Al-Farahidi University
College of Medical Technology
Dept. of Forensic Evidence Sciences
2nd Class Students

Carbohydrates Metabolism

Lecture (4)

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Metabolism: all of the chemical reactions that are involved in catabolism and anabolism.

Catabolic reactions:

* The reactions governing the breakdown of food to obtain energy.

* In catabolic reactions, complex substances are broken down to simpler end products with release of free energy.

* exergonic

* spontaneous

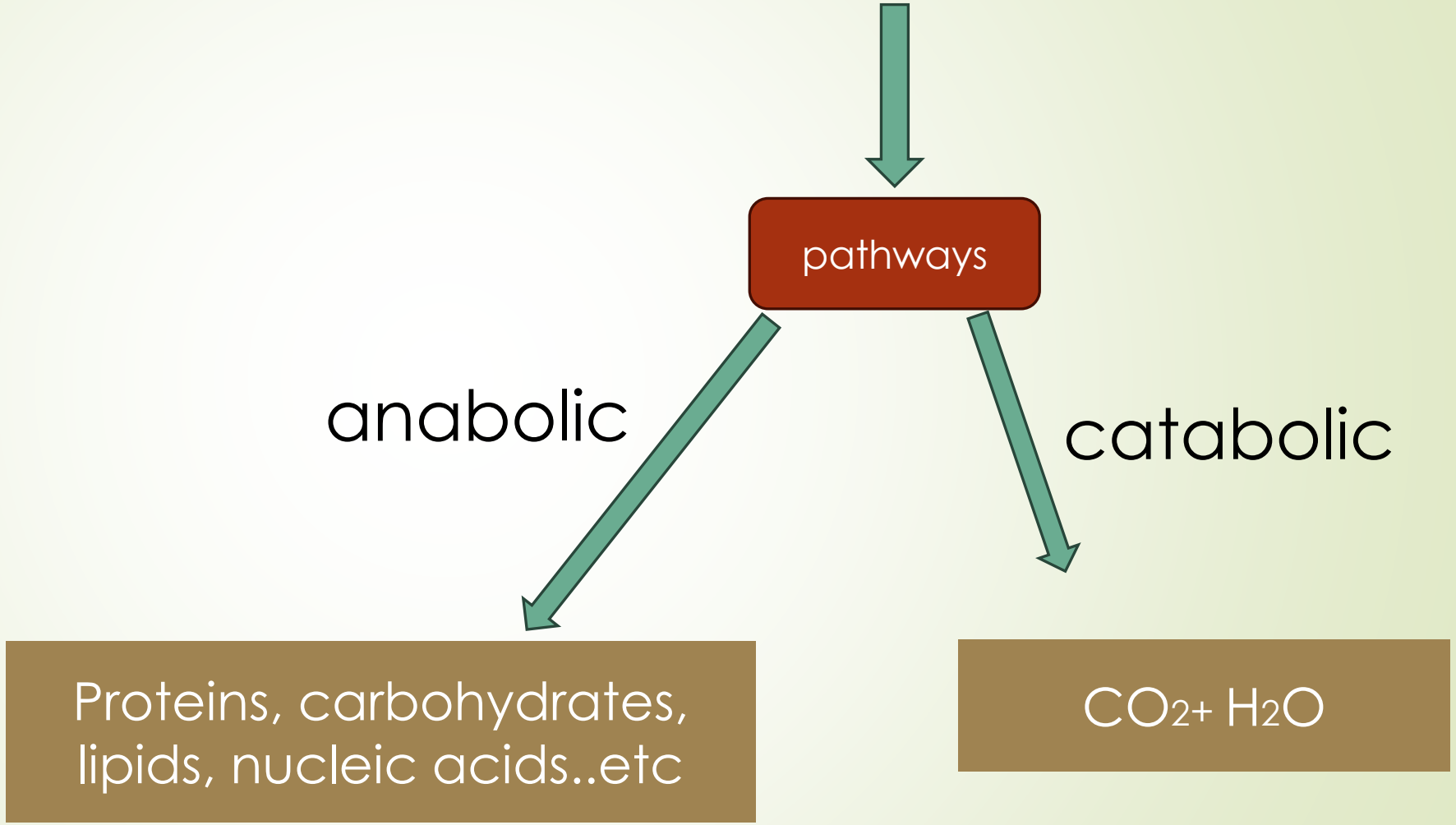
Anabolic reactions:

* The reactions that use the energy produced by catabolic reactions to synthesize larger molecules from smaller ones, such as when the body forms proteins by series of amino acids.

