

SNS COLLEGE OF PHYSIOTHERAPY

Affiliated To The Tamil Nadu Dr. MGR Medical University, Chennai

Coimbatore – 641035

COURSE NAME: PHYSIOLOGY

***SUBJECT CODE: 6281 TOPIC: GENERAL
METABOLISM – CARBOHYDRATES, FAT,
PROTEIN***

Introduction of general metabolism

General Metabolism :

Metabolism refers to all chemical reactions occurring in the body

Two major components:

Anabolism – synthesis of complex molecules

Catabolism – breakdown of molecules to release energy

Major nutrients involved:

Carbohydrate

Proteins

Primary purpose: Energy production, growth, and maintenance



Role of Metabolism in the Human

PROVIDE ENERGY FOR :

Body
Muscle contraction

Nerve conduction

Cellular repair and growth

MAINTAIN;

Body temperature

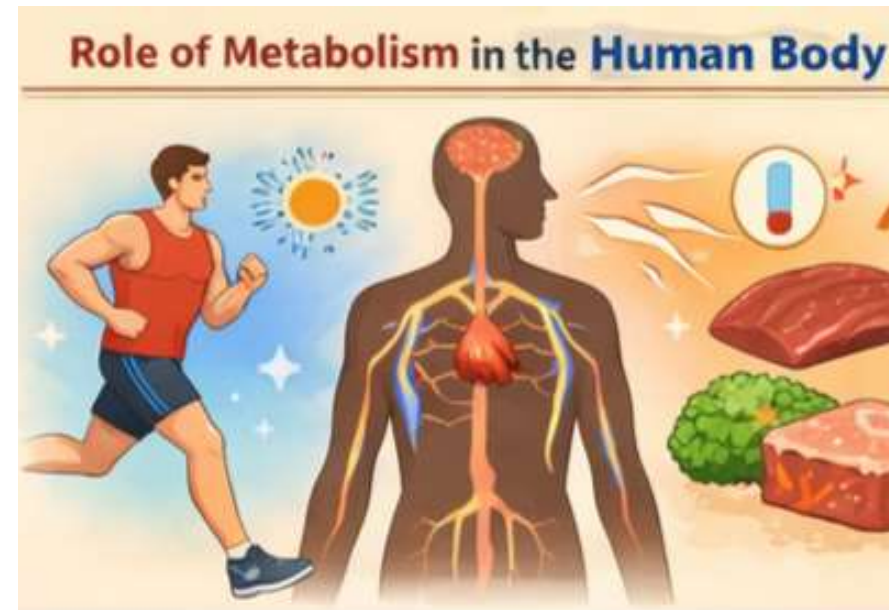
Acid–base balance

Supports physiological activities like:

Exercise

Healing

Hormonal regulation



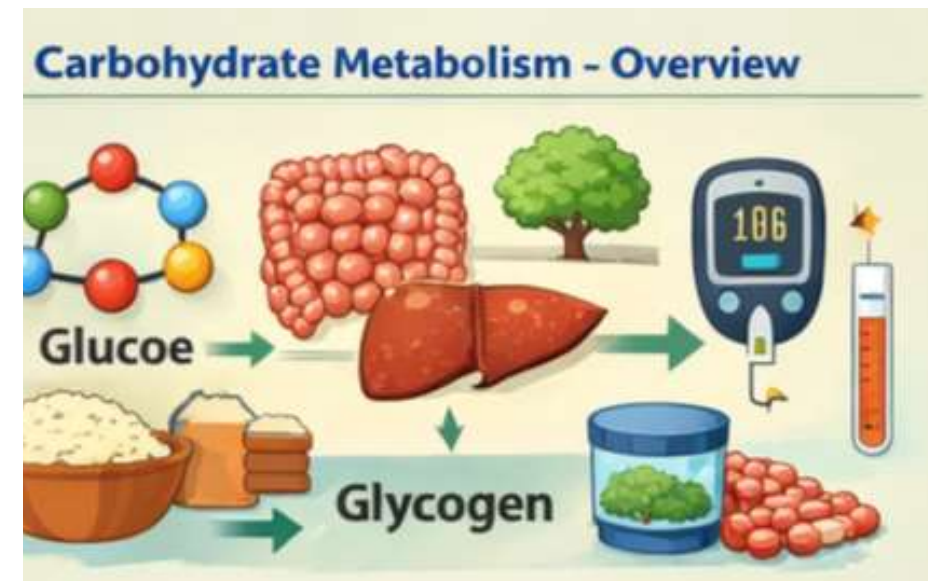
Carbohydrate Metabolism – Overview

Primary and quickest source of energy
Major dietary carbohydrates:

