PLANT POWERED PLUS

SCIENTIFIC REFERENCE COMPANION

The Scientific Evidence Supporting the Book

William J. Bulsiewicz, MD, MSCI

Board-Certified Gastroenterologist
New York Times Bestselling Author

Purpose of this Document

This reference companion provides the scientific sources that support the claims, mechanisms, and clinical insights presented in *Plant Powered Plus*. It is intended for readers who wish to explore the underlying research, including clinicians, researchers, and scientifically curious readers.

Because *Plant Powered Plus* does not include numerical citations within the text, this document serves as a transparent, organized index of the peer-reviewed literature, clinical trials, systematic reviews, and authoritative reports that informed the book. My approach to supporting my work is defined further in **The Ultimate Companion Guide to Plant Powered Plus.**

How References Are Organized

References are indexed by the first five words of the sentence they support. This allows readers to efficiently locate sources using the Find function (Command/Control + F) in a PDF or document reader. In many cases, a single citation supports an entire paragraph or concept rather than a single sentence.

References are listed in the order they appear in the book and grouped by chapter and topic.

About Page Numbers

Page numbers are not included in this document. Final pagination changed multiple times during production, and matching sentences to final page numbers would have required manual verification that was not feasible prior to publication. If an efficient and reliable method for mapping references to final page numbers becomes available, this document may be updated in the future.

Table of Contents

Click to jump to the section

Medical Conditions Associated with Inflammation & Gut Dysbiosis

Autoimmune & Allergic Conditions

Medical condition	Chronic inflammation	Dysbiosis	Intestinal permeability
Type 1 diabetes	Tsalamandris, Eur Cardiol 2019	Abdellatif J Diabetes 2019	Bosi Diabetologia 2006
Rheumatoid arthritis	Mueller Cells 2021	Romero-Figueroa Front Cell Infect Microbiol 2023	Heidt Nutrients 2023
Psoriatic arthritis	Schett Nat Rev Rheumatol 2022	Myers Best Pract Clin Rheumat 2019	Hecquet Joint Bone Spine 2021
Psoriasis	Rendon Int J Mol Sci 2019	Hidalgo-Cantabrana Br J Dermatol 2019	Humbert J Dermatol Sci 1991
Multiple sclerosis	Haase Ther Adv Neurol Disord 2021	Ordonez-Rodriguez Int J Environ Res Public Health 2023	Annibali J Neuroimmunol 2014
Systemic lupus erythematosus	Gottschalk Front Immunol 2015	Pan Front Immunol 2021	Bowes Clin Immunol 2024
Ulcerative colitis	Bergemalm Gastro 2021	Pittayanon Gastro 2020	Munkholm Gut 1994
Crohn's disease	Neurath Nat Rev Immunol 2014	Aldars-Garcia Microorganisms 2021	Wyatt Lancet 1993
Lymphocytic colitis	Dey PLOS One 2013	van Hemert Ann Transl Med 2018	van Hemert Ann Transl Med 2018
Collagenous colitis	Park Gut Liver 2015	Carstens Clin Transl Gastro 2019	Munch Gut 2005
Grave's disease	Zdor Int Arch Allergy Immunol 2020	Su J Clin Endocrin Metab 2020	Knezevic Nutrients 2020
Sjogren's disease	Rodrigues Autoimmunity 2017	Moon PLOS One 2020	Sjöström Clin Exp Rheumatol 2021
Hashimoto's thyroiditis	Weetman J Endocrinol Invest 2021	Virili Rev Endocr Metab Disord 2018	Cayres Front Immunol 2021

