



# AstraGin<sup>®</sup>

A FULL SPECTRUM  
GUT HEALTH NUTRACEUTICAL



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Thank you for your interest in our research overview.





# THE FORMULATION FOR BETTER HEALTH & WELLNESS

3 human clinical, 16 *in-vitro*, and 8 *in-vivo* studies

Published in:

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Molecular Nutrition & Food Research

Scientific Reports

Journal of Biochemistry and Biotechnology

FFHD (Functional Foods in Health and Disease)

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## KEY BENEFITS



ENHANCED NUTRIENT  
ABSORPTION



FULL-SPECTRUM  
GUT HEALTH



MICROBIOTA  
POPULATION SUPPORT

AstraGin

# THE IMPORTANCE OF GUT HEALTH

Gut health plays a pivotal role in maintaining overall well-being, encompassing various interconnected aspects. The gut is responsible for absorption, where essential nutrients from the food we consume are assimilated into the bloodstream, sustaining bodily functions. A healthy gut lining, comprised of tightly packed cells and abundant nutrient transporters, ensures efficient nutrient absorption while helping to prevent harmful substances from entering the bloodstream.

The microbiota, a diverse community of microorganisms residing in the gut, also influences health. A balanced microbiome supports digestion, synthesizes vitamins, and helps to bolster the immune system. A good population of healthy bacteria also prevents the overgrowth of harmful bacteria.

The gut-immune connection is another crucial component; a substantial portion of the immune system is situated in the gut lining. A well-maintained gut helps prevent the intrusion of pathogens and keeps inflammation low to support immune function.

Furthermore, the gut-brain axis underscores the intricate link between gut health and mental well-being. Bidirectional communication between the gut and brain influences mood, stress, and cognitive health. A harmonious gut environment supports the production of neurotransmitters like serotonin, impacting emotional balance.

In conclusion, gut health encompasses the absorption of nutrients, a resilient gut lining, a diverse and balanced microbiota, a strong immune system, and a profound connection to mental health. Nurturing gut health through a balanced diet, probiotics, and more could have far-reaching positive effects on overall health and wellness.

*For more details, please view the scientific papers*

This gut health overview includes a literature review of existing research for informational purposes. It is not our original research nor does it assert any claims about our product. This content offers an overview of current scientific knowledge only. Any mentioned benefits stem from scientific literature, not as guarantees. Our company isn't liable for individual actions based on this overview.

## WHAT IS ASTRAGIN®

AstraGin® is a proprietary food and dietary ingredient comprised of highly fractionated *Panax notoginseng* and *Astragalus membranaceus* extracts produced by a proprietary pharmaceutical extraction technology. AstraGin® has demonstrated through *in-vitro*, *in-vivo*, and human studies to:

- Enhance absorption of a broad spectrum of nutrients, such as amino acids, fatty acids, vitamins, and phyto-compounds by up-regulating their transporter proteins.<sup>1,2,3,4</sup>
- Support a healthy intestinal wall environment at the cellular level and healthy tight junctions.<sup>3,4,5</sup>
- Promote microbiota ecosystem homeostasis by supporting the health of the gut wall and maintaining a healthy population of microbiota.<sup>5</sup>
- Maintain a healthy immune system by supporting a healthy gut environment.<sup>5</sup>



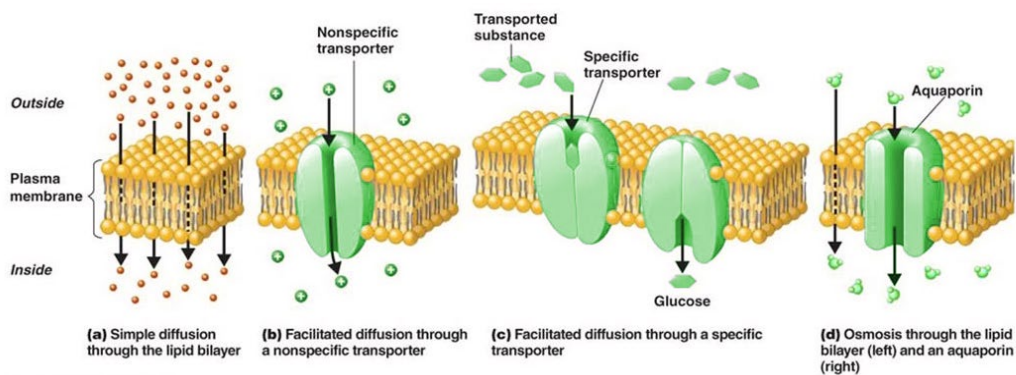
# ASTRAGIN® SUPPORTS ABSORPTION & BIOAVAILABILITY OF FATTY ACIDS, AMINO ACIDS, PEPTIDES, VITAMINS, AND PHYTONUTRIENTS

Many nutrients, such as glucose and amino acids, are absorbed through special absorption sites on the intestinal lumen by specific transport proteins. AstraGin® has demonstrated preclinically in 16 *in-vitro* studies on Caco-2 cells, and 8 *in-vivo* studies on rats, to increase the absorption of amino acids, peptides, fatty acids, folate, and phytonutrients by up-regulating the expression level of specific mRNA and transport proteins, such as SGLT1 and CAT1.

Additionally, human studies on AstraGin® demonstrated a positive impact on L-arginine levels, supporting the preclinical findings on arginine absorption.