Glucose
Fructose
Galactose

Stored in the body as glycogen (liver and muscles)

Normal blood glucose level is tightly regulated



Pathways of Carbohydrate Metabolism

Glycolysis – breakdown of glucose to produce ATP

Glycogenesis – formation of glycogen from glucose

Glycogenolysis – breakdown of glycogen to glucose

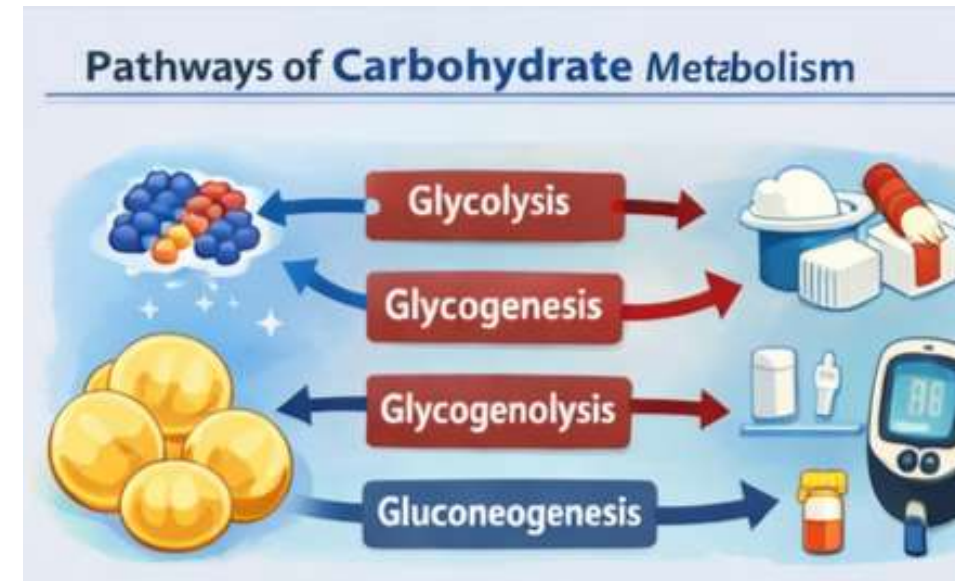
Gluconeogenesis – formation of glucose from non-

carbohydrate sources

Key hormones:

Insulin

Glucagon



Fat Metabolism – Overview

Fats are the most concentrated energy source

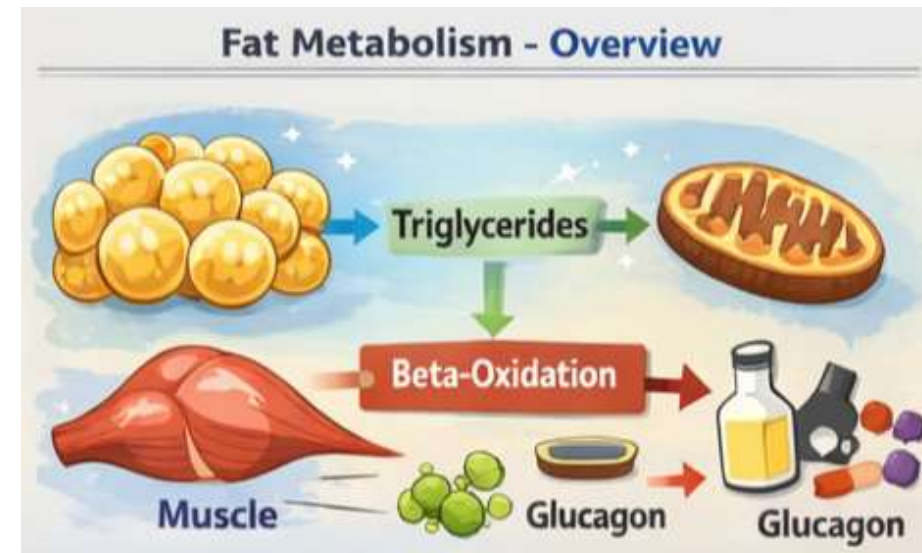
Stored as triglycerides in adipose tissue

