

D- Xylose Absorption Test



Blood sample taken



"Clean catch" urine sample collected

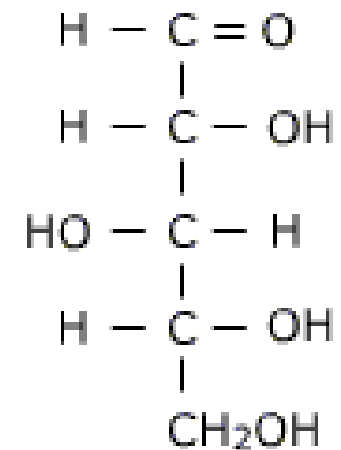
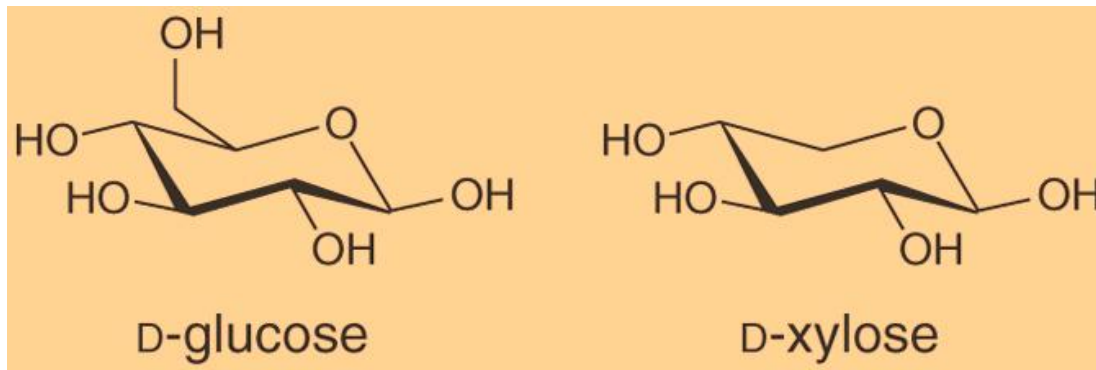


ADAM.

D- Xylose

Xylose is a monosaccharide of the aldopentose type, which means that it contains five carbon atoms.

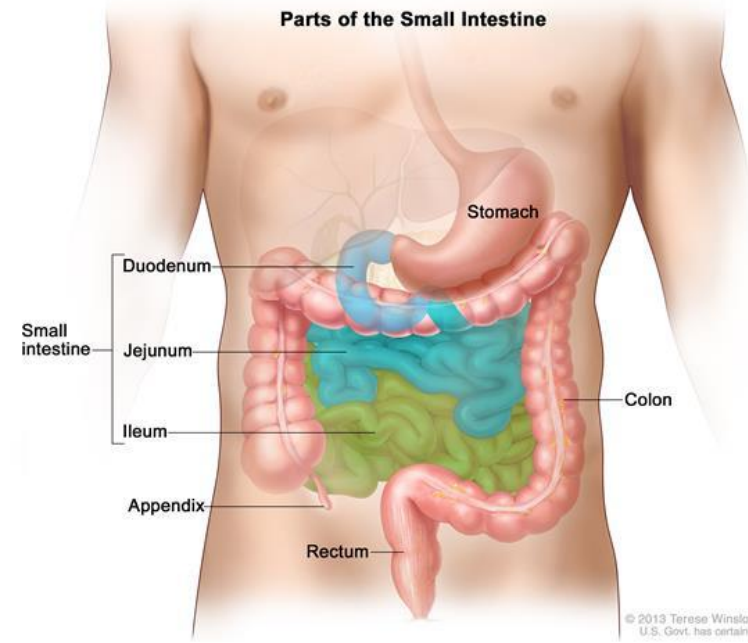
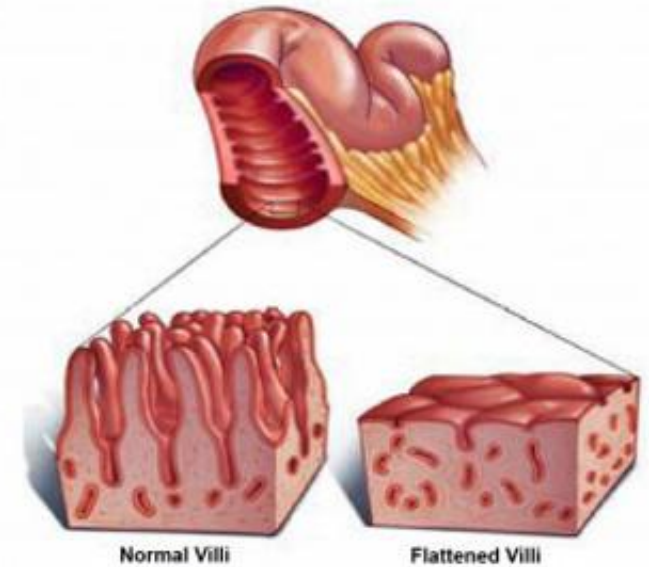
It is derived from hemicellulose, one of the main constituents of biomass. With its free carbonyl group, it is a reducing sugar



