- **What are nutrients:**
  - They are food constituents (مكونات الغذاء الأساسية) needed for sustaining and driving normal body functions.
  - **Nutrients provide your body with:**
    - ✓ Energy (which you need to perform various functions).
    - ✓ Essential molecules which:
      - ❖ Cannot be synthesized by the body or synthesized in an inadequate amount which cannot meet the body demands.
  - **Essential nutrients are:**
    - ✓ Proteins/ amino acids:
      - ❖ *Animals*: containing all essential amino acids.
      - ❖ *Plants*: do not contain all essential amino acids. Therefore, they have lower biologic value than animal proteins.
    - ✓ Carbohydrates:
      - ❖ *Monosaccharies*: glucose and fructose.
      - ❖ *Disaccharides*: sucrose, lactose and maltose.
      - ❖ *Polysaccharides*: starch found in plants, wheat and vegetables.
      - ❖ *Dietary fibers:*
        - ➢ Non-digestible carbohydrates (cellulose, lignin and pectin).
        - ➢ They increase bowel motility thus reducing the risk of colon cancer, constipation and hemorrhoids.
    - ✓ Fatty acids:
      - ❖ Triglycerol constitutes the majority (90%) of dietary lipids.
      - ❖ Lipids are needed to provide essential fatty acids and absorption of dietary fat-soluble vitamins (A, D, K and E).
    - ✓ Vitamins: including both water-soluble and fat-soluble vitamins.
    - ✓ Minerals: including calcium, phosphorus, sodium, potassium and iron.
- **Recommended Dietary Allowance (RDA):**
  - An estimate of the amount of a nutrient needed to meet the needs of 98% of the population.
  - It does not indicate the minimal requirement for healthy individuals (it provides a margin of safety for most individuals).
  - It is designed to prevent nutrition deficiency syndromes (e.g. rickets مرض الكساح and scurvy داء الأسقربوط).
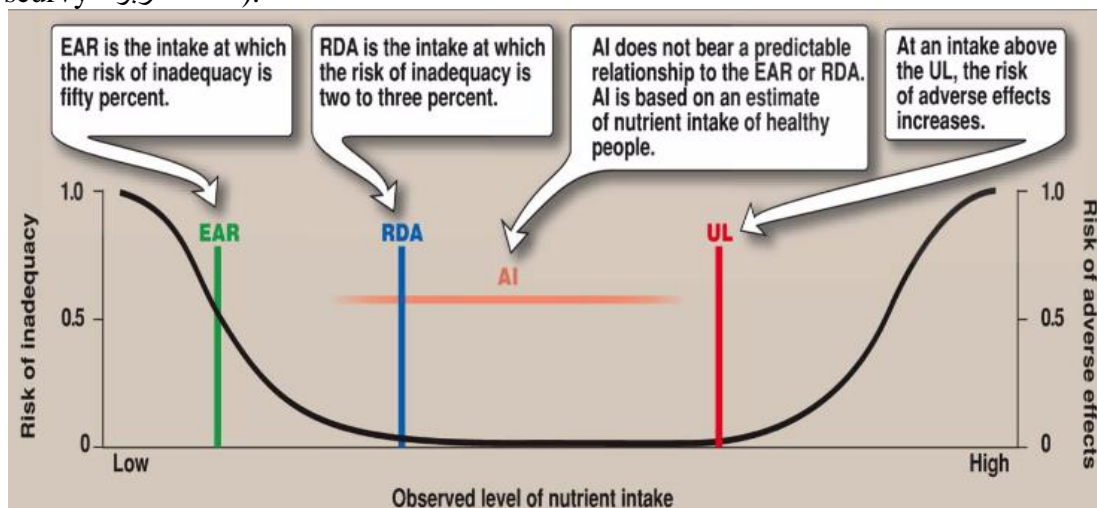
  - ✓ EAR: Estimated Average Requirement.
  - ✓ RDA: Recommended Dietary Allowance.
  - ✓ AI: Adequate Intake.
 - ✓ UL: tolerable Upper intake Level.

- **What are the factors which affect RDA:**
  - ✓ <u>Age</u>:
    - ❖ *Adults*: 0.8 g of protein/ kg of body weight.
    - ❖ *Infants*: more than 2.0 g of protein/ kg of body weight.
  - ✓ <u>Gender</u>:
    - ❖ *Males*: RDA for males is 20% greater than those for females.
    - ❖ *Females*: increased RDA for iron to compensate for periodic iron loss during menstruation.
  - ✓ <u>Physiological and pathological factors</u>:
    - ❖ *Pregnant and lactating females*: 20-30% increased RDA for most nutrients.
    - ❖ Increased requirements of some nutrients in patient with injury and illness.

- **<u>Energy Requirements:</u>**
  - **Adult 70 kg male**: 2900 kcal.
  - **Adult 50 kg female**: 2100 kcal.
  - **The energy intake depends on the type of food taken:**
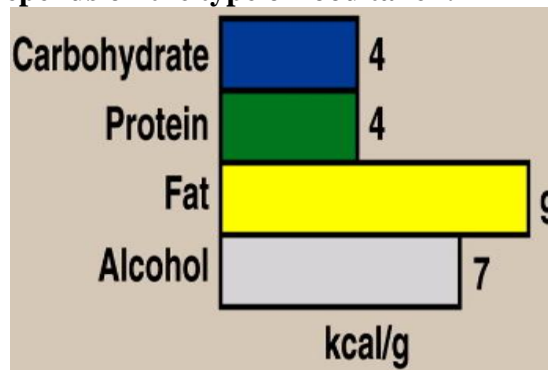
  - **Total energy requirement:**
    - ✓ <u>It is the sum of three energy-dependent processes:</u>
      - ❖ *Basal Metabolic Rate (BMR):* energy expended in resting, post-absorptive state for normal body functions (e.g. respiration and blood flow).
      - ❖ *Thermic effect of food*: increased heat production (30%) during food digestion and absorption.
      - ❖ *Physical activity*: provides for the greatest difference in energy needs.

- **<u>Nitrogen balance</u>**: difference between nitrogen consumed and excreted.
  - **Positive-nitrogen balance:**
    - ✓ Consumed nitrogen exceeds excreted nitrogen.
    - ✓ <u>Typically seen in:</u>
      - ❖ Children and pregnancy.
      - ❖ Recovery from a severe illness.
      - ❖ Some pathological conditions such as tissue growth.
  - **Negative-nitrogen balance:**
    - ✓ Excreted nitrogen exceeds consumed nitrogen.
    - ✓ <u>Associated with:</u>
      - ❖ Inadequate dietary protein intake.
      - ❖ Lack of an essential amino acid.
      - ❖ Physiologic stresses: trauma, burns, illness or surgery.