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INSULIN

Insulin is a small protein; human insulin has a molecular weight of 5808. It is composed of two amino acid chains, connected to each other by disulfide linkages.

Insulin is synthesized in the beta cells of Islet of Langerhans.The insulin receptors is tyrosine specific protein kinase.

Factors Affecting Insulin secreation

stimulators	Inhibitors
Increased blood glucose	Somatostain
Mannose	2-deoxyglucose
Increased fatty acids	Mannoheptulose
Increased blood amino acids (leucine,arginine etc.)	α-adrenergic stimulators(norepinephrine,epinephrine)
Intestinal hormone(GIP,GLP-1,gastrin,secretin)	β-adrenergic blockers(propanolol)
β-keto acid	Decreassing blood glucose
acetylcholine	Fasting
Growth hormone, cortisol	Galnin
Insulin resistance,obesity	Diazoxide
cAMP	Thiazide diuretics
β-adrenergic stimulators	Alloxan
Theophyline	Phenetoyin

Effects of Insulin on Various Tissues

Adipose Tissue

- Increased glucose entry
- Increased Fatty acid synthesis
- Increased glycerol phosphate synthesis
- Increased triglyceride deposition
- Activation of lipoprotein lipase
- Inhibition of hormone sensitive lipase

Muscle

- Increased glucose entry
- Increased glucose synthesis
- Increased amino acid uptake
- Increased protein synthesis in ribosome
- Decreased protein catabolism
- Decreased release of gluconeogenic amino acid
- Increased ketone uptake
- Increased K^+ uptake

Liver

- Decreased ketogenesis
- Increased Protein synthesis
- Increased lipid synthesis
- Decreased gluconeogenesis and increased glycogen synthesis

General

Increased cell growth

Actions of Insulin on Various Mammalian Cellular Types

Cell or tissue	Glucose Uptake	Glycogenesis	Lipid uptake	Net triglyceride syntheis
Skeletal Muscle	+	+	0	
Cardiac Muscle	+	+		
Adipocytes	+	+	+	+
Cartilage	+	+		
Bone	+	+		
Fibroblasts	+	+		
Leukocytes	+	+		
Mammary Gland(during lactation)	+	+		
Erythrocytes,kidney,testis,brain,etc.	0	0		

Refference

1. *Ganong,W.F., Review of Medical Physiology,22nd edition*
2. *Norris,D.O., Vertebrate Endocrinology, 2nd edition*