D - Xylose

■ The small intestine can be studied in two parts, the upper small intestine and the lower small intestine. Vitamin B12 absorption is the best test for the lower small bowel, while D-xylose absorption test is considered the best test for the upper small intestinal function.

■ Impaired absorption of D-xylose occurs in conditions where there is flattening of the intestinal villae and this results in abnormally low urinary excretion of the test dose of D-xylose.



Important of D- Xylose Absorption Test

- ✓ this test is done to measure the level of D-Xylose in blood or urine sample , it help diagnosis problems that prevent the upper small intestine from absorbing nutrients in food .
- ✓ D-Xylose is normally easily absorbed by intestine . When problems with Absorption occur D-Xylose is not absorbed by intestine , and its level in urine and blood is low

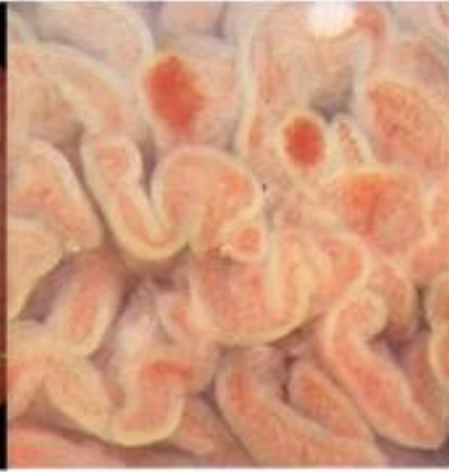
Why the Test is Performed?

D-xylose absorption is a laboratory test to determine how well the intestines absorb a simple sugar (D-xylose). The test is Performed to diagnose conditions that present with malabsorption due to defects in the integrity of the gastrointestinal mucosa and helps determine if nutrients are being properly absorbed.

