



Biomend Lifesciences Pvt Ltd.

# Gut–Brain Health for Neurodivergent & Developmentally Delayed Children.

Microbiome insights & practical steps for  
GI comfort, sleep, and behavior



# Why the gut matters

The gut isn't just for digestion—it's home to trillions of microbes that help break down food, make vitamins, train the immune system, and even “talk” to the brain.

In children with conditions like autism, ADHD, cerebral palsy, Down syndrome, Rett syndrome, or Tourette's, scientists have found differences in gut microbes compared to other children. These changes can affect both the tummy and the brain.

## How the gut talks to the brain

### 01. Neurotransmitters

Microbes influence serotonin, dopamine, and GABA pathways tied to mood, attention, and sleep.

### 02. Short-chain fatty acids (SCFAs)

Butyrate supports gut lining and brain protection; propionate at high levels may affect behavior in some models.

### 03. Bacterial byproducts

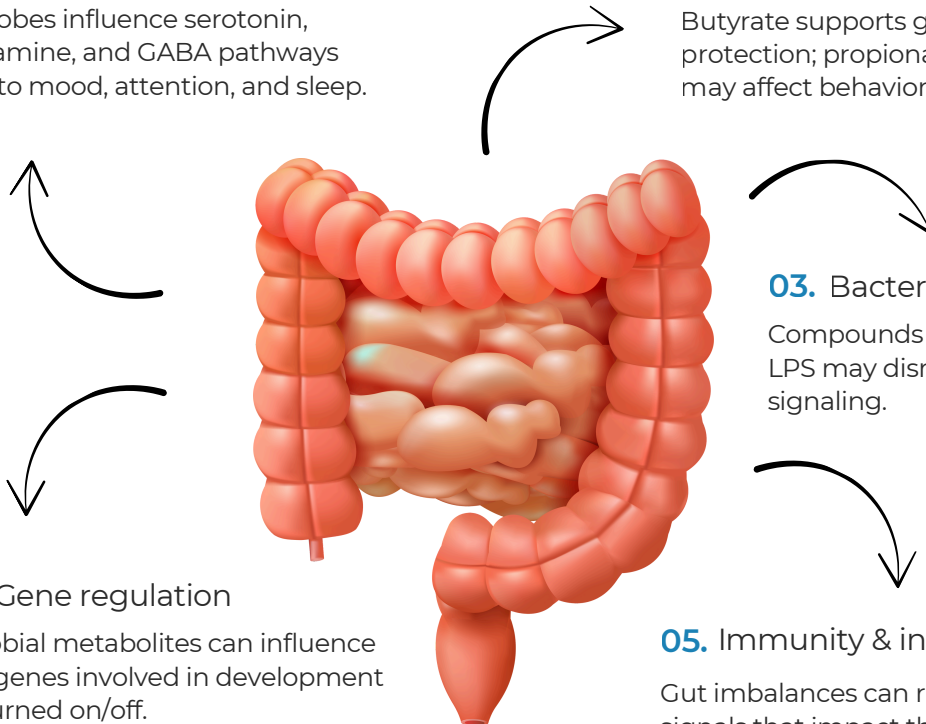
Compounds like p-cresol and LPS may disrupt brain signaling.

### 04. Gene regulation

Microbial metabolites can influence how genes involved in development are turned on/off.

### 05. Immunity & inflammation

Gut imbalances can raise inflammatory signals that impact the brain.



# Common Challenges in Neurodiverse Children

Children with neurodevelopmental conditions (like autism, ADHD, cerebral palsy, Rett, Tourette's, and Down syndrome) often experience gut-related problems that overlap with their daily health, mood, and behavior.



## GI Symptoms

Gastrointestinal symptoms are frequent. Constipation, diarrhea, stomach pain, reflux, and bloating are common and often linked to changes in gut bacteria that disrupt balance and cause discomfort.



## Nutrient Gaps

Nutrient and metabolite problems arise when beneficial microbes are reduced. This can lower vitamins like folate and B12 and short-chain fatty acids such as butyrate, while raising others like propionate.



## Behavior Links

Gut microbes influence brain messengers such as serotonin and dopamine, and imbalances may contribute to hyperactivity, anxiety, sleep trouble, or repetitive behaviors.



