

# Hexa-LPS producing microbes

## Marker Guide

### What this marker measures

The collective capacity of the microbial community to produce *hexa-acylated lipopolysaccharides* (hexa-LPS), an immunostimulatory outer membrane component of some Gram-negative bacteria, particularly Gammaproteobacteria<sup>1,2</sup>. Elevated hexa-LPS-producing potential may increase microbial inflammatory potential and may be relevant in intestinal inflammation, systemic inflammation, or impaired gut barrier integrity<sup>1,3-7</sup>.

### Clinical associations

Consider this marker when your patient presents with:

#### Inflammatory presentations

Crohn's disease, rheumatoid arthritis, or chronic low-grade systemic inflammation where gut-derived inflammatory signalling may be relevant<sup>3,8,9</sup>.

#### Gut barrier concerns

Suspected increased intestinal permeability or concern for LPS translocation/endotoxaemia

### Interpreting the result

All results are compared to Microba's healthy cohort to determine whether they fall within or outside the expected range.

LOW

#### Hexa-LPS producing potential is lower than expected

This suggests lower inflammatory signalling potential from this pathway.  
No intervention needed for this marker.

WITHIN RANGE

#### Hexa-LPS producing potential is within expected parameters

This result does not suggest excess hexa-LPS-related inflammatory potential.

HIGH


#### Hexa-LPS producing potential is higher than expected

May indicate increased capacity for TLR4-mediated innate immune stimulation, particularly in the context of inflammation.  
Action: see patient management insights


### Patient management insights

Reduce excess hexa-LPS-producing potential and support reduced inflammatory signalling.


#### DIETARY STRATEGIES

- Increasing the omega-3 to saturated fat ratio in the diet may reduce postprandial circulating endotoxin/LPS-related inflammatory responses<sup>10-12</sup> 

#### SUPPLEMENTATION PREBIOTIC

- GOS (galacto-oligosaccharides) supplementation may reduce *Escherichia coli* (a hexa-LPS producer)<sup>13</sup> 

#### SUPPLEMENTATION PROBIOTIC

- A combination probiotic *Lactobacillus gasseri* KS-13, *Bifidobacterium bifidum* G9-1 and *Bifidobacterium longum* MM-2 may reduce *Escherichia coli* (hexa-LPS producer). 



## Tips for patients discussion

Your report shows elevated levels of gut microbes that can produce hexa-LPS, a bacterial compound that can strongly stimulates immune signalling, particularly when the gut barrier is under stress. Increasing fibre-rich plant foods and omega-3s while reducing excess saturated fat can help.

## The community

Hexa-LPS is not produced by a single species, it's a community-level function. Below are some of the most common, though this list is not exhaustive.

<i>Citrobacter freundii</i>	<i>Escherichia sp000208585</i>	<i>Haemophilus_D sp001815355</i>
<i>Haemophilus_D pittmaniae</i>	<i>Enterobacter himalayensis</i>	<i>Haemophilus_D MIC7468</i>
<i>Klebsiella pneumoniae</i>	<i>Enterobacter kobei</i>	<i>Haemophilus_D parainfluenzae</i>
<i>Klebsiella_A michiganensis</i>	<i>Klebsiella_A oxytoca</i>	<i>Enterobacter ludwigii</i>
<i>Haemophilus_D parainfluenzae_K</i>	<i>Haemophilus_D parainfluenzae_L</i>	<i>Haemophilus_D parainfluenzae_L</i>
<i>Enterobacter nimipressuralis</i>	<i>Pseudomonas aeruginosa</i>	<i>Haemophilus_D parainfluenzae_M</i>
<i>Escherichia dysenteriae</i>	<i>Escherichia coli</i>	<i>Haemophilus_D parainfluenzae_N</i>
<i>Raoultella ornithinolytica</i>	<i>Escherichia flexneri</i>	<i>Haemophilus_D sp001679485</i>

## How results are calculated

All microbiome marker results are compared against the Microba Healthy Cohort — a purpose-built group of more than 450 healthy individuals, with samples collected and analysed using the same workflow as patient samples.

Each marker is scored by comparing the patient's relative abundance against the cohort average. The distance from this average is expressed as standard deviations, and determines whether a result is classified as Low, Borderline, or High.

### How the result scale works



The patient's relative abundance is compared to the Healthy Cohort average. A **negative** distance from average means the microbial group is less abundant than the Healthy Cohort. A **positive** distance means it is more abundant. Results falling outside the expected range are classified as borderline or high/low (borderline high/low: +/-0.68, and high/low: +/-1.28).

### GRADE DESCRIPTION

A	Body of evidence can be trusted to guide practice
B	Body of evidence can be trusted to guide practice in most situations
C	Body of evidence provides some support for recommendation, but care should be taken in its application
D	Body of evidence is weak, and recommendation must be applied with caution
PP H	Body of evidence is observational only and must be applied with caution
PP IV	Body of evidence is in vitro and must be applied with a high degree of caution

## Evidence grading for patient management insights

The letter grades shown next to each patient management insight show the quality of the research behind it. Every insight provided has been through a rigorous review of the scientific literature and graded using the NHMRC Levels of Evidence, so you can see exactly how strong the evidence is before applying it in practice.