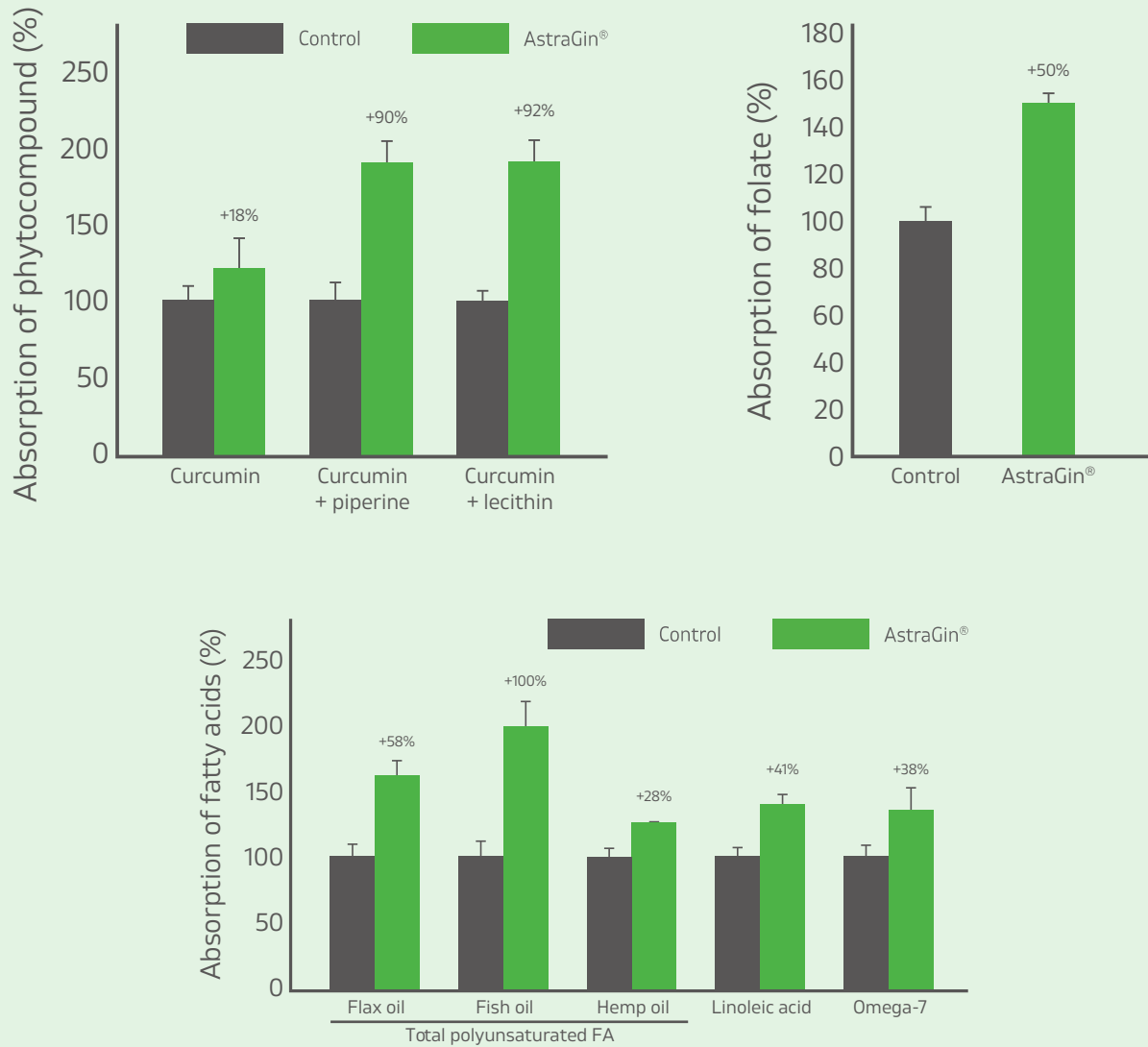
## Types of Transport Proteins

- Non Specific transporter
- Specific transporter



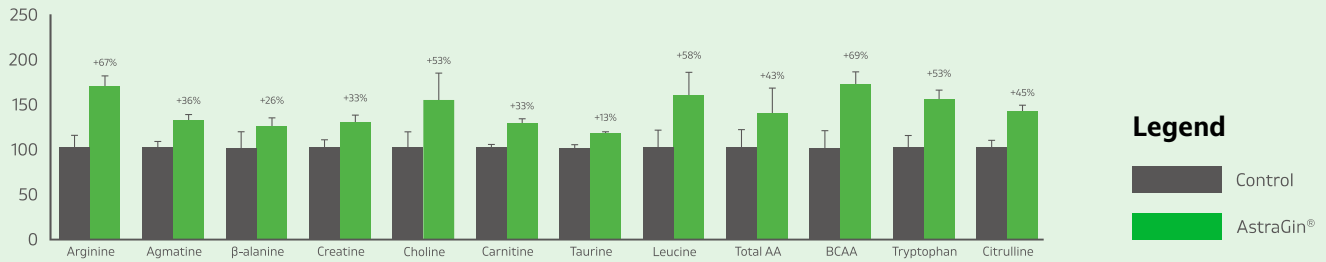
# ASTRAGIN® SUPPORTS FATTY ACID AND PHYTONUTRIENT ABSORPTION

## Preclinical *in-vitro* Data

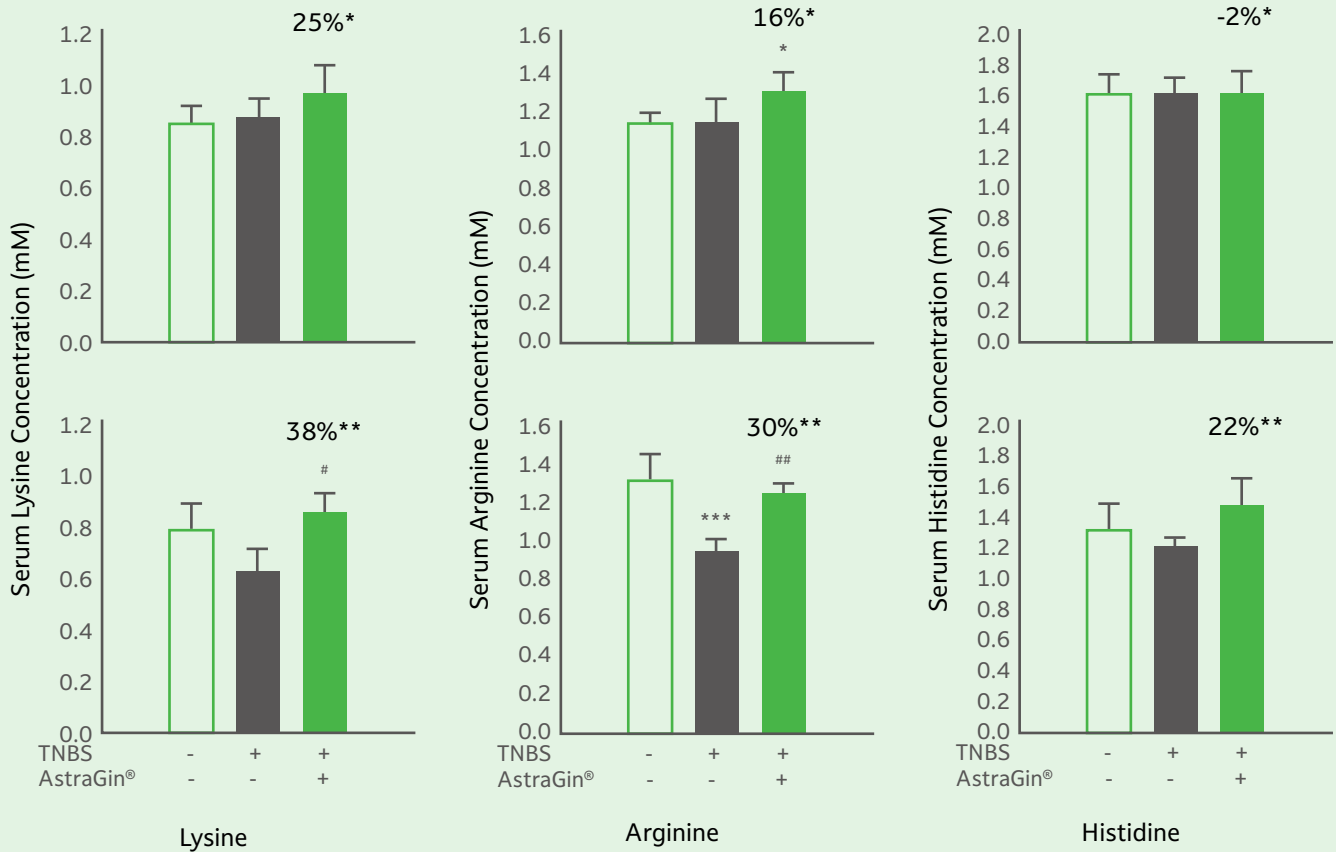


# ASTRAGIN® SUPPORTS AMINO ACID AND PEPTIDE ABSORPTION

## Preclinical *in-vitro* Data



## Preclinical *in-vivo* Data



\* 1 week after AstraGin® in normal rats  
 \*\* 1 week after AstraGin® in TNBS-induced rats



# ASTRAGIN® SUPPORTS AMINO ACID AND PEPTIDE ABSORPTION

## Human Study Data

Table 2. Pharmacokinetics of Arginine, Citrulline, and Ornithine (N=24)

		AUC (μmol*hr/L)	Tmax (min)	Cmax (μmol/L)
Arginine	Placebo	259.30±76.02	60.00±26.54	236.21±41.80