Medical condition	Chronic inflammation	Dysbiosis	Intestinal permeability
Myasthenia gravis	Huda Front Immunol 2023	Kapoor Autoimmun Rev 2023	Sun Int Immunopharmacol 2024
Celiac disease	Porpora Int J Mol Sci 2022	Rossi Cells 2023	van Elburg Gut 1993
Scleroderma	Rosendahl Kaohsiung J Med Sci 2022	Lemos J Clin Rheum 2022	Catanoso Scand J Rheumatol 2001
Dermatitis herpetiformis	Clarindo An Bras Dermatol 2014	Wacklin Inflamm Bowel Dis 2013	Smecuol Clin Gastroenterol Hepatol 2005
Antiphospholipid syndrome	Ambati Curr Opin Rheumatol 2023	van Mourik Front Immunol 2022	Kinashi Int J Mol Sci 2021
Ankylosing spondylitis	Zhu Bone Res 2019	Sternes Arthritis Res Ther 2022	Smith Ann Rheum Dis 1985
Interstitial cystitis	Grover Ther Adv Urol 2011	Braundmeier-Fleming Sci Rep 2016	Rahman-Enyart Am J Physiol Regul Integr Comp Physiol. 2021
Autoimmune hepatitis	Sebode Liver Int 2018	Wei Gut 2020	Lin Int J Clin Exp Pathol 2015
Autoimmune pancreatitis	Watanabe J Immunol 2017	Hamada Tohoku J Exp Med 2018	Hong Front Immunol 2024
Primary biliary cholangitis	Gulamhusein Nat Rev Gastro Hep 2020	Tang Gut 2018	Fussey Dig Dis Sci 2006
Primary sclerosing cholangitis	Eaton Gastro 2013	Sabino Gut 2016	Sato J Transl Autoimmun 2019
Sarcoidosis	Franzen Swiss Med Wkly 2022	Farahat Egyptian Journal of Int Med 2023	Wallaert Am Rev Respir Dis 1992
Fibromyalgia	Benlidayi Rheum Int 2019	Minerbi Pain 2023	Goebel Rheumatology (Oxford) 2008
Guillain-Barre syndrome	Willison Lancet 2016	Brooks Microbiome 2017	Shi Heliyon 2024
Behcet's disease	Gul Semin Immunopathol 2015	Ye Microbiome 2018	Fresko Ann Rheum Dis 2001

Medical condition	Chronic inflammation	Dysbiosis	Intestinal permeability
Behcet's disease	Gul Semin Immunopathol 2015	Ye Microbiome 2018	Fresko Ann Rheum Dis 2001
Kawasaki disease	Hara Clin Transl Immunology 2021	Zeng PeerJ 2023	Rivas J Immunol 2019
ANCA-associated vasculitis	Geetha Am J Kidney Dis 2020	Sun Front Cell Infect Microbiol 2022	Sun Front Immunol 2022
Asthma	Murdoch Mutat Res 2010	Hufnagl Semin Immunopathol 2020	Benard J Allergy Clin Immunol 1996
Food allergies	Johnston J Immunology 2014	Abril Int J Mol Sci 2023	Aktas J Allergy Clin Immunol 2023
Eczema	Itamura Int J Mol Sci 2022	Fang Front Immunol 2021	Pike J Invest Dermatol 1986
Seasonal allergies	Galli Nature 2008	Watts Int Arch Allergy Immunol 2021	Niewiem Nutrients 2022
Eosinophilic esophagitis	Racca Front Physiol 2022	Harris PLOS One 2015	Katzka Gut 2015

Cardiovascular & Pulmonary Diseases

Medical condition	Chronic inflammation	Dysbiosis	Intestinal permeability
Atherosclerosis	Libby JACC 2006	Samarraie Int J Mol Sci 2023	Quirk Am J Physiol Gastrointest Liver Physiol 2025
Coronary artery disease	Christodoulidis Cardiol Rev 2014	Choroszy Metabolites 2022	Li Sci Rep 2016
Myocardial infarction	Ren Curr Drug Targets Inflamm Allergy 2003	Liu Front Microbiol 2022	Oikonomou Am J Med Sci 2024
Congestive heart failure	Adamo Nat Rev Cardiol 2020	Lupu Cells 2023	Sandek J Am Coll Cardiol 2007
Stroke	Anrather Neurotherapeutics 2016	Meng Eur J Prev Cardiol 2023	Błaż J Thromb Haemost 2024

