Glucose Absorption
And
Glycogen Metabolism
Starch Digestion

Starch (1000’s of residues)

α-amylase in saliva

Starch (average of 8 residues)

α-amylase inactivated in stomach

Starch (in Small Intestine)

pancreatic α-amylase

dextrins

maltose

Glucose

Specific enzymes
Glucose Absorption from Small Intestine

Fig 18.25

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Exocytosis of Glucose Receptors in Response to Insulin
Glucose Transporter

Fig 18.15

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Glycogen Structure

Fig 17.1

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Glycogenesis
(Glycogen Synthesis)

Five steps:
1) Hexokinase (G → G6P)
2) Phosphoglucomutase (G6P ↔ G1P)
3) UDP-glucose Pyrophosphorylase (G1P + UDP → UDP-Glucose)
4) Glycogen Synthase* (regulated step)
5) Branching Enzyme
Step 1: Hexokinase and Hexokinase D

Hexokinase is in all cells except liver
- inhibited by G6P

Hexokinase D is in liver
- not inhibited by G6P

Glucose $\rightarrow$ G6P

Fig 16.4

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Step 2: Phosphoglucomutase (PGM)

Reversible
Used in both glycogen synthesis and breakdown

Fig 17.4
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Step 3: UDP-Glucose Pyrophosphorylase

Fig 17.6
Step 4: Glycogen Synthase

Fig 17.7

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Step 5: Branching Enzyme

$\alpha (1 \rightarrow 4)$-terminal chains of glycogen

branching enzyme

Fig 17.8

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Glycogenolysis
(Glycogen Breakdown)

4 Steps:

1) Glycogen Phosphorylase* (regulated step)

2) Phosphoglucomutase (G1P ↔ G6P)

3) Debranching Enzyme

4) Glucose-6-phosphatase (G6P → G)
   (only in liver)
Step 1: Glycogen Phosphorylase

PLP is a cofactor

Fig 17.3
Step 2: Phosphoglucomutase (PGM)

Fig 17.4 Biochemistry 2nd ed, Voet/Voet
Step 3: Debranching Enzyme

Fig 17.5

Step 4: Glucose-6-phosphatase

Glucose-6-phosphate $\rightarrow$ Glucose

Only happens in Liver

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