	APS	304.24±91.95	68.75±31.87	262.50±49.78
	p-value	0.041	0.352	0.062
Ornithine	Placebo	241.24±109.96	96.88±38.56	209.92±67.65
	APS	250.82±118.18	90.00±45.11	228.08±70.83
	p-value	0.666	0.332	0.323
Citrulline	Placebo	12.01±8.62	103.13±51.07	42.15±11.38
	APS	14.44±10.57	95.00±49.78	42.63±10.92
	p-value	0.268	0.544	0.720

\* Data were expressed as mean ± standard deviation and a p-value less than 0.05 was considered statistically different

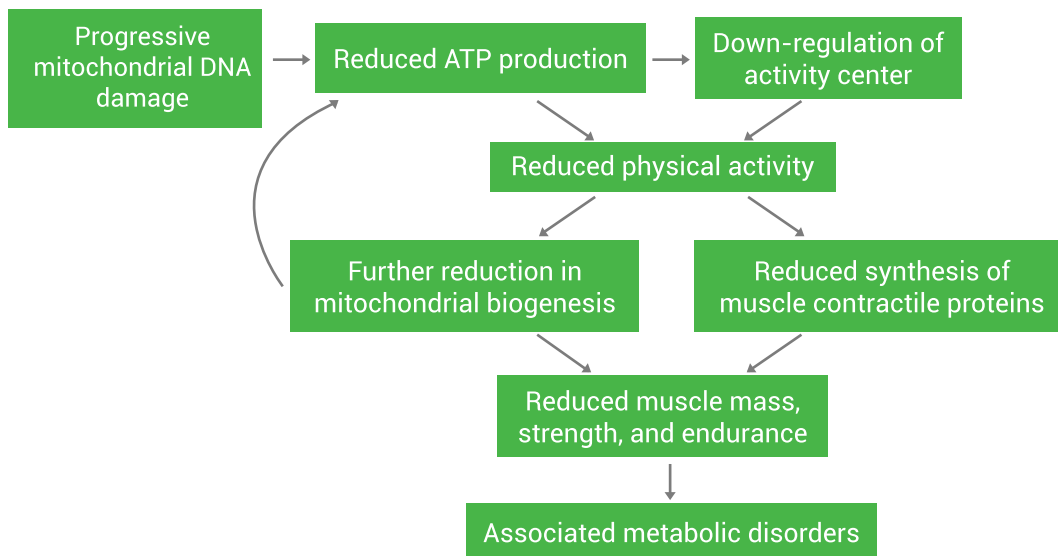
Table 3. Plasma ADMA and Arg/ADMA ratio of subjects (N = 24)

	Placebo	APS	APS
ADMA	1.53±1.24	0.88±1.02	0.081
Arg /ADMA ratio	77.91±93.40	208.01±239.47	0.007

\* Data were expressed as mean ± standard deviation and a p-value less than 0.05 was considered statistically different