Healthy mucosa



Endoscopy



Microscope

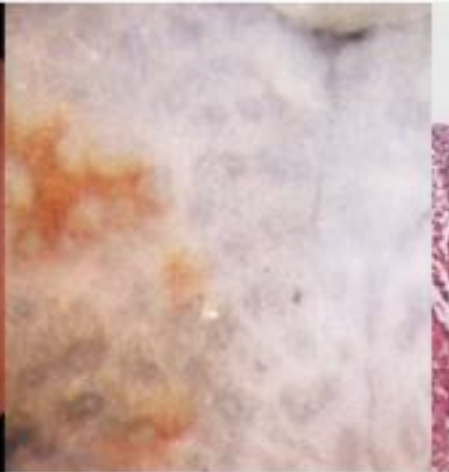


Histology

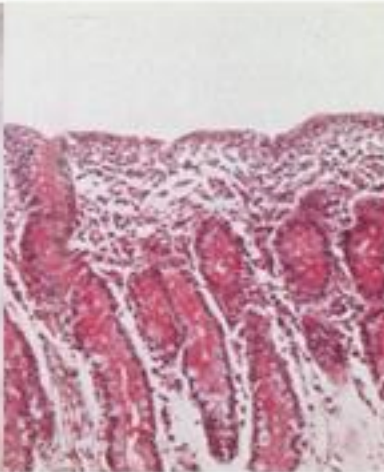
Damaged mucosa in celiac disease



Endoscopy



Microscope

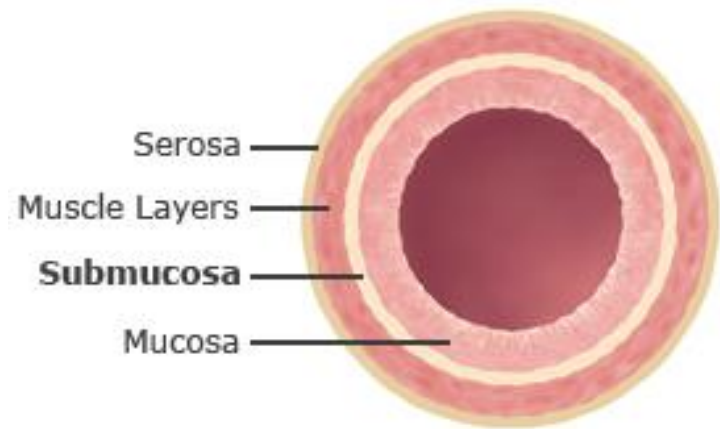


Histology

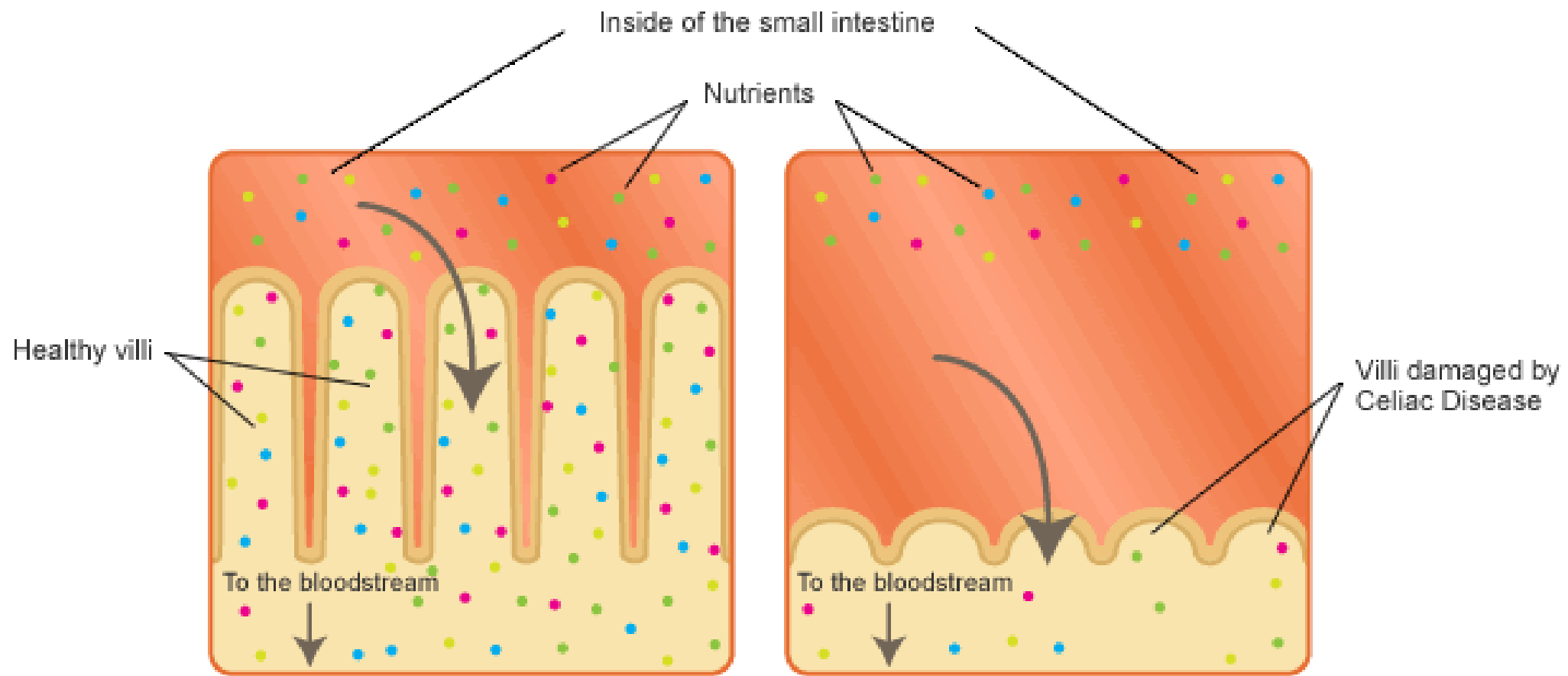
absorption of D-Xylose

Since D-Xylose is a monosaccharide, or simple sugar, it does not require enzymes for digestion prior to absorption. Its absorption requires an intact mucosa only.

