BioHealth LABORATORY Quality First.
23900 Hawthorne Blvd. # 150, Torrance, CA 90505
800-570-2000/307-212-6600 | www.biohealthlab.com

Intestinal Permeability Test

for **Test Patient**

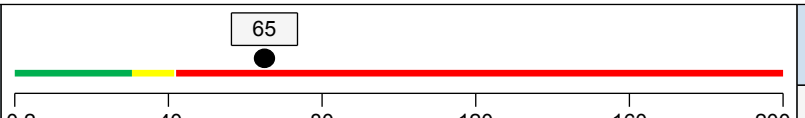
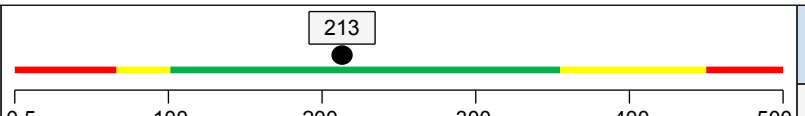
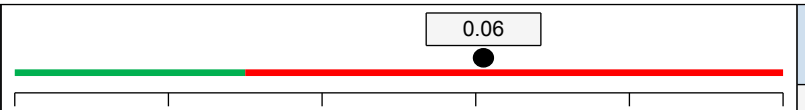
Accession #T112483

Authorizing Clinician	Patient	Collected	Received	Reported
BioHealth Laboratory 23900 Hawthorne Blvd Suite #150 Torrance , CA 90505	**Test Patient** Gender: Female DOB: 01/01/1988	07/26/2018	07/02/2018	07/02/2018

Intestinal Permeability Test (#110)

Parameter	Result	Unit
Lactulose Baseline	<0.2	ug/mL
Mannitol Baseline	23.0	ug/mL

Baseline levels may be raised if patient did not adhere to dietary and fasting preparations. Lactulose is not expected to be present in the baseline sample and baseline mannitol should not exceed the post-drink mannitol result.

		Result	Reference Range	Unit
Lactulose Result Post Drink (4-hour)		**65**	**<= 42**	**ug/mL**
Mannitol Result Post Drink (4-hour)		**213**	**66 - 449**	**ug/mL**
Lactulose/Mannitol Ratio:		**0.06**	**<= 0.03**	**Ratio**

INTERPRETATION*:	Intestinal Permeability is suspected based on Lactulose/Mannitol Ratio result.

Traditional determination of laboratory ranges includes the central 95% of an apparently healthy population. Comparing results against additional intervals within these standard ranges allows for a more precise assessment of patient values. Yellow zones were established based on a study of the central 68th percentile within the healthy population and are not necessarily abnormal and should not be used as absolute cut-offs for patient diagnostic criteria. Results should always be interpreted in the context of other external diagnostic and clinical information specific to the patient.

*The guidelines are for research purposes only.

Testing performed by Vitae Diagnostics 3838 Del Amo Blvd, #202 Torrance, CA 90503 CLIA ID: 05D2044828

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Interpretive Guidance

Intestinal Permeability can be assessed through the Lactulose/Mannitol test. The two different sized sugar molecules are excreted in the urine which reflects absorption from the gut and is a reliable representation of gut permeability. The smaller molecule (mannitol) freely crosses the gut barrier and is a general measure of small intestinal surface area; while the larger molecule (lactulose) is thought to only cross through the small intestine if pores are enlarged or cells are damaged (sometimes referred to as "leaky gut"). This can often occur in patients with celiac disease, patients with damage due to allergens, inflammation, pathogens, or NSAIDS.

To assess intestinal permeability, lactulose and mannitol excretion is recovered in urine. Variations in transit time in the intestine and renal clearance are normalized through the use of a ratio calculation which reflects the proportion of large to small sugars. This ratio is the researched criteria for assessing suspected intestinal permeability. It is important to note that the accuracy of the results are dependent on patient adherence to test preparations and instructions as well as normal renal function.

Lactulose: Rate of excretion is variable and dependent on diet and renal clearance.

Mannitol: Rate of excretion is variable and dependent on diet and renal clearance.

L/M Ratio: Intestinal permeability is measured as a ratio of lactulose and mannitol sugars excreted in urine (L/M ratio). Literature has established L/M Ratio normal cutoff is 0.03. Patients with values above 0.03 should be assessed for possible intestinal permeability.

References:

1. Kubica, P. et al. Modern approach for determination of lactulose, mannitol and sucrose in human urine using HPLC MS/MS for the studies of intestinal and upper digestive tract permeability. Journal of Chromatography B, 907 (2012) 34-40.
2. Mishra A, Makharia GK. Techniques of Functional and Motility Test: How to Perform and Interpret Intestinal Permeability. J Neurogastroentrol Motil. 2012. 18(4): 443-447.

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