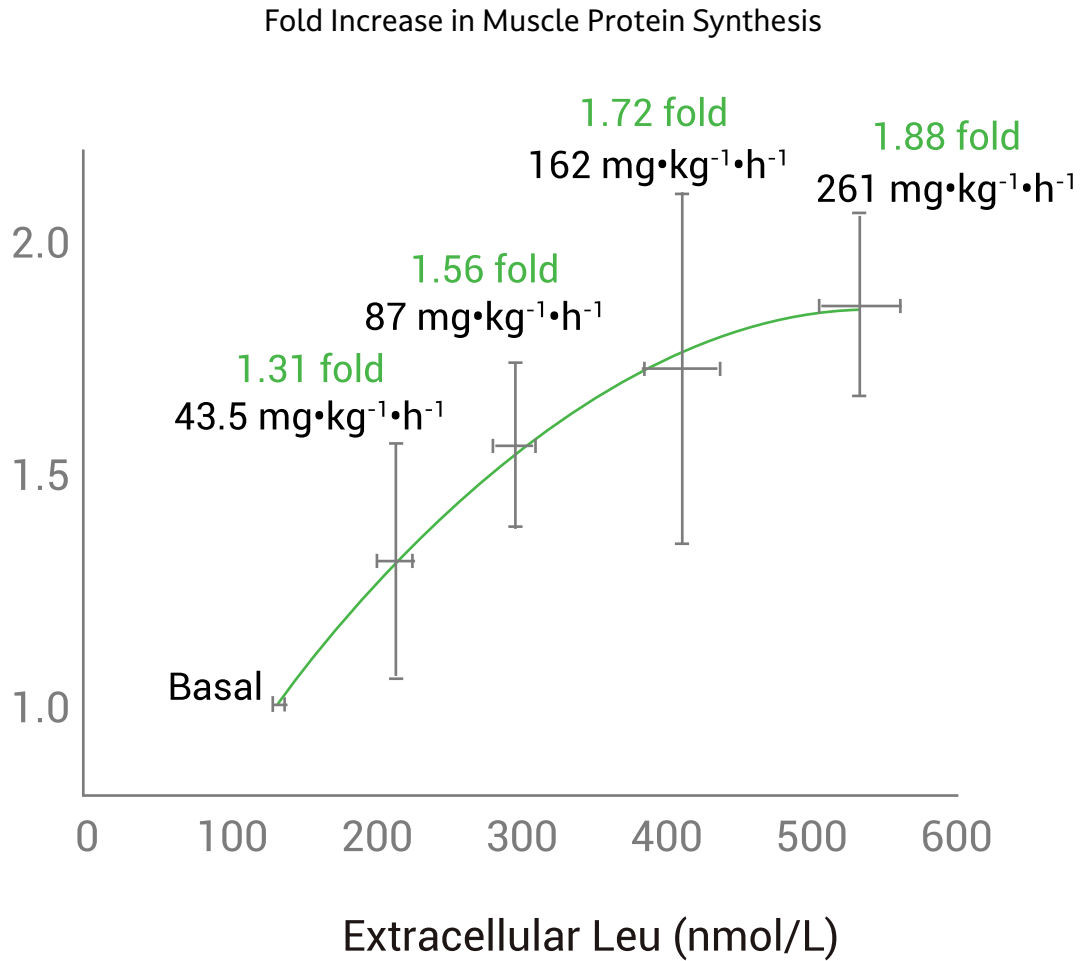
# ASTRAGIN® INCREASES PROTEIN SYNTHESIS THROUGH MITOCHONDRIAL FUNCTION DERIVED SIGNALING PATHWAYS

Mitochondrial dysfunction inhibits muscle mass growth. AstraGin® has shown preclinically to increase liver ATP production by 18% and elevated mitochondrial function.

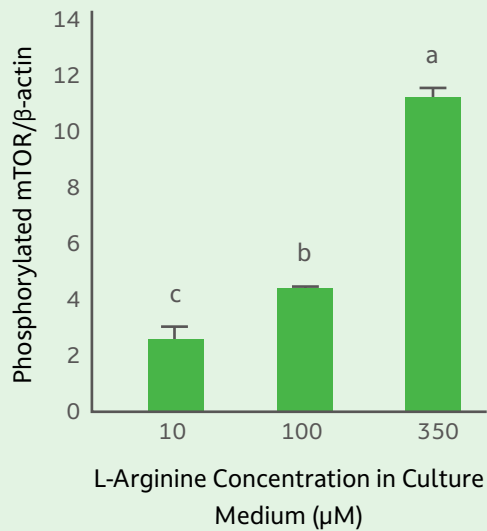


# PLASMA CONCENTRATION LEVEL OF LEUCINE AND HUMAN MUSCLE PROTEIN SYNTHESIS

Muscle protein synthesis is influenced by the availability of leucine.

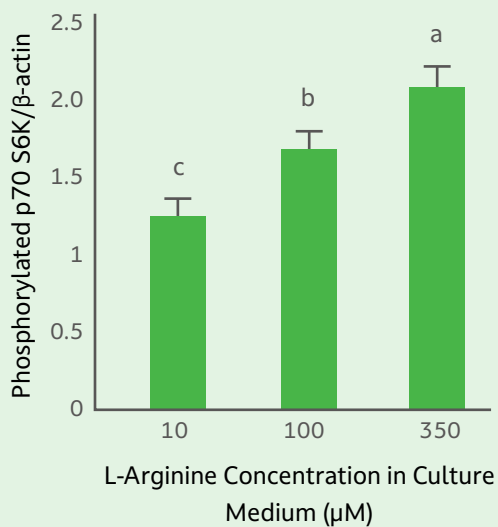


# ARGININE CONCENTRATION AND mTOR PATHWAYS



## mTOR

Mammalian target of rapamycin (mTOR) is an enzyme that is stimulated by nutrients and growth factors and inhibited by stress to ensure that cells grow only during favorable conditions.