* endergonic

* non- spontaneous

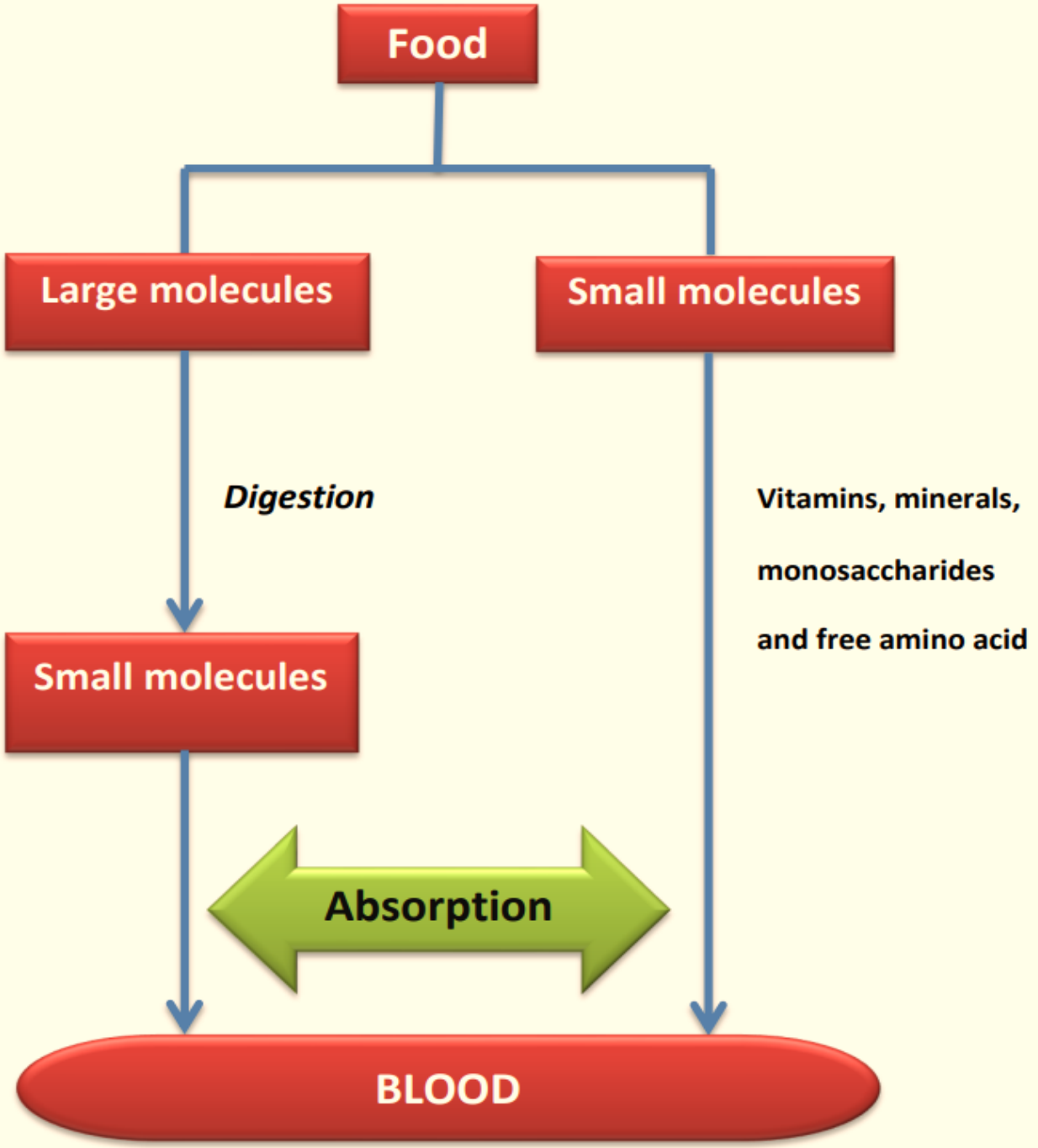
Food molecules ⟶ simpler molecules