In contrast, polysaccharides require enzymes, such as amylase, to break them down so that they can eventually be absorbed as monosaccharides.



Cross-section diagram of porcine small intestine



A. In a healthy person, nutrients get absorbed by villi in the small intestine and go into the bloodstream.

B. In a person with Celiac Disease, the villi have been damaged by inflammation, so fewer nutrients pass into the bloodstream.

How the Test is Performed?

The test requires a blood and urine sample.

There are several ways to perform this test. A typical procedure is:

- Patient will be asked to drink 8 ounces of water that contains 25 grams of a d-xylose.
- The amount of d-xylose that comes out in the urine over the next 5 hours will be measured.
- Patient may have a blood sample collected at 1 and 3 hours after drinking the liquid.



Blood sample taken



"Clean catch" urine sample collected



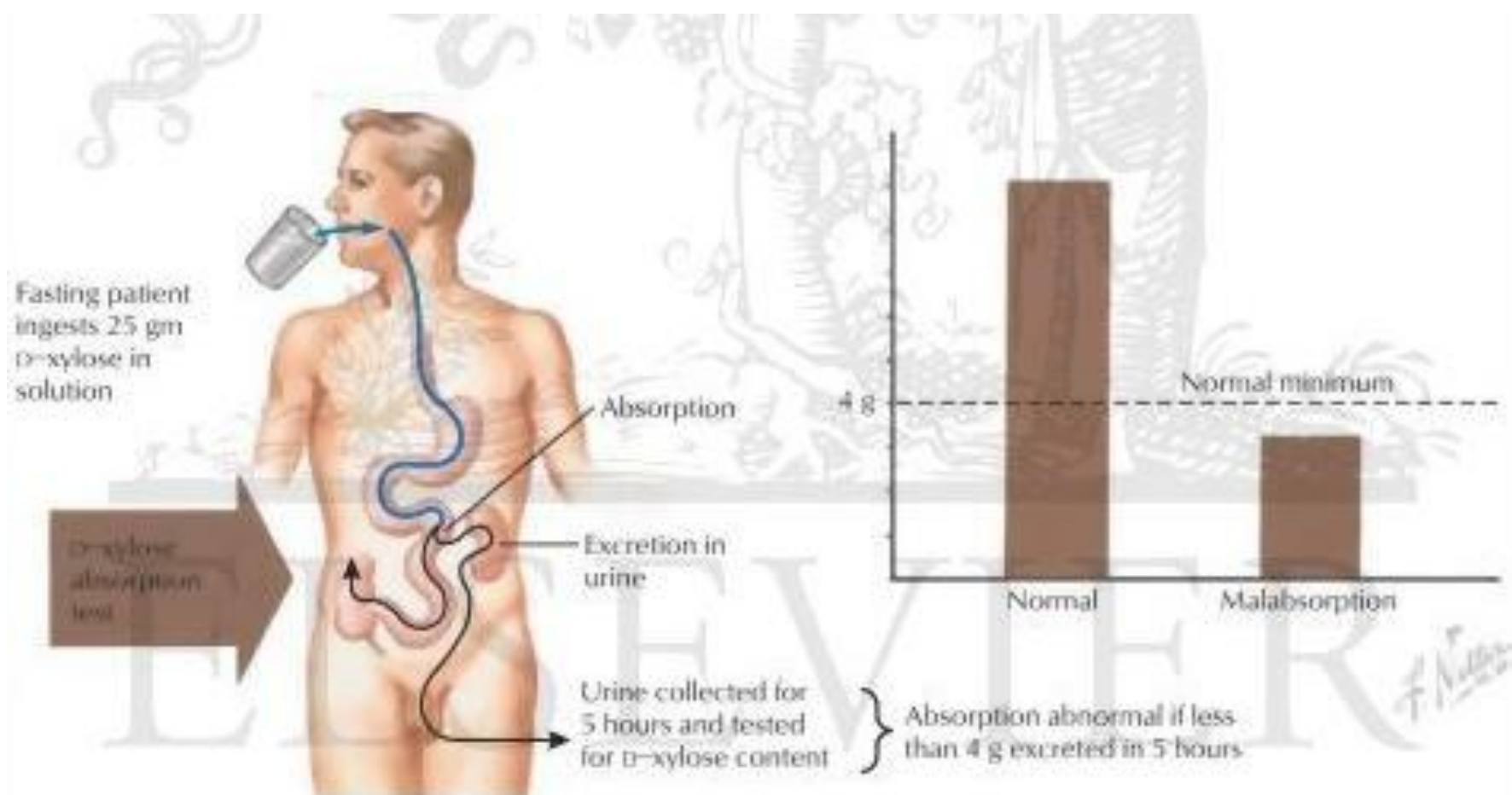
How to Prepare patient for the Test?