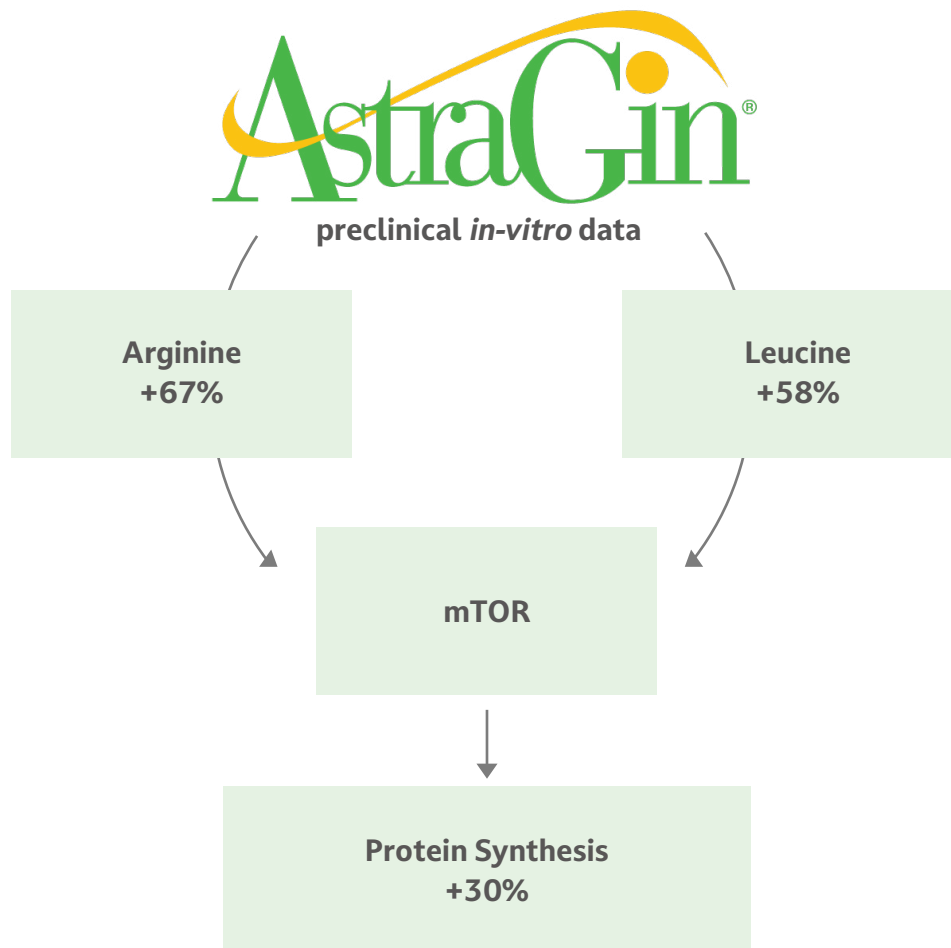
## p70S6K

p70S6K (S6K1) is a kinase that acts downstream of mTOR signaling in response to growth factors and plays a role in protein synthesis and in cell growth control.

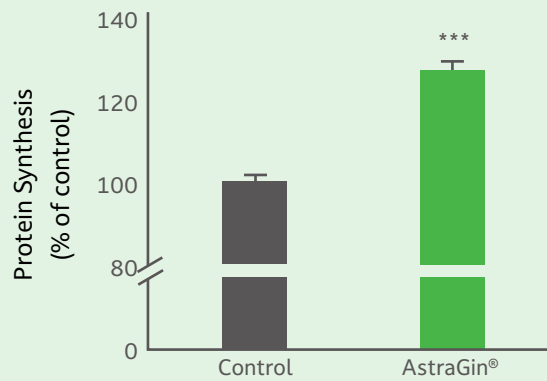
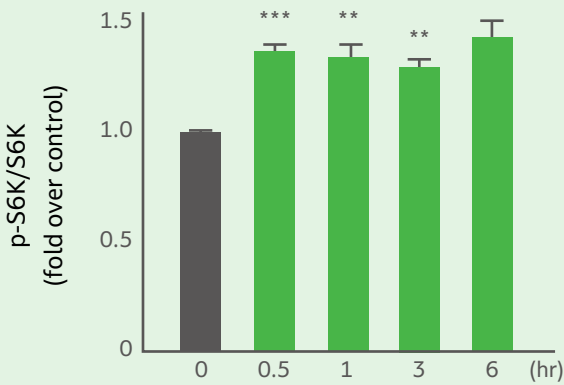
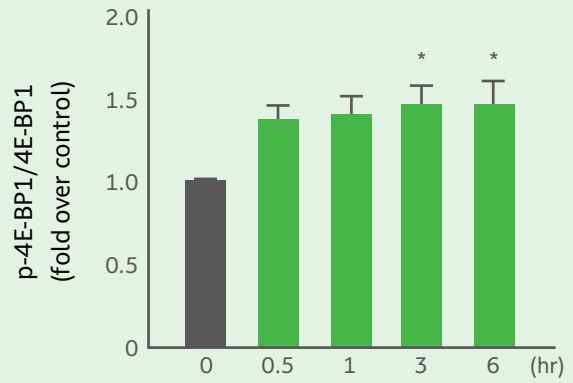
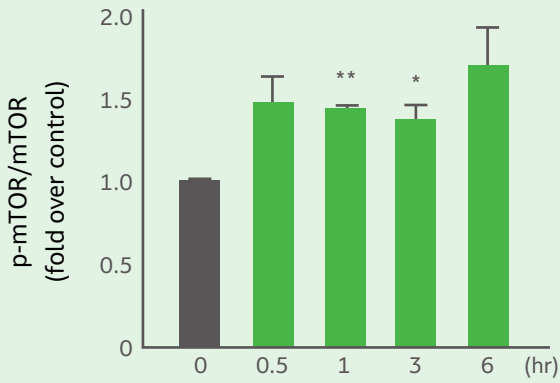


# EFFECTS OF ASTRAGIN® ON mTOR PATHWAY

Based on the difference in extracellular concentration of leucine from 130nM to 210nM.