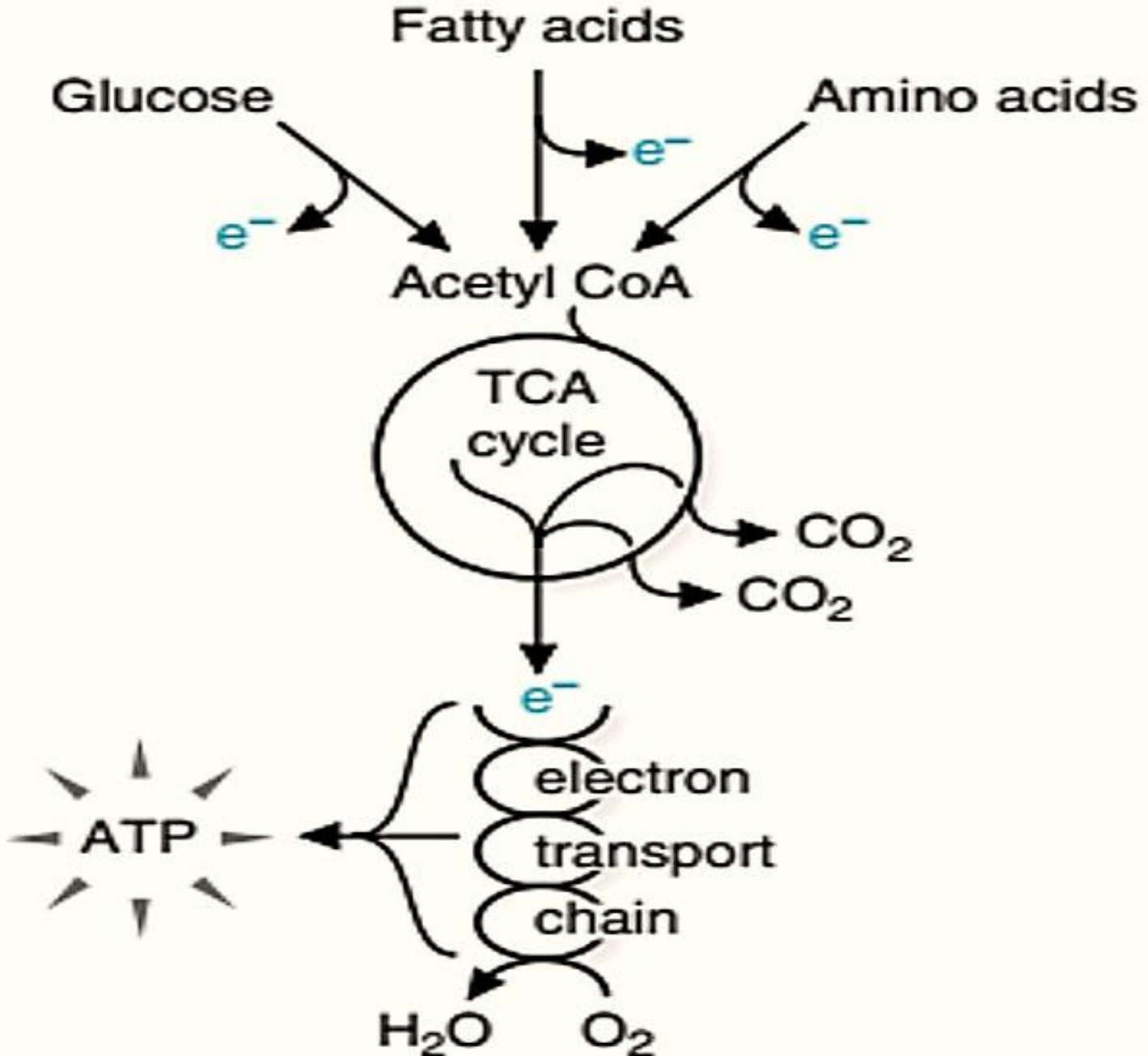


Anabolism and **catabolism** occur together at the same time in the cell