Medical condition	Chronic inflammation	Dysbiosis	Intestinal permeability
Abdominal aortic aneurysm	Marquez-Sanchez Front Immunol 2022	Benson Circulation 2023	Guo Biomedicines 2025
Aortic dissection	Luo Ageing Res Rev 2009	Jiang Front Microbiol 2023	Li Front Physiol 2022
Deep vein thrombosis (DVT)	Aksu Curr Pharm Des 2012	Hasan Thromb Res 2020	Liu Thrombosis Journal 2023
Pulmonary embolism/venous thromboembolism	Saghazadeh Crit Rev Oncol Hematol 2016	Zhang J Pers Med 2023	Ząbczyk Thromb Res 2023
Brain aneursym	Hosaka Transl Stroke Res 2014	Kawabata Stroke 2022	Liu Sci Rep 2025
Peripheral artery disease	Signorelli Int J Mol Med 2014	Ho Microorganisms 2022	Katada J Pharmacol Exp Ther 2009
Aortic valve disease	Cote Inflammation 2013	Liu Atherosclerosis 2019	Boccella Am J Physiol Heart Circ Physiol 2021
Myocarditis	Krejci Biomed Res Int 2016	Wang Front Cell Infect Microbiol 2023	Toprak Arq Bras Cardiol 2023
Atrial fibrillation	Hu Nat Rev Cardiol 2015	Tabata Heart Vessels 2021	Zhang Cardiovasc Res 2022
Takotsubo cardiomyopathy	Fernandez-Ruiz Nature Reviews Cardiology 2019	Liu Biomedicines 2023	--
Rheumatic heart disease	Franczyk Int J Mol Sci 2022	Shi Front Cell Infect Microbiol 2021	Sumitomo Sci Rep 2016
Pulmonary hypertension	Price Chest 2012	Moutsoglou Am J Respir Crit Care Med 2023	Yang Pulm Pharmacol Ther 2025
Renal artery stenosis	Al-Suraih World J Cardio 2014	Jaworska PMC 2021	Maruyama Nutrients 2023
Endocarditis	Hu Int Heart J 2022	Guidice Microorganisms 2021	Wells J Infect Dis 1990

Cancer

Medical condition	Chronic inflammation	Dysbiosis	Intestinal permeability
Non-small cell lung cancer	Gomes Adv Exp Med Biol 2014	Zheng Gut Microbes 2020	Moratiel-Pellitero J Immunother Cancer 2024
Small cell lung cancer	Winther Syst Rev 2021	Ming bioRxiv 2019	--
Colorectal cancer	Janakiram Adv Exp Med Biol 2014	Pandey Cancers 2023	Saylam Pathogens 2025
Breast cancer	Danforth Cancers 2021	Ruo Cureus 2021	Shrout Psychoneuroendocrinology 2022
Pancreatic cancer	Padoan Int J Mol Sci 2019	Attebury Cancer J 2023	Yin Cell Death Dis 2021
Prostate cancer	Tewari Adv Exp Med Biol 2018	Fujita Cancer 2023	Lin Ann Med 2022
Kidney (renal cell) cancer	Chevez Adv Exp Med Biol 2014	Chen Front Microb 2022	--
Acute myeloid leukemia (AML)	Recher Front Oncol 2021	Yu FEBS Open Bio 2021	Sundström Leukemia 1998
Acute lymphoblastic leukemia (ALL)	Zhang Blood Adv 2022	Oldenburg Cancers 2021	Leite Nutr Hosp 2014
Chronic lymphocytic leukemia (CLL)	Andersen Cancer 2018	Faitova Haematologica 2022	Skupa Cancer Res Commun 2025
Chronic Myelogenous Leukemia	Dikic Biomolecules 2022	Pagani Microorganisms 2022	--
Non-Hodgkin lymphoma	Makgoeng JNCI Cancer Spect 2018	Shi Clin Med Insights Oncol 2021	Tyszka Int J Mol Sci 2022
Hodgkin lymphoma	Anber Biosci Rep 2019	Cozen British J Cancer 2013	Tyszka Int J Mol Sci 2022
Multiple myeloma	Wang Int J Cancer 2022	Zhang Front Immunol 2022	Banaszkiewicz Ren Dis Transplant Forum 2022

Medical condition	Chronic inflammation	Dysbiosis	Intestinal permeability
Hepatocellular (liver) carcinoma	Refolo Cancers 2020	Yu Nat Rev Gastro Hep 2017	Zhang Front Oncol 2021
Cholangiocarcinoma (bile duct)	Cadamuro Adv Cancer Res 2022	Rao Front Physiol 2021	Wang Cancers 2025
Gallbladder cancer	Roa Nat Rev Dis Primers 2022	Choi J Korean Med Sci 2021	--
Ovarian cancer	Maccio Cytokine 2012	Sipos Mol Med 2021	--
Esophageal adenocarcinoma	O'Sullivan Expert Rev Gastro Hep 2014	Gillespie Biology 2021	--
Esophageal squamous cell cancer	Wei BMC Cancer 2015	Cheung J Gastro Hep 2022	--
Stomach cancer	Matowicka-Karna Clin Dev Immunol 2013	Ferreira Gut 2018	--
Endometrial cancer	Dossus Endocr Relat Cancer 2010	Boutriq J Persian Med 2021	--
Melanoma	Nevala Clin Cancer Res 2009	Mekadim BMC Microbiol 2022	Drymel Int J Mol Sci 2025
Glioma (brain cancer)	Basheer Cancers 2021	Jiang Bioengineered 2022	Patrizz Sci Rep 2020
Thyroid cancer	Guarino Mol Cell Endocr 2010	Zhang Endocrine 2019	--

