



## SPECIALTY TESTS EnteroScan®

### BIOCHEMICAL & IMMUNOLOGICAL BLOOD TESTS

Name:	Gender: <b>MALE</b>	Age:
Sample Taken Day: <b>9 DECEMBER 2022</b>	Date of Analysis: <b>9 DECEMBER 2022</b>	
Specimen: <b>Serum</b>	Patient Code Number:	

Code	TEST	RESULT	REFERENCE VALUES
1976	<p><b>Zonulin, Serum</b> (Zonulin Family Proteins, ZFP)</p> <p><b>Method:</b> ELISA</p>	29.2 ng/ml	< 48.0 ng/ml
1976	<p>Zonulin is a newly discovered protein involved in the structure and function of tight junctions between intestinal epithelial cells. Measurement of faecal zonulin levels is a clinically useful indicator for assessing intestinal epithelial permeability. Zonulin is a protein that regulates intestinal paracellular permeability and is produced in intestinal epithelial cells and liver cells. High zonulin levels have been associated with increased intestinal permeability because it causes the destruction of tight intercellular connections between epithelial cells. Several autoimmune, inflammatory, and neoplastic diseases have been associated with increased zonulin levels or increased intestinal permeability. Chronic elevated serum zonulin levels have been associated with celiac disease and non-celiac hypersensitivity to gluten (seronegative celiac disease), metabolic syndrome, obesity, type I diabetes, non-alcoholic fatty tissue disease, Crohn's disease, with lichen planus and possibly food intolerances, multiple sclerosis, rheumatoid arthritis, asthma and inflammatory bowel diseases, and in smokers without obvious health problems. Elevated serum zonulin levels have been associated with the results of the lactulose / mannitol test for "leaky gut" testing, but to date no such association has been reported with faecal zonulin.</p> <p>Cellular receptors for zonulin are present in the small and large intestine, in the heart and in the brain. The release of zonulin from the intestinal mucosa can be caused by gliadin fragments, by the contact of microorganisms on the surface of intestinal epithelial cells, by LPS derived from Gram (-) bacteria, by bacterial proteases, by corticosteroids and by protein fragments derived from food. Excessive intake of simple sugars, sodium, emulsifiers, microbial transglutaminase (used as a food additive) and nanoparticles can also cause excessive release of zonulin.</p> <p>Reducing zonulin levels and restoring the integrity of the intestinal barrier presupposes a reduction or even zero exposure to the factors that cause the release of zonulin in the intestinal tract. Therapeutic interventions to repair the gastrointestinal tract barrier include dietary changes, treatment of dysbiosis, support of digestion and supplements with anti-inflammatory action such as quercetin, vitamin C, curcumin, γ-linoleic acid, omega-3 fatty acids (EPA, DHA) and aloe vera. In addition, other nutrients such as zinc, β-carotene, pantothenic acid and glutamine can provide important support for intestinal barrier rejuvenation. The use of certain probiotics has been shown to reduce zonulin levels in both blood serum and faeces. Taking prebiotic inulin (about 10 grams per day) reduces serum zonulin levels after just 5 days in healthy young people. Comprehensive testing of the intestinal microbiome and its functions (EnteroScan®) may be needed to investigate the possible causes of increased intestinal permeability.</p>		

Reference Values & Methods adapted from:

1. Analytical Biochemistry, Holme & Peck, 3<sup>rd</sup> ed., 1998, Prentice Hall
2. Laboratory Tests and Diagnostic Procedures, Chernecky & Berger, 5<sup>th</sup> ed., 2008, Saunders Elsevier
3. Interpretation of Diagnostic Tests, Wallach, 8<sup>th</sup> ed., 2007, Lippincott

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