# Regulation of Blood Sugar.

## # Normal plasma glucose level.

- fasting blood sugar (12 hours after last meal - FBS) = 70 - 110 mg/dL. 70-11
- post prandial blood sugar (1 1/2 hours after having rich diet - PPBS) = 90 - 140 mg/dL. 90-140.
- Random blood sugar = 80 - 120 mg/dL. 80-120.

Concentration of sugar in blood depends upon the balance between two sets of factors.

(1) rate of glucose enters into blood stream
(2) rate of removal of glucose from blood stream.

① Entry of glucose

- Absorption from GIT
- glycogenolysis.
- gluconeogenesis

. Glucose absorbed from other carbohydrates like galactose, fructose etc.

② Removal of glucose

- glycolysis
- Glycogenesis.
- lipogenesis.
- synthesis of cmpds containing carbohydrates like lactose, glycoproteins, glycolipids etc.

# Regulation is fasting and post prandial states.

## A. post - prandial state.

- After meal, glucose enters blood.
- Stimulates secretion of insulin
- Conversion of glucose to glycogen or fat.

## B. Fasting state.

- Liver is the major organ that supplies glucose for maintaining blood glucose level.
  - ✓ Hepatic glycogenolysis.
  - ✓ Gluconeogenesis
  - ✓ action of hyperglycemic hormones.

# ROLE OF HORMONES.

- Balance between Entry and depletion of glucose is brought about by insulin (hypoglycemic) and other hyperglycemic hormones.

- When blood glucose level is within normal level it is called normoglycemia

- Above normal range is hyperglycemia and below normal range is hypoglycemia (<50mg/dL)

1. Hormones which decrease blood sugar level. {Hypoglycemic hormone) - insulin.

2. Hormones which increase blood sugar level. {Hyperglycemic hormone).
ie, glucagon, catacholamines, growth hormone, glucocorticoids, Thyroxine.

## Role of Insulin.

- produced by beta cells of islets of langerhans in pancreas.
- major stimulants for insulin secretion - Glucose.

Insulin lower blood Sglucose by stimulating

(a) glycogenesis (Active glycogen synthase enzyme)

(b) glycolysis (Activate key glycolytic enzymes glucokinase, PFK and pyruvate kinase)

(c) Increase rate of uptake of glucose by tissues.

(d) stimulate HMP shunt pathway by activating G6PD.

Insulin lowers blood glucose by inhibiting,

(a) glycogenolysis (by inhibiting glycogen phosphorylase).

(b) gluconeogenesis (by inhibiting key enzymes).

## Role of glucagon.

- It is secreted by alpha cells of islets of langerhans of pancreas.
- stimulant for secretion - hypoglycemia.
- It raises blood sugar level to normal by alkalating.

→ Hepatic glycogenolysis (by activating glycogen phosphorylase)

→ Gluconeogenesis (by activating key enzymes of gluconeogenesis).