Provide:

Long-term energy

Insulation and protection

Yield more ATP compared to carbohydrates



Pathways of Fat Metabolism

Lipolysis – breakdown of triglycerides into fatty acids

Beta-oxidation – oxidation of fatty acids to produce ATP

Ketogenesis – formation of ketone bodies during fasting

Important organs involved:

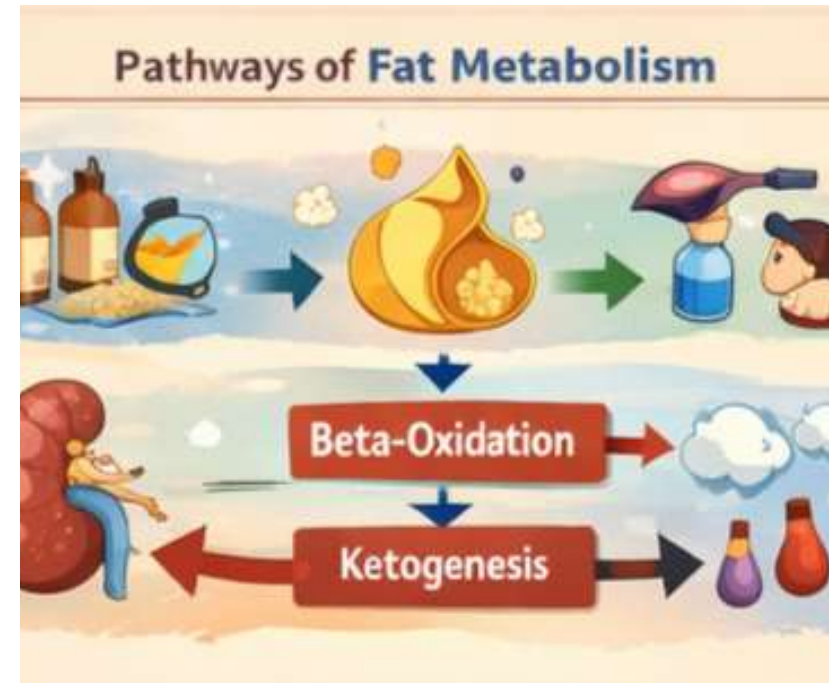
Liver

Adipose tissue

Hormonal control:

Glucagon

Adrenaline



Protein Metabolism – Overview

Proteins are mainly used for:

