
Lactating	-	-	+500

❖ Vegetarians and nutrient intake

- Lower intake of iron, calcium and vitamin D
- Long-term vegans may develop megaloblastic anemia due to vitamin B_{12} deficiency
- Most consume enough protein
- Lower in total dietary fat

megaloblastic anemia: anemia characterized by the presence of megaloblasts in the bone marrow and macrocytic erythrocytes. It occurs in vitamin B12, cobalt and folic acid deficiencies.

❖ Vegetarians and chronic disease

- Lower Body Mass Index (BMI)
- Lower death rate from ischemic heart disease
- Lower blood pressure **(lower incidence of high blood pressure)**

- **Lower cancer rates compared to non-vegetarians**

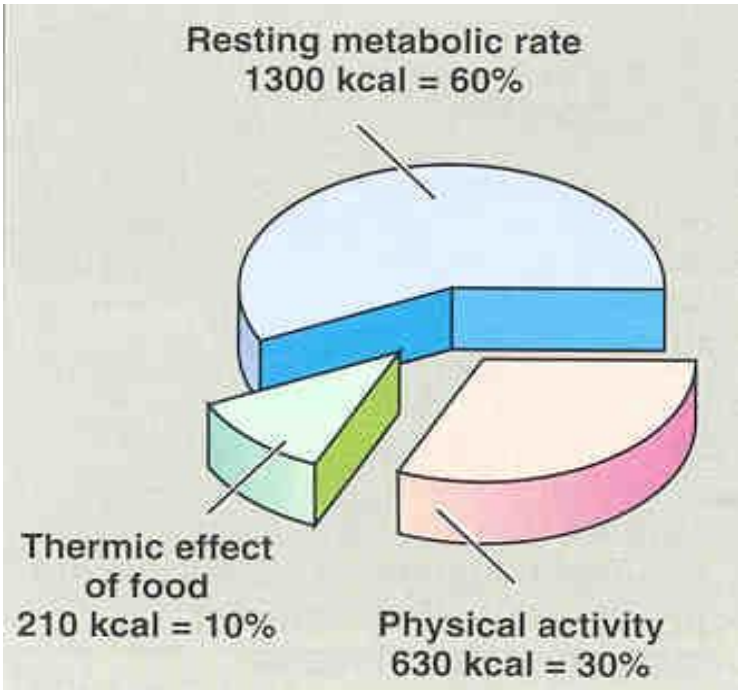
❖ **Basic energy expenditure depends on:**

Resting metabolic rate (RMR) : is the amount of calories that we need to maintain normal body functions after taken food and without any activities.

- **Energy expense at rest**
- **Required for normal body function**
- **Depends on age, sex, growth, body surface area, fever, fasting, stress**
- **Men: 1800 kcal**
- **Women: 1300 kcal**

❖ **Physical activity**

- **Sedentary (inactive person) person: 30-50% above RMR**
- **Active person: 100%+ above RMR**
- **Thermic effect of food**
- **Heat produced by the body due to food digestion and absorption**
- **5-10% of total energy expenditure**



Questions:

1. Which ONE of the following is the basic energy expenditure above the resting metabolic rate (RMR) of an active person?
A. 10%
B. 30%
C. 50%
D. 100%

2. Which ONE of the following approximately covers the nutritional requirement ofall individuals in a group due to insufficient data?
A. Acceptable Macronutrient Distribution Range (AMDR)
B. Estimated Average Requirement (EAR)
C. Adequate Intake (AI)
D. Dietary Reference Intake (DRI)

3. The most common cause of megaloblastic anemia is:
A. Iron deficiency
B. B12 deficiency
C. Myxaedema
D. None of the above

4. Benefits of vegetarians and nutrients intake :
A. Lower blood pressure.
B. Lower intake of iron.
C. Lower intake of calcium.
D. Lower in total dietary fat.

5. Which ONE of the following is the largest energy source :
A. Carbohydrates.
B. Fats.
C. Proteins.
D. None of the above.

1. D
2. C
3. B
4. A
5. A

Good luck

Done by: Abdulaziz Al-Shamlan , Osamah Al-Jarallah and Deema Jomar