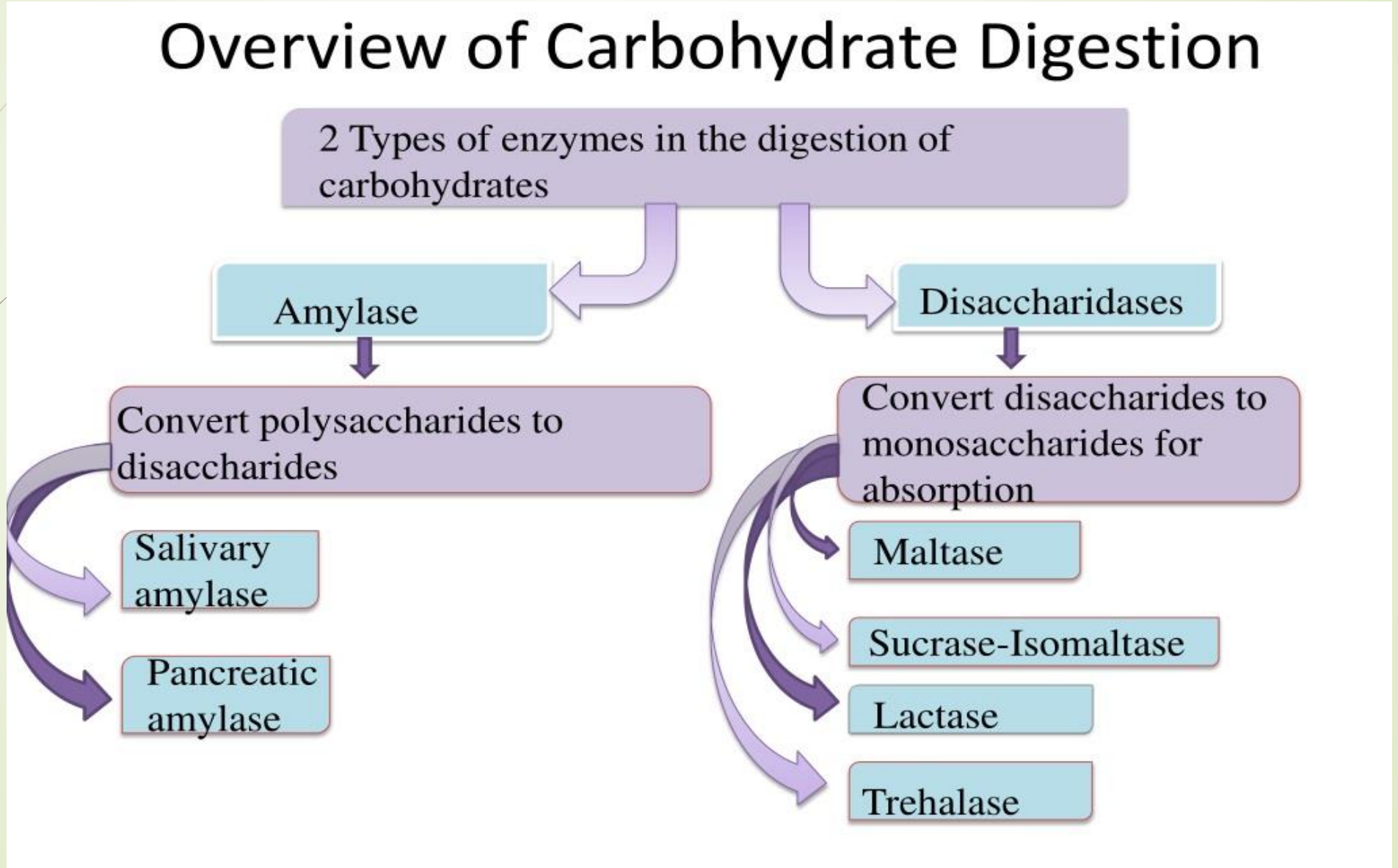
*The energy released in catabolism is stored and the used in anabolism.