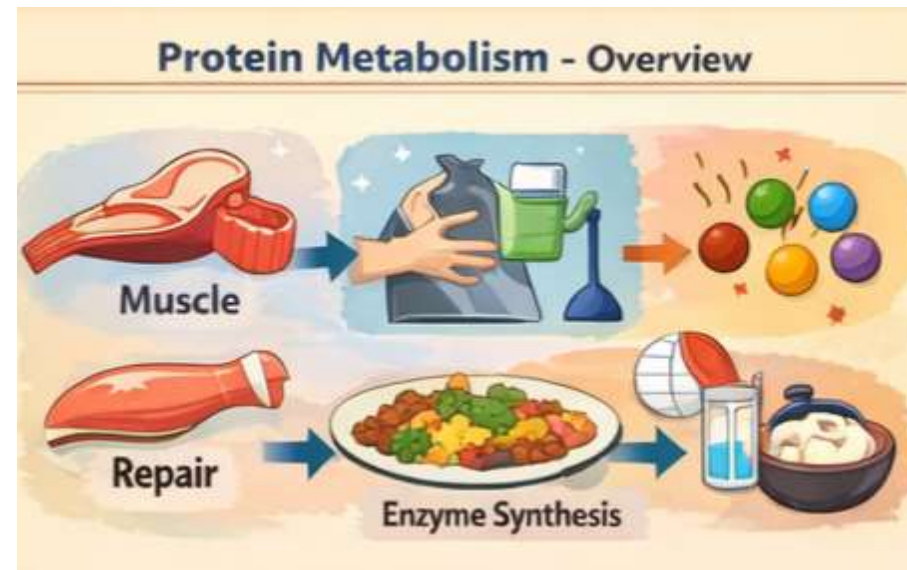
Growth

Tissue repair

Enzyme and hormone synthesis

Not a primary energy source

Broken down into amino acids



Pathways of Protein Metabolism

Proteolysis –breakdown of proteins into amino acids

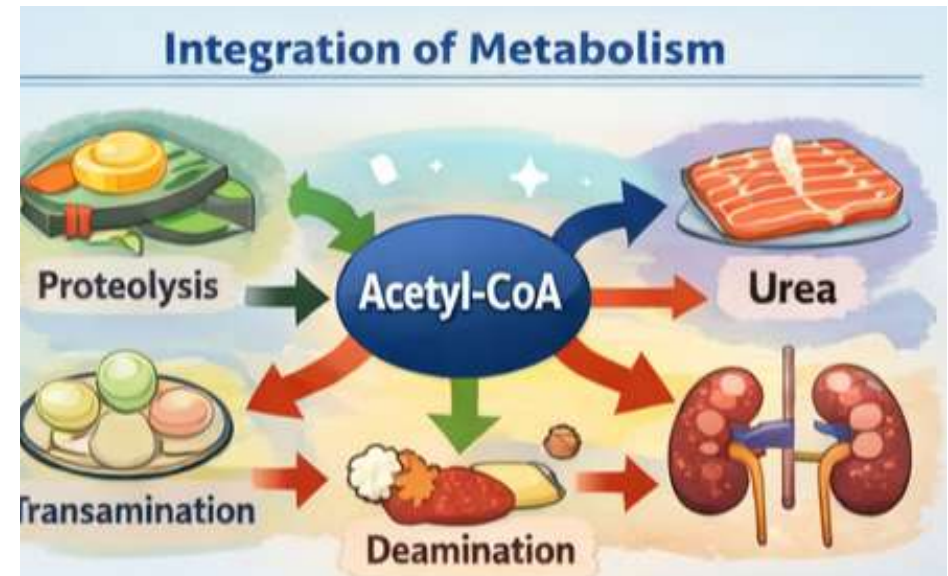
Transamination – transfer of amino groups

Deamination – removal of amino group

End products:

Urea (excreted by kidneys)

Carbon skeletons used for energy or glucose production



Integration of Carbohydrate, Fat, and Protein Metabolism

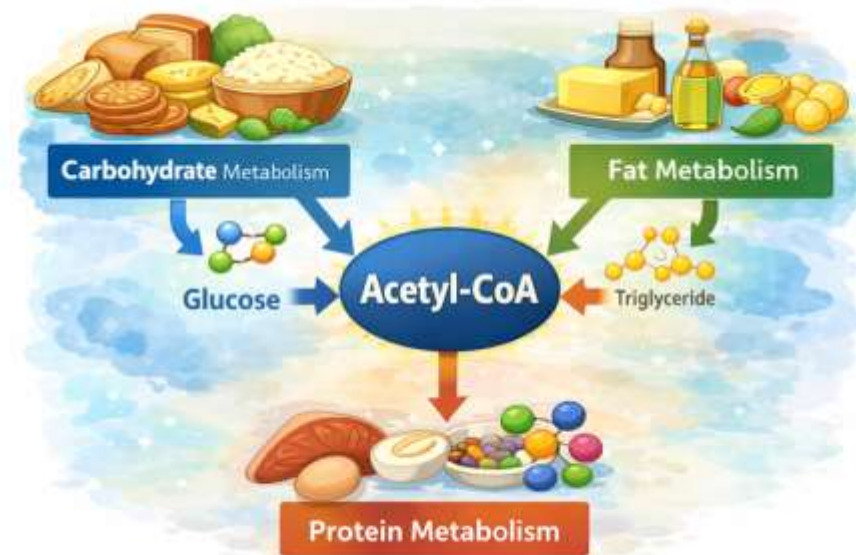
All three metabolic pathways are interconnected