## Immune Effects

A weakened gut barrier allows toxins and bacterial products into the blood, which can trigger immune reactions and brain inflammation, worsening symptoms.

# Gut Microbiome Patterns by Condition

Research reveals unique microbial shifts in each condition. Here's what studies show

## Autism (ASD):

Higher levels of certain bacteria (*Clostridium*, *Desulfovibrio*); lower *Bifidobacterium* and *Akkermansia*. This often links to tummy pain, behavior changes, and serotonin balance.

## ADHD:

Fewer “calming” bacteria like *Faecalibacterium*; more species that may affect dopamine and serotonin. This connects with hyperactivity and emotional challenges.

## Cerebral Palsy/Epilepsy:

More *Enterococcus* and *Streptococcus*; fewer helpful butyrate-producers like *Roseburia*. Constipation and inflammation are common.

## Down Syndrome:

Gut shifts linked to thinking and learning differences, with more *Sutterella* species and fewer *Prevotella*.

## Tourette's / Tic Disorders:

Some kids show higher *Ruminococcus* and lower *Prevotella*, connected with tic severity.

## Rett Syndrome:

Higher levels of *Clostridium* and *Eggerthella*; lower levels of helpful bacteria like *Faecalibacterium*. This may increase gut inflammation.





# Our Approach

- We evaluate each child's gut microbiome using shotgun metagenomic sequencing and translate findings into simple, safe, evidence-informed steps for families and schools.
- Results guide nutrition, daily habits, and targeted supplements where appropriate—in collaboration with your care team.

# What we Analyze

We evaluate 11 key parameters of your child's gut microbiome.

Parameter	What it Checks	Why it Matters in NDD
1. Kingdom distribution	Balance of bacteria, fungi, archaea, protozoa, viruses	Imbalances reduce metabolic coverage (fermentation, barrier support) and may relate to GI symptoms in ASD/ADHD
2. Top abundant species	Which microbes dominate (e.g., <i>Prevotella</i> , <i>Bacteroides</i> , <i>Faecalibacterium</i> )	Over-dominance can reflect restricted diets and GI complaints; balanced diversity supports mood and gut stability
3. Foundation (keystone) microbiota	Barrier-building, anti-inflammatory species ( <i>Akkermansia</i> , <i>Bifidobacterium</i> , <i>Faecalibacterium</i> , <i>Roseburia</i> )	Reduced levels linked to weaker gut lining, lower SCFA production, and more GI pain, sleep, and behavior issues
4. Probiotic characterization	Presence/absence of beneficial strains (e.g., <i>Lactobacillus</i> , <i>Bifidobacterium</i> , <i>Akkermansia</i> )	Important for digestion and gut-brain signaling (serotonin, GABA), relevant to anxiety, sleep, and irritability
5. Pathogen & overgrowth screen	Pathobionts, yeasts, protozoa, dysbiotic overgrowth	Overgrowth may drive bloating, constipation, or diarrhea, which worsen discomfort and behavior/sleep in NDDs

<b>6. Antibiotic resistance genes (ARGs)</b>	Potential resistance across drug classes	Critical if antibiotics are needed; lower ARGs are reassuring for safer, more effective treatment in children
<b>7. SCFA production potential</b>	Genetic capacity for butyrate, propionate, acetate	SCFAs maintain barrier integrity, immune balance, and gut-brain signaling; altered SCFA profiles are seen in ADHD
<b>8. Microbiota recovery potential</b>	Resilience after antibiotics or diet stress	More resilient microbiomes show fewer swings between constipation/diarrhea and adapt better to dietary changes
<b>9. Vitamin production potential</b>	Microbial capacity for B-vitamins and K2	B vitamins support energy and neurotransmitter synthesis; low microbial vitamin potential may add to selective eating challenges
<b>10. Neurotransmitter-related potential</b>	Genes linked to serotonin, dopamine, GABA, histamine	Altered pathways influence mood, stress, and sleep; disruptions are reported in ASD/ADHD and other NDDs
<b>11. Propensity to disease development</b>	Microbiome-linked risk patterns (constipation, leaky gut, IBS, sleep, anxiety)	Many NDD children face GI discomfort, poor sleep, or anxiety; microbiome risk flags help guide supportive care





# How results turn into action

**01**

## **More comfort, fewer tummy troubles:**

By identifying patterns linked with constipation, diarrhea, bloating, or reflux, we can target diet, fiber type, hydration, and probiotics to reduce GI discomfort.

