

## The Unexpected Relationship of Gut Health to Fitness, Health, and Athletic Performance

Joni M. Boyd, PhD, MS-Nutrition, MEd  
joni.boyd@nasm.org



*Scan for business card  
and contact info.*

### 1. Introduction to Gut Health

1. Microbiota is the diverse ecosystem (bacteria, archaea, viruses, and fungal communities) living in a particular area.
2. Collection of genomes from all microorganisms within an environment.  
**Microbiota** describes the actual bacteria; **microbiome** is the bacteria AND their genes.
3. Provide an essential functions for health & digestion.

### 2. Introduction to Probiotics

1. Probiotics are "live microorganisms that confer a health benefit on the host."
2. Found in foods such as yogurt and kefir; Can be added to supplements such as capsules, tablets, or powders
3. Help to absorb nutrients and assist the digestive tract. Impact the body through the amount and diversity of the good bacteria in the digestive tract.
4. probiotics are bacteria consumed through food or supplements; prebiotics are carbohydrates (such as fiber) that feed the good bacteria residing in our guts

### 3. Review of the Research on Probiotics

1. positive effects on overall digestion
2. reduction of disease risk (obesity, CHD, diabetes, IBD)
3. positive effects on mental health
4. current gaps in the research (humans vs. mice; strain-specific)

### 4. Review of the Associations on Gut Health and Fitness, and Athletic Performance

1. exercise increases richness and diversity of gut microbiota
2. diet is established modulator of gut microbiota
3. body composition and microbiota gut health are related

### 5. Review of the Impact of Probiotic Supplementation in Athletes

1. Improves immune response to training
2. Expedite recovery and decrease soreness.
3. Reduces the risk for URTI and related illnesses.
4. Potential to increase performance variables.
5. Assists with energy production.
6. May influence muscle mass and strength.
7. Can decrease stress levels and increase resilience.

### 6. How does it interact with protein supplementation?

1. May increase amino acid absorption from plant protein
2. Can speed recovery and reduce soreness
3. Has shown negative impact when mixed with certain proteins in endurance athletes

### 7. Summary of Information & Research Findings

1. Probiotics are live microorganisms that offer a health benefit when consumed in adequate amounts.
2. Regular consumption of specific probiotics may assist with immune function and reduce sickness.
3. Probiotic benefits include better gut-barrier function, nutrient absorption, recovery, and overall performance.
4. Probiotics may improve body composition, lean body mass, neurotransmitter synthesis, cognition, and mood.
5. Positive effect of probiotics on normalizing age-related reductions in testosterone and reduced cortisol levels.
6. Interpretation depends on the specific strain of probiotic, and by the differing clinical outcome measures within the literature.

#### 8. Recommendations for Probiotics

1. Address the current diet.
2. Increase prebiotic foods.
3. Focus on probiotic foods that have been validated within the research.
4. Consider supplements as a preventative approach to wellness.
5. Aim for 10 – 20 billion units per day (based on tolerance)

#### 9. Summary of Research: Strain-Specific

***The following probiotic strains/species have shown improvements in athletic performance/recovery:***

1. B. coagulans GBI-30, 6086 (BC30) at  $1 \times 10^9$  CFU has beneficial effects in combination with protein on exercise recovery;
2. Encapsulated B. breve BR03 in combination with S. thermophilus FP4 at  $5 \times 10^9$  CFU each has beneficial effects on exercise recovery and performance following muscle-damaging exercise;
3. L. delbrueckii ssp. bulgaricus at  $1 \times 10^5$  CFU can increase VO<sub>2</sub>max and aerobic power;
4. L. acidophilus SPP, L. delbrueckii bulgaricus, B. bifidum, and S. salivarius thermophilus at  $4 \times 10^{10}$  CFU administered in form of a yogurt drink can increase VO<sub>2</sub>max;
5. L. plantarum TWK10 at  $1 \times 10^{10}$  CFU has been shown to increase endurance performance;
6. L. acidophilus, L. rhamnosus, L. casei, L. plantarum, L. fermentum, B. lactis, B. breve, B. bifidum and S. thermophilus at  $4.5 \times 10^{10}$  CFU can increase run time to fatigue in the heat.

***The following probiotic strains/species have been linked to improved gut health in athletes:***

1. L. rhamnosus GG at  $4 \times 10^{10}$  CFU in form of a milk-based drink,
2. B. bifidum W23, B. lactis W51, E. faecium W54, L. acidophilus W22, L. brevis W63, and L. lactis W58, at  $1 \times 10^{10}$  CFU;
3. L. salivarius (UCC118) (unknown dose).

***The following strains/species have been shown to improve immune health in athletes, reducing the episodes, severity or duration of exercise-induced infections:***

1.  $1.2 \times 10^{10}$  CFU L. fermentum VRI-003 (PCC) at  $1.2 \times 10^{10}$  CFU and at  $1 \times 10^9$  CFU in males;
2. L. casei Shirota (LcS) at  $6.5 \times 10^9$  CFU twice daily;
3. L. delbrueckii bulgaricus, B. bifidum, and S. salivarius thermophilus at  $4 \times 10^{10}$  CFU administered in the form of a yogurt drink;
4. B. animalis subsp. lactis BI-04  $2 \times 10^{10}$  CFU;
5. L. gasseri  $2.6 \times 10^9$  CFU, B. bifidum  $0.2 \times 10^9$ , and B. longum  $0.2 \times 10^9$  CFU;

6. *B. bifidum* W23, *B. lactis* W51, *E. faecium* W54, *L. acidophilus* W22, *L. brevis* W63, *L. lactis* W58 at  $1 \times 10^{10}$  CFU;
7. *L. helveticus* Lafti L10 at  $2 \times 10^{10}$  CFU.