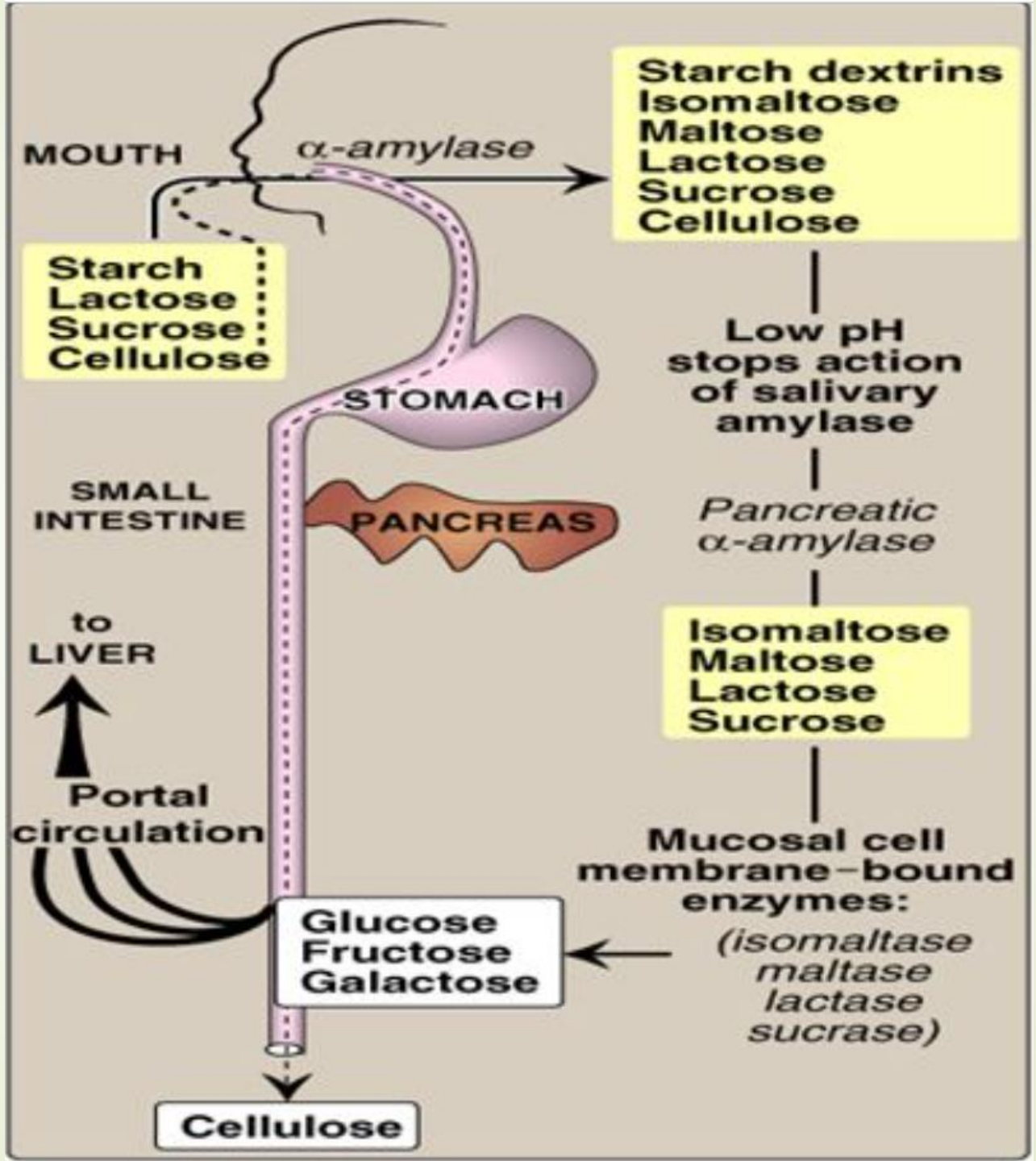
* Citric acid cycle, electron transport chain, and oxidative phosphorylation all take place in the **mitochondrial membrane**. In contrast, glycolysis, pentose phosphate pathway, and fatty acid biosynthesis all occur in the **cytosol** of a cell