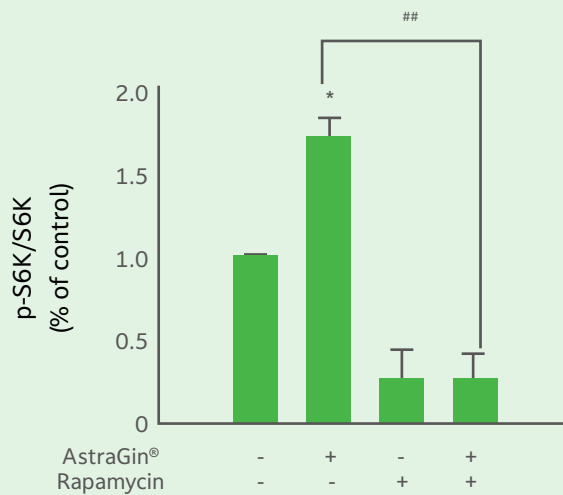
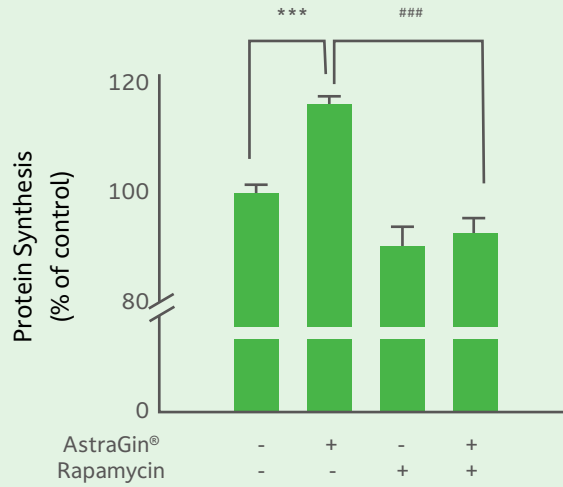
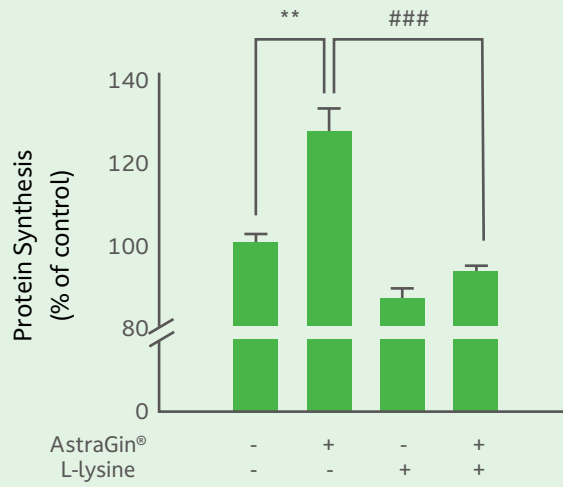


# ASTRAGIN® ACTIVATES THE MTOR PATHWAY, SUPPORTING SYNTHESIS IN CACO-2 CELLS



\*p < 0.05, \*\*p < 0.01, and \*\*\*p < 0.001 versus the untreated control.

# LYSINE AND RAPAMYCIN SUPPRESS THE EFFECTS OF ASTRAGIN® ON MTOR SIGNALING PATHWAY IN CACO-2 CELLS

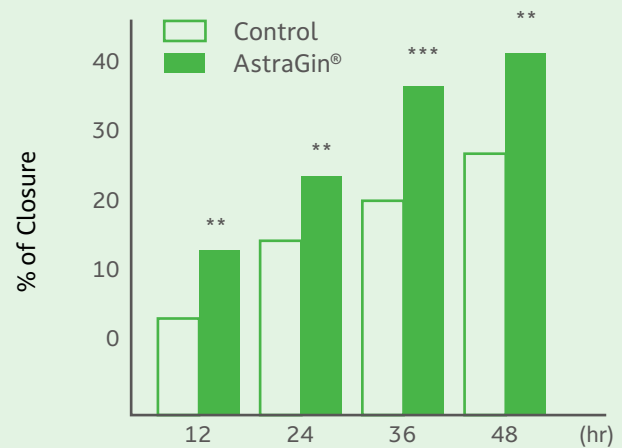
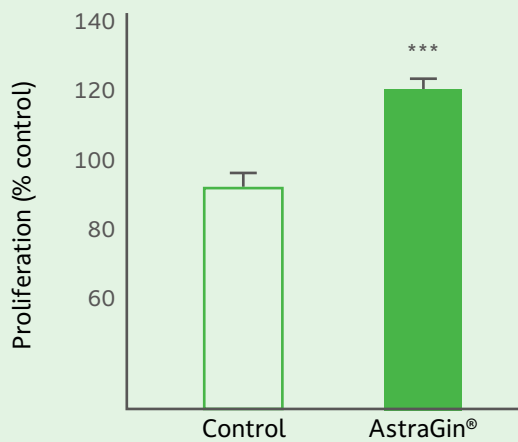


\*p < 0.05, \*\*p < 0.01, and \*\*\*p < 0.001 versus the untreated control.

## p < 0.01, and ### p < 0.001 versus the AstraGin®-treated.

# ASTRAGIN® PROMOTES CELL PROLIFERATION AND SCRATCH WOUND CLOSURE IN CACO-2 CELLS

The mTOR pathway, a central regulator of human metabolism and physiology, regulates cell growth, cell proliferation, cell motility, cell survival, protein synthesis, autophagy, and transcription.



\*\*p<0.01, and \*\*\*p<0.001 versus the untreated control



# THE ROLE OF INTESTINAL BARRIER HEALTH AND MICROBIOTA ON OVERALL WELL-BEING

The intestinal epithelial cells lining the walls of the intestine play a vital role in transporting essential nutrients such as amino acids, carbohydrates, and lipids from the intestinal cavity into the bloodstream. These nutrients are crucial for maintaining overall health.

In a healthy intestinal environment, a thriving community of beneficial microorganisms, known as the microbiota, resides in the lumen. This diverse microbiota helps digest complex carbohydrates, produces essential vitamins, and maintains a balanced immune system.

