WASHINGTON STATE UNIVERSITY
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READING GUIDE

INTRODUCTION TO CARBOHYDRATES

Objectives

1. Diagram and describe the physiological significance of mono-, di-, oligo-, and polysaccharide carbohydrates
2. Diagram and distinguish the biochemical structure and physiological significance of alpha-sugars and beta-sugars
3. Diagram and describe the digestion of a carbohydrate meal from mouth to cecum and the consequences of enzyme deficiencies (congenital sucrase-isomaltase deficiency and lactose intolerance) in this process

STRUCTURE OF CARBOHYDRATES

Big picture

This chapter begins with a section on nomenclature. Review the definitions of isomers, epimers, and enantiomers. These are all important distinctions between sugars but are not part of day-to-day conversations about sugars and carbohydrates. Probably most important of all is the anomeric carbon and its use in the nomenclature of bonds between sugars in oligo and polysaccharides.

What defines a reducing sugar, and why would this property of a sugar be clinically useful?

What is the difference between b-glucose and a-glucose? (Fig. 7.6)

DIGESTING CARBOHYDRATES

What enzymes cleave between sugars of carbohydrates in the digestion process? (Fig. 7.8)

Where is a-amylase produced and what sugar-sugar bond does it cleave?

Why can't we (humans) digest cellulose, the carbohydrate fiber in plants?

Where are the enzymes that digest disaccharides produced and act? (Fig. 7.10)

What is different about isomaltase compared to the specificity of other glycosidases that digest disaccharides?

What is congenital sucrase-isomaltase deficiency?

What is the basic mechanism that results in the GI symptoms typical of lactose intolerance? Does this apply to deficiencies in other disaccharide glycosidases? (Fig. 7.11)

SUMMARY

(Fig. 7.12)