

### LABORATORY REPORT

ID:	XXXX	SAMPLE NAME:	XXXX
DOB:	XX/XX/XX	GENDER:	XXXX
COLLECTION DATE:	XX/XX/XX	COLLECTION TIME:	-
RECEIVED DATE:	XX/XX/XX	REPORT DATE:	XX/XX/XX

TEST: ADVANCED GUT HEALTH SCREEN (URINE)

ANALYSIS: Q-TOF MASS SPECTROMETRY VIA HPLC

Units of measurement are mmol/mol creatinine unless specified (creatinine is mol/L)

COMPOUNDS	RESULT (L)ow / (H)igh	REF RANGE
BENZOATE	9.560038	NOT AVAILABLE
HIPPURATE	76.0621	≤ 680
RATIO BENZOATE:HIPPURATE	0.125687 (H)	≤ 0.07
PHENYLACETATE	3.881333 (H)	TRACE LEVELS ONLY
PHENYLPROPIONATE	0	TRACE LEVELS ONLY
p-HYDROXYBENZOATE	1.19624	≤ 3.0
p-HYDROXYPHENYLACETATE	0	2 - 32
TRICARBALLYLATE	20.299233 (H)	TRACE LEVELS ONLY
DIHYDROXYPHENYLPROPIANATE	0.383689	≤ 227
CITRAMALATE	0.853389	≤ 5.0
TARTARATE	0.134190	≤ 6.5
ARABINITOL	44.42202	16 - 89
INDICAN (INDOXYL SULFATE)	47.91633 (H)	NOT AVAILABLE
p-CRESOL SULFATE	1377.234 (H)	NOT AVAILABLE
trans-INDOLYLACRYLOLYGLYCINE (IAG)	20.65111 (H)	Average: 5.8
BETA-CASOMORPHIN 1-5	Detected (*)	
BETA-CASOMORPHIN 1-6	Detected (*)	
BETA-CASOMORPHIN 1-7	None detected	
GLUTEN EXORPHIN A5	None detected	
GLUTEN EXORPHIN B5	None detected	
GLUTEN EXORPHIN C	None detected	
CREATININE (random urine)	0.003722	mol/L
SPECIFIC GRAVITY (SG)	1.012	
SAMPLE pH	6.2	

[Amino acids are nmol/mg creatinine]

TRYPTOPHAN	39.58533 (L)	43 - 217
PHENYLALANINE	94.15922	34 - 145
TYROSINE	232.8634	122 - 517

SAMPLE ID:		STATUS: COMPLETED
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## COMMENTS ABOUT THIS RESULT

An interesting result.

- Levels of one amino acid (tryptophan) were below reference ranges. This could imply (a) issues with dietary intake of this amino acid, or (b) increased biological consumption of this amino acid (specifically associated with certain gut bacteria).
- The ratio between benzoate:hippurate exceeded the reference range suggestive of either (a) issues with the availability of glycine or (b) issues with the availability of vitamin B5 or (c) issues with gut bacteria. This result seems to have been caused by high levels of benzoate in the sample.
- A question on the reported level of phenylacetate has been raised. This compound potentially being linked to the actions of certain strains of bacteria (e.g. Clostridium spp) on the amino acid phenylalanine.
- Levels of tricarballoylate were above the trace levels normally expected, potentially suggestive of an issue with magnesium availability as a result of the chelating potential of this compound.
- Levels of indican were elevated above the trace amount typically expected. Elevated levels of indican are a potential marker for intestinal (gut) dysbiosis.
- Levels of p-cresol sulfate were high. This is a known uremic toxin (affecting kidney functions). It has been found to be elevated in cases of autism and other conditions including chronic kidney disease. It has been linked to impaired sulfation capacity.
- Levels of urinary IAG were above average in this sample. IAG and its precursory compounds have been linked to gut barrier issues and are seemingly affected by use of a gluten-free diet under certain circumstances.
- Levels of two dietary-derived peptides were potentially present in this sample (beta-casomorphin 1-5, beta-casomorphin 1-6). This could indicate issues with the digestion of foods containing the protein casein.

## ABOUT THIS TEST

### Benzoate & Hippurate

Bacterial deamination of phenylalanine forms benzoate, which is conjugated with glycine to form hippurate. Elevated levels of benzoate compared to hippurate can indicate low levels of glycine and pantothenic acid (vitamin B5). Benzoate can be increased due to dietary intake of certain foods.

### Phenylacetate & Phenylpropionate

Formed from bacterial action on phenylalanine. Should only be present at trace levels.

### p-Hydroxybenzoate, p-hydroxyphenylacetate

Formed by bacterial and protozoa action on tyrosine. Not products of human metabolism. These compounds should not be present or only present at trace levels.

### Tricarballoylate

Produced by a strain of aerobic bacteria. Binds to magnesium which results in magnesium deficiency.

### Dihydroxyphenylpropionate

Confirmed overgrowth of clostridia shows elevated levels of this compound.

### Citramalate, Tartarate, Arabinitol

Closely related to human metabolites that can block human metabolic pathways.

### Urinary Indican (indoxyl sulfate)

Produced by bacteria in the upper bowel. Normal population of bacteria will only produce trace levels of this compound.

### p-cresol sulfate

A microbial metabolite that is found in urine and likely derives from secondary metabolism of p-cresol. A uremic toxin (affecting kidney functions) it is thought to be derived from certain Clostridial bacteria acting on tyrosine. Possible links to autism, multiple sclerosis, cardiovascular disease and oxidative injury.

### trans-Indolyacryloylglycine (IAG)

Bacterially derived metabolite of tryptophan. Potential biomarker for autism, gastrointestinal (GI) dysfunction and other conditions as well as linked to intestinal permeability. Potentially sensitive to the use of a gluten-free diet.

### Beta-casomorphins and gluten exorphins

Dietary-derived peptides formed following the digestion of foods containing casein (the protein derived from mammalian dairy sources) or gluten (the major protein found in various cereal crops). Such peptides would normally be digested in the GI tract and wouldn't typically be found in urine.

### Tryptophan, Phenylalanine, Tyrosine

Precursors of some of the above compounds. High or low levels of these amino acids can affect the gut dysbiosis markers.

### Creatinine

Used in conjunction with specific gravity to determine the concentration of the urine

### pH

The pH or acidity of the urine affects the results obtained from the analysis

**Analutos does not provide clinical advice on results obtained. In the event of specific findings being flagged up, we suggest you contact your healthcare professional.**

Several interventions have been proposed in relation to intestinal dysbiosis. These include:

Class	Examples
General	Encourage high fibre diet, remove mucosal irritants such as allergenic foods, alcohol, <i>etc.</i>
Antibacterial	Pharmaceutical (speak to your medical provider)
Anti-fungal	Pharmaceutical (speak to your medical provider)
Anti-protozoal	Pharmaceutical (speak to your medical provider)
Probiotic	Aerobic species: <i>L.acidophilus</i> , <i>S.boulardii</i> , <i>etc.</i>
Prebiotic	Fructo-oligosaccharide, use of raw and cooked vegetables
Mucosal regeneration	Glutamine, pantothenic acid

[Adapted from Bralley JA, Lord RS. Laboratory evaluations in molecular medicine. 2001].

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