**04**

## **Smarter supplement choices:**

Functional pathway insights (SCFAs, neurotransmitter- and vitamin-related potential) help decide when to use or avoid certain products, and when food-first makes more sense.

**02**

## **Better sleep and routines:**

Improving gut comfort and regularity often helps sleep and daily behavior get easier. Families frequently report calmer mornings and smoother school days after implementing changes.

**05**

## **Track progress objectively:**

Re-testing at 8–12 weeks shows how the microbiome is shifting alongside symptom logs—motivating for families and helpful for care teams.

**03**

## **Personalized nutrition (not guesswork):**

Results guide which fibers, fermented foods, and pre/probiotics are most likely to help—avoiding trial-and-error that can be stressful for kids.

**06**

## **Built on quality you can trust:**

ISO 9001:2015 and ISO/IEC 17025:2017 certified; NABL and NABH accredited





# The Process Workflow

Collecting your sample is simple and stress-free with our at-home kit. It includes clear instructions and pre-labeled containers, with no need for special handling or refrigeration. Once your sample reaches our lab, we use advanced shotgun metagenomic analysis to identify key microbes, their abundance, and functional roles such as vitamin and short-chain fatty acid (SCFA) production.

Your personalized digital report then highlights microbiome strengths, potential imbalances (dysbiosis), and provides food and lifestyle recommendations to support gut and overall wellbeing.

## How to Collect Your Sample



Scan the QR code to watch a quick step-by-step video on proper sample collection. This ensures accuracy, reliability, and a smooth testing process.



**Collect your sample**  
using our easy, at-home  
kit.



**Advanced NGS Analysis**  
for Your Microbiome



**You receive a digital**  
report with personalized  
insights.

# Our Commitment:

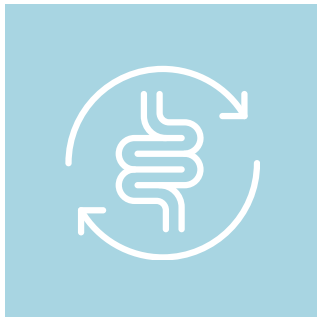
We are dedicated to advancing child health with science-based solutions. By understanding the gut microbiome, we aim to provide families and clinicians with practical insights that support children's unique journeys.

## Potential Benefits Observed:

Enhanced nutrient uptake  
to support growth and  
development



Reduction in irritability  
and restlessness



Improved  
digestive comfort



Better sleep quality &  
Strengthened immune function

# Scientific References

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# Frequently Asked Questions (FAQ)

## **1. Why is the gut microbiome important for children with special needs?**

Research shows that children with Autism Spectrum Disorder (ASD), ADHD, and developmental delays often have imbalances in their gut microbiome. These imbalances may contribute to digestive issues, irritability, sleep problems, and nutrient deficiencies.

## **2. How can gut microbiome profiling help my child?**

The test identifies whether your child's gut bacteria are imbalanced, missing key beneficial species, or overgrown with harmful microbes. With this knowledge, we can suggest dietary and probiotic strategies to support digestion, mood, and overall health.

## **3. Is this a medical test or a diagnostic tool?**

No. Gut microbiome profiling is not a diagnostic test. It is a supportive tool that provides insights into gut health, which can be used alongside medical treatments, therapies, and dietary interventions.

## **4. Can improving the gut microbiome really help with behavior or sleep?**

Yes, scientific studies show that improving gut health can reduce gastrointestinal discomfort, irritability, and restlessness, and may also support better sleep and mood regulation in children with ASD and ADHD.