Metabolic Disorders

Medical condition	Chronic inflammation	Dysbiosis	Intestinal permeability
Obesity	Ellulu Arch Med Sci 2017	Pinart Nutrients 2022	Keirns Am J Physiol Heart Circ Physiol 2024
Type 2 diabetes	Wang Diabetes Care 2013.	Chong Front Endocrin 2025	Jayashree Mol and Cell Biochem 2013
Non-alcoholic fatty liver disease (NAFLD)	Yaqub Cureus 2021	Wieland Aliment Pharmcol Ther 2015	De Munck Liver Int 2020
Nonalcoholic steatohepatitis (NASH)	Luci Front Endocrinol 2020	Kobayashi Int J Mol Sci 2022	Luther Cell Mol Gastro Hep 2015
Alcoholic steatohepatitis	Gao J Hepatol 2019	Grodin Alcohol Clin Exp Res 2024	Rao Hepatology 2009
Acute alcohlic hepatitis	Jampana World J Hepatol 2011	Zheng Int J Mol Sci 2023	Rao Hepatology 2009
Alcoholic cirrhosis	Xu Pharmacol Ther 2017	Bajaj J Hepatol 2013	Rao Hepatology 2009
Acute pancreatitis	Habtezion Curr Opin Gastroenterol	Xia J Gastro 2019	Juvonen Scand J Gastro 2000
Chronic pancreatitis	Habtezion Curr Opin Gastroenterol	Frost Clin Transl Gastro 2020	Xia Cell Death Dis 2020
Hyperlipidemia	Siasos Curr Pharm Des 2011	Jia Front Cell Infect Microbiol 2021	Mouchati Front Immunol 2023
Hypertension	Xiao Can J Cardiol 2020	O'Donnell Nat Rev Nephrol 2023	Snelson Curr Hypertens Rep 2024
Chronic kidney disease	Mihai J Immunol Res 2018	Bhargava Toxins 2022	Terpstra World J Nephrol 2016
Gout	So Nat Rev Rheumatol 2017	Singh World J Gastro 2024	Shirvani-Rad Front Med 2023

Hormonal Conditions

Medical condition	Chronic inflammation	Dysbiosis	Intestinal permeability
Hypothyroid	Kvetny Clin Endocrinol 2004	Su Clin Sci 2020	Küçükemre Aydın J Clin Res Pediatr Endocrinol 2020
Hyperthyroid	Senturk Clin Invest Med 2003.	Chang Front. Cell. Infect. Microbiol. 2021	Zheng Front Endocrinol 2021
Endometriosis	Jiang Front Biosci 2016	Yuanyue Front Microbiol 2025	Mohling J Endometriosis and Uterine Disorders 2023
Polycystic ovary syndrome (PCOS)	Rudnicka Int J Mol Sci 2021	Guo Reprod Sci 2022	Zhang Eur J Endocrinol 2015
Endometrial hyperplasia	Kubyshkin Inflamm Res 2016	Ying BMC Microbiol 2024	--
Female infertility	Weiss Reprod Sci 2009	Patel BMC Womens Health 2022	Çelik J Obstet Gynaecol Res 2023
Male infertility	Azenabor J Reprod Infertil 2015	Fu Front Microbiol 2023	--
Female sexual dysfunction	Lorenz Curr Sex Heatlh Rep 2019	Li J Sex Med 2021	--
Erectile dysfunction	Kaya-Sezginer Curr Pharm Des 2020	Qiao Microb Biotechnol 2024	--
Male hypogonadism (low testosterone)	Mohamad Aging Male 2019	Matsushita World J Mens Health 2022	Tremellen Am J Endocrinol Metab 2018
Early menopause	Bertone-Johnson Menopause 2019	Wu BMC Pregnancy Childbirth 2021	Shieh JCI Insight 2020
Menopause	Zhang Lipids Health Dis 2018	Yang Dis Markers 2022	Chen PLoS One 2022