For 24 hour before D-Xylose test , do not eat food high in pentose or any sugar similar to D-Xylose .

- Temporary stop medicine which interfering with this test , drugs that can affect test results include aspirin and atropine.
- Do not eat or drink anything except water for 8- 12 hour
- In adults , the standard oral dose is 25 g after which the urinary output during the next five hours is 5.8 g (about 25% of the dose) in normal subjects.

Normal D-Xylose urinary output :

- Less than 2.5 g is Abnormal
- 2.5 g or more than 2.5 g is normal



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What Normal Results mean?

- A normal result depends on how much D-xylose is given. A positive result means that D-xylose is found in the blood or urine and is therefore being absorbed by the intestines.

What Abnormal Results mean?

Lower than normal values may be seen in:

- Celiac disease
- Crohn's disease
- Lymphatic obstruction
- Small intestinal bacterial overgrowth
- Viral gastroenteritis

*In case of impaired renal function the D-xylose level in a 5- hours urine sample is low ,which can lead to false diagnosis of coeliac disease

Treatment

Treatment of coeliac disease with a gluten free diet improves D-xylose absorption but it remains low normal .



Gluten free



Objectives

- 1-To test the function of the upper small intestine.
- 2-To learn the technique of D-xylose estimation .

Principle:

D- xlose is a pentose which produces a brown color with o-toluidine in the presence of acetic acid and heat, A brown complex will be formed with a maximum absorption at 475 nm which is used for the estimation of xylose.

Hexoses also reacts with O- toluidine but produce a different complex with an absorption peak at 622 nm, this ensures that interference with glucose is minimum.

Method:

-Set up 6 test tube the Please follow the table:

Chemical	Test		Test		standard	Blank
	1	2	3	4	5	
Sample A	0.1 ml	0.1 ml	-	-	-	-
Sample B	-	-	0.1 ml	0.1 ml	-	-
Working standard	-	-	-	-	0.1 ml	-
O-toluidine reagent	3 ml	3 ml	3ml	3 ml	3 ml	3 ml

- Cover all tube by aluminum foil then place all tube in water bath at boiling degree for 5 min.
- Read the absorption of 6 tubes against blank at 475 nm. and record your result

Result:

Test tube		Absorption at 475 nm
Sample A	Test 1	
	Test 2	
Sample B	Test 3	
	Test 4	
Standard	Test 5	

- Concentration of Standard = 0.5 g/ml
- Dilution factor is 10

Calculation :

Concentration of Standard = 0.5g/ml

Amount of D-Xylose = $\frac{\text{Means Ab Test}}{\text{Means Ab Std.}} \times \text{Concentration of Standard} \times 10(\text{D.F}) = \dots\dots\dots \text{g/ml}$

Example:

Means Absorption of sample 1= 0.145

Means Absorption of Standard= 0.357

- Conc. Of urine D-xylose (Sample 1) = $(0.145 \div 0.357) \times 0.5 \times 10 = 2.03 \text{ g/ml}$



Discussion

Discuss the result you obtained after calculation of Xylose concentration and decide whether the sample is for patient normal or not .



References

- <http://www.nlm.nih.gov/medlineplus/ency/article/003606.htm>
- <http://www.phadia.com/en-GB/3/Diseases/Celiac-DiseaseOther-Gastrointestinal-Diseases/>

Thank You