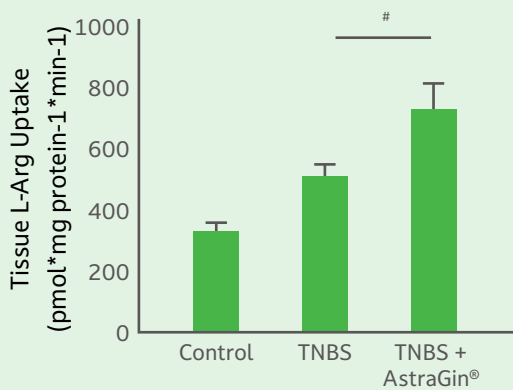
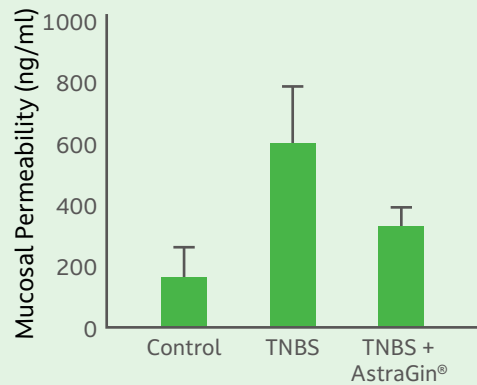
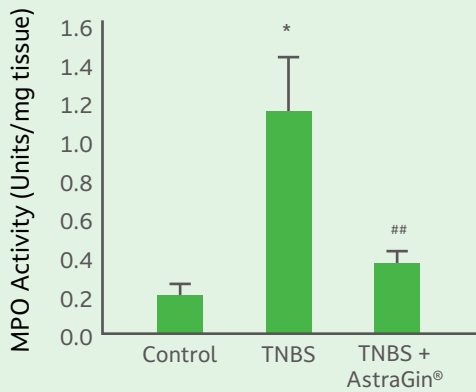
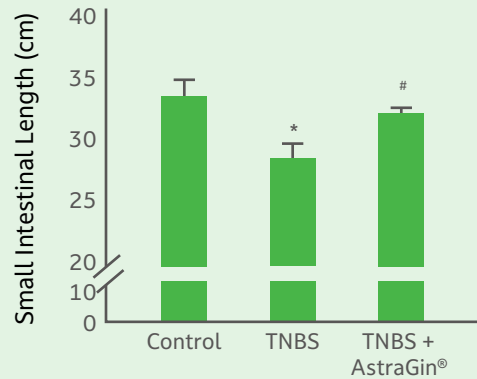
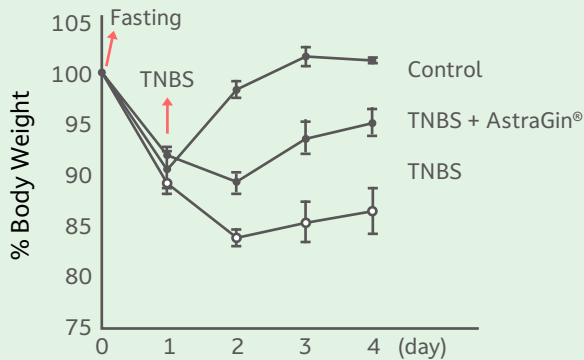
However, when the protective barrier formed by epithelial cells is compromised—whether due to inflammation, medications, or other factors—it can disrupt the delicate balance of the microbiota, as well as the absorption rate of those beneficial nutrients.

The exact mechanisms behind these interactions are not yet fully understood, but research indicates that maintaining a healthy lumen and microbiota population is essential for overall well-being. Factors such as genetics, infections, environmental influences, and autoimmune responses may all play a role in this complex relationship.

Efforts to support the integrity of the protective intestinal barrier also benefit the lumen and microbiota. In summary, a healthy intestinal barrier, a balanced lumen, and a thriving microbiota are all interconnected components that contribute to overall well-being.