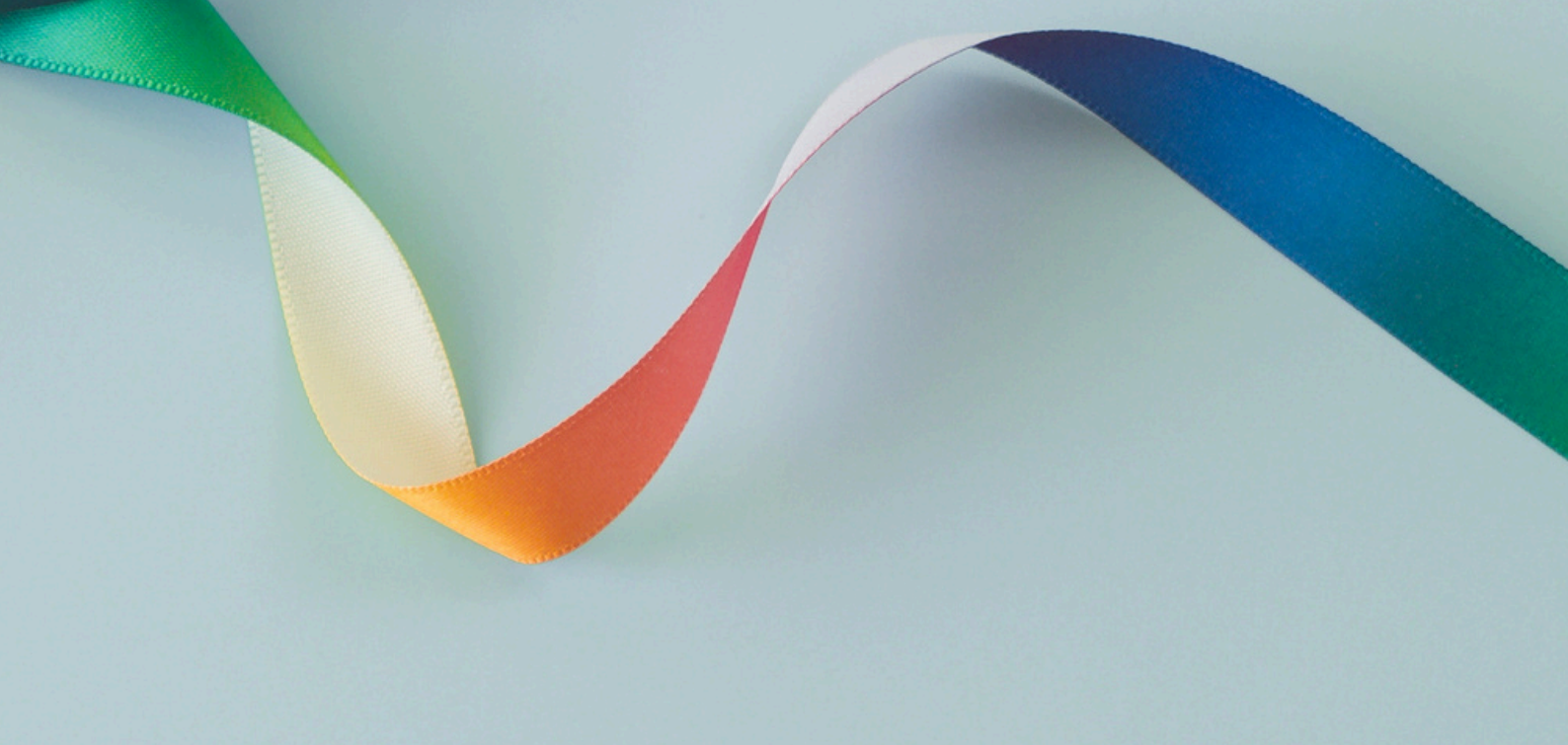
## **5. Will my child need to follow a strict diet?**

Not necessarily. Based on your child's gut profile, we provide practical, family-friendly food and probiotic suggestions that fit into daily life, without overwhelming restrictions.

## **6. Can gut microbiome profiling help all children with special needs?**

Every child is unique. While results and outcomes vary, profiling often provides useful insights that help improve digestive comfort, nutrition, and overall wellbeing.





# Evidence based solutions for your child

Contact Us to Book your Test Today



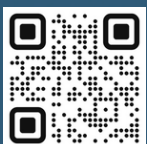
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