Common metabolic intermediate: Acetyl-CoA

During fasting or exercise:

Fat and protein metabolism increase

Balanced diet ensures proper metabolic functioning



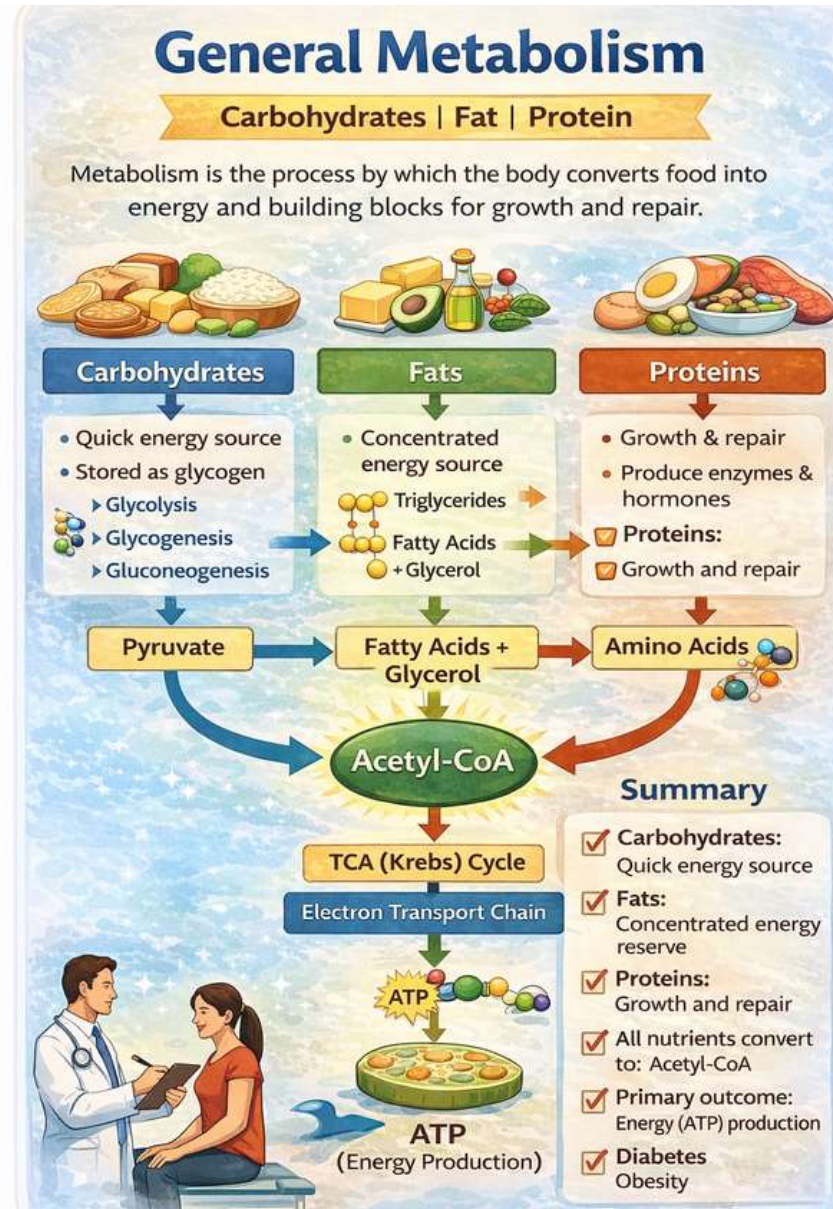
Summary

- Carbohydrates: quick energy source
- Fats: long-term energy reserve
- Proteins: structural and functional role
- Metabolic disorders:

 - Diabetes mellitus
 - Obesity
 - Protein-energy malnutrition

- Understanding metabolism is essential for:

 - Exercise prescription
 - Rehabilitation
 - Disease management



Thank you