# ASTRAGIN® DEMONSTRATES REDUCED INFLAMMATION IN TNBS-INDUCED MICE

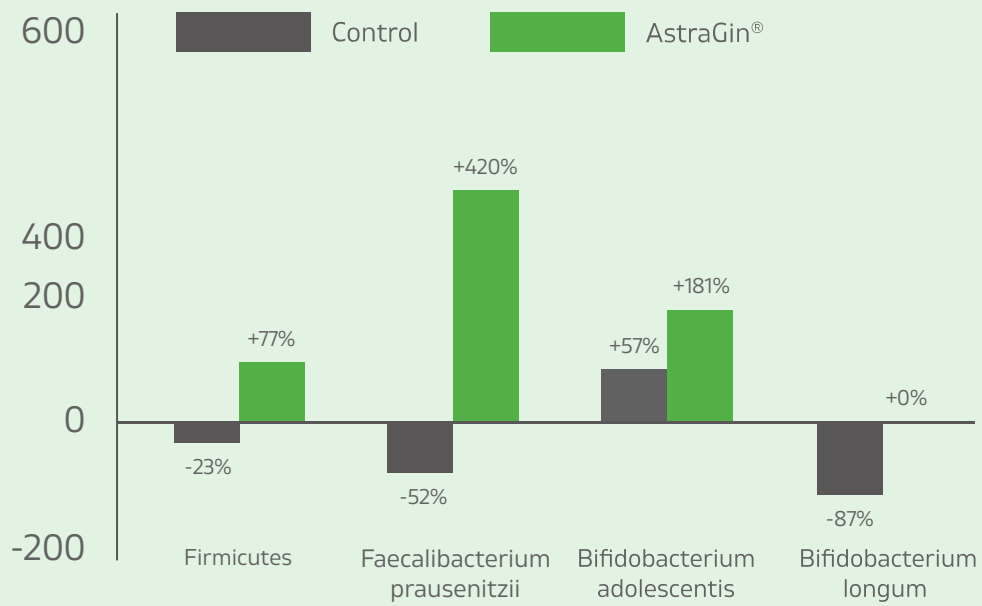


\* 1 week after AstraGin® in normal rats

\*\* 1 week after AstraGin® in TNBS-induced rats

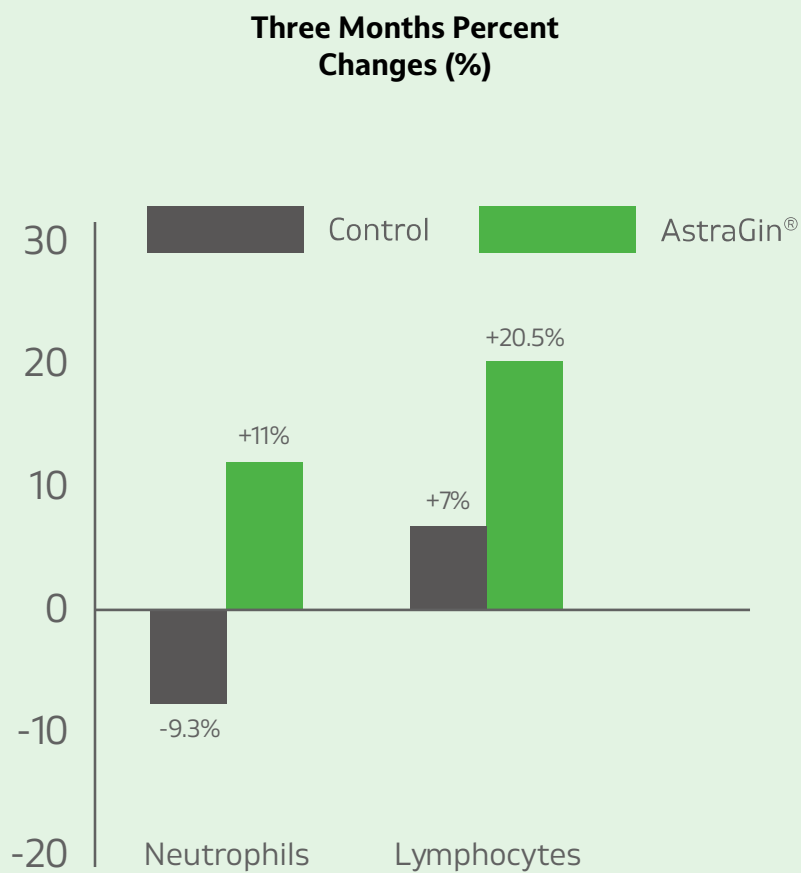
# ASTRAGIN® DEMONSTRATED BENEFITS TO A HEALTHY MICROBIOME POPULATION IN HUMAN SUBJECTS

Probiotics Three Months  
Percent Changes (%)

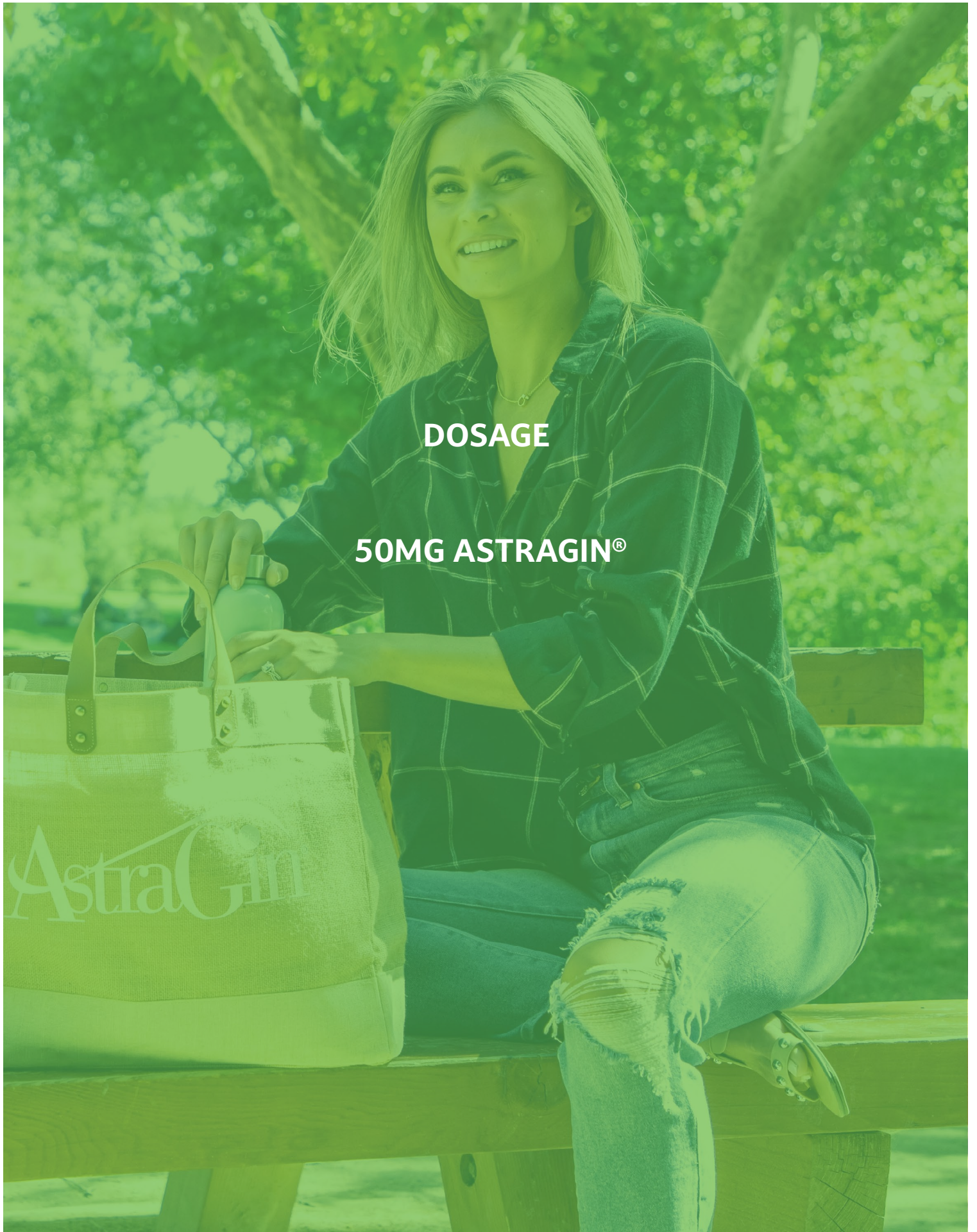


# ASTRAGIN® DEMONSTRATED ACTIVATED GUT-BASED IMMUNE CELLS IN TESTED HUMAN SUBJECTS

Activated Immune cells to bolster gut-based immune function.







**DOSAGE**

**50MG ASTRAGIN®**

## REFERENCES

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