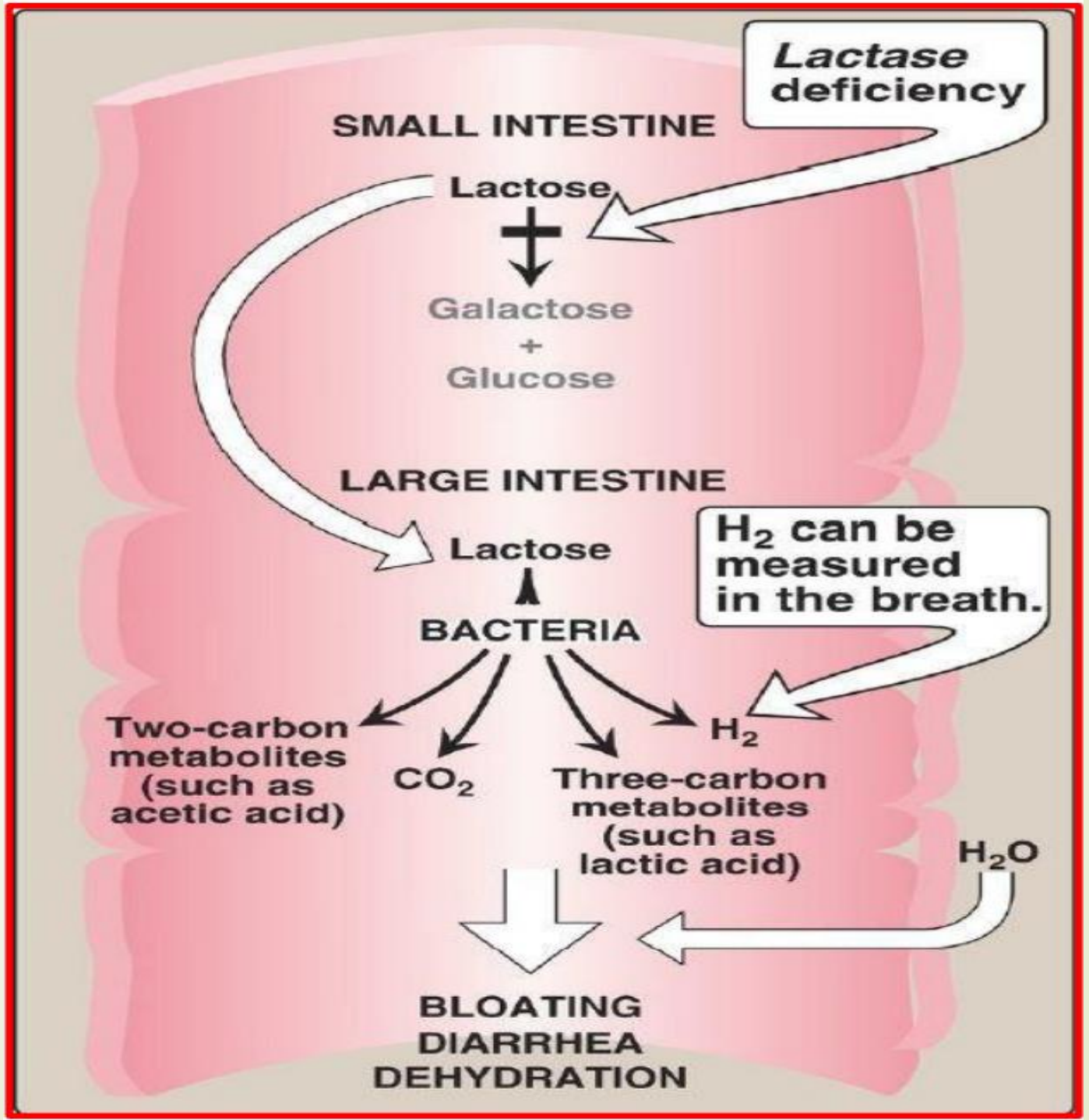

Food
Large molecules
Small molecules
Digestion
Vitamins, minerals,
monosaccharides
and free amino acid
Small molecules
Absorption
BLOOD


Fatty acids
Glucose
Amino acids
e⁻
e⁻
e⁻
e⁻
Acetyl CoA
TCA
cycle
CO2
CO2
e⁻
electron
transport
chain
ATP
H2O
O2

Oxidation of carbohydrates to CO_2 and H_2O in the body produces approximately 4 kcal/g




MOUTH
α-amylase
Starch dextrins
Isomaltose
Maltose
Lactose
Sucrose
Cellulose
Starch
Lactose
Sucrose
Cellulose
STOMACH
Low pH
stops action
of salivary
amylase
SMALL
INTESTINE
PANCREAS
Pancreatic
α-amylase
to
LIVER
Isomaltose
Maltose
Lactose
Sucrose
Portal
circulation
Mucosal cell
membrane-bound
enzymes:
(isomaltase
maltase
lactase
sucrase)
Glucose
Fructose
Galactose
Cellulose


Lactase deficiency
SMALL INTESTINE
Lactose
+
Galactose
+
Glucose
LARGE INTESTINE
Lactose
BACTERIA
H2 can be measured in the breath.
Two-carbon metabolites (such as acetic acid)
CO2
H2
Three-carbon metabolites (such as lactic acid)
H2O
BLOATING
DIARRHEA
DEHYDRATION