CARBOHYDRATES METABOLISM
GLUCOSE METABOLISM

- **Site of absorption:** Mainly the upper part of small intestine.

- **Route of absorption:** By the portal vein to the liver, i.e., blood stream chiefly in the form of hexoses (glucose, fructose, mannose and galactose) and as pentose sugars (ribose).
Blood values of glucose

- The normal fasting value: 70-110 mg/100 ml.
- After meal: 120-150 mg/100 ml.
Glucose sources in human body

- Dietary carbohydrates.
- Liver glycogenolysis.
- Gluconeogenesis.
The fate of absorbed glucose

- Glucose oxidation.
- Glycogenesis.
- Lipogenesis.
- Lose in urine (in special conditions).
Tissues which maintain glucose balance in blood:

➢ Gastrointestinal tract:

It prevents hyperglycemia (high blood glucose level) after carbohydrate meal. When the glucose contacts with the intestinal mucosa, it secretes into the blood certain factors which stimulate insulin secretion.
The liver:

It plays the most important role in regulation of blood glucose level.

In hyperglycemia: it decreases blood glucose by:
1. Glycogenesis.
2. Oxidation of glucose.
3. Lipogenesis.

In hypoglycemia: it increases blood glucose by:
1. Glycogenolysis.
2. Gluconeogenesis.
3. Interconversion from different hexoses (fructose or galactose) into glucose.
Muscles:
It prevent hyperglycemia by:
1. Glycogenesis.
2. Oxidation of glucose.

Adipose tissue:
It prevent hyperglycemia by increasing lipogenesis.

The kidney:
It prevent glucose loss in urine.
It adds little glucose to the blood by gluconeogenesis.
Hormones which maintain glucose balance in blood:

- **Insulin**: it lowers the blood glucose level by increasing:
  1. Glycogenesis.
  2. Oxidation of glucose.
  3. Lipogenesis.
  4. Glucose uptakes.

It also inhibits:

- 1. Glycogenolysis.
- 2. Gluconeogenesis.
- **Glucagon and adrenaline**: they increase the blood glucose level by increasing glycogenolysis and gluconeogenesis and inhibiting glycogenesis.

- **Glucocorticoids and growth hormone**: they increase the blood glucose level by increasing gluconeogenesis and inhibiting glucose uptake, oxidation and lipogenesis.

- **Thyroxine**: it increases the blood glucose level by:
  1. Increasing the rate of glucose absorption from intestine.
  2. Stimulating glycogenolysis and gluconeogenesis.
  3. Inhibiting glycogenesis.
  4. Increasing the catabolism of insulin.