Neuropsychiatric Diseases

Medical condition	Chronic inflammation	Dysbiosis	Intestinal permeability
Migraine headaches	Kursun J Headache Pain 2021	Mugo J Headache Pain 2025	Ülfer BMC Neurol 2025
Alzheimer's dementia	Kinney Alzheimers Dement 2018	Jemimah PLoS One 2023	Boschetti Int J Mol Sci 2023
Vascular dementia	Custodero Geroscience 2022	Xu Front Immunol 2025	--
Insomnia	Prather J Psych Res 2015	Li Front Cell Infect Microbiol 2023	Fan Nat Sci Sleep 2023
Generalized anxiety disorder	Costello BMJ Open 2019	Nikolova JAMA Psychiatry 2021	Stevens Gut 2018
Major depression	Miller Nat Rev Immunol 2016	Sanada J Affect Disord 2020	Calarge J Psychiatr Res 2019
Premenstrual dysphoric disorder	Tiranini Fac Rev 2022	Takeda Sci Rep 2022	--
Postpartum depression	Brann J Neurosci Res 2020	Zhou Front Cell Infect Microbiol 2020	--
Neuropathic pain	Sommer Pain 2018	Calabrò Int J Mol Sci 2023	Shen Heliyon 2022
Visceral hypersensitivity	Vergnolle Neurogastro Motil 2008	Botschuijver Gastroenterology 2017	Zhou Gut 2009
Bipolar disorder	Rosenblat Psychiatr Clin North Am 2016	Obi-Azuike Brain Behav 2023	Zengil Psychiatry Investig 2023
Schizophrenia	Mongan Early Interv Psychiatry 2020	Murray Schizophr Res 2023	Usta Compr Psychiatry 2021
Epilepsy	Kamali Endocr Metab Immune Disorder Drug Targets 2021	He Front Microbiol 2024	--
Post-traumatic stress disorder	Hori Psychiatry Clin Neurosci 2019	He Sci Rep 2024	Hoisington Brain Behav Immun Health 2023

Medical condition	Chronic inflammation	Dysbiosis	Intestinal permeability
Anorexia nervosa	Solmi Psychoneuroendocrinology 2015	Kleiman Psychosom Med 2015	Grigioni Clin Nutr 2022
Bulimia nervosa	Tabasi Arch Iran Med 2020	Tempia Valenta Neurosci Appl 2025	--
Attention-deficient/hyperactivity disorder	Leffa Neuroimmunomodulation 2018	Wang Front Endocrinol (Lausanne) 2022	Özyurt Psychiatry Res 2018
Hepatic encephalopathy	Coltart Arch Biochem Biophys 2013	Xu World J Hepatol 2025	Pascual Hepatology 2003
Chronic fatigue syndrome	Jonsjo Psychoneuroendocrinology 2020	König Front Immunol 2022	Maes J Affect Disord 2007
Restless leg syndrome	Dowsett Sci Rep 2022	Montini Sleep 2025	Darol Rev Assoc Med Bras 2025
Parkinson's disease	Tansey Nat Rev Immunol 2022	Romano Nat Commun 2025	Ulaş Clin Nutr ESPEN 2023
Amyotrophic lateral sclerosis	Liu Front Immunol 2017	Nicholson Amyotroph Lateral Scler Frontotemporal Degener 2021	--

General Physical Health and Other Conditions

Medical condition	Chronic inflammation	Dysbiosis	Intestinal permeability
Aging	Goldberg Immunol Rev 2015	Escudero-Bautista J Clin Med 2024	Qi J Am Med Dir Assoc. 2017
Frailty	Soysal Ageing Res Rev 2016	Haran Gastro 2021	Rashidah Ageing Res Rev 2022
Osteoarthritis	Knights Curr Opin Rheumatol 2023	Chisari PLoS ONE 2021	Guido Ann Med 2021

Medical condition	Chronic inflammation	Dysbiosis	Intestinal permeability
Vertebral fractures	Eriksson J Bone Miner Res 2014	Kiel Front Endocrinol 2023	Shieh J Clin Invest Insight 2020
Low back pain	Teodorczyk-Injeyan Clin J Pain 2019	Li JOR Spine 2025	--
Sarcopenia (muscle loss)	Bano Maturitas 2017	Wang Front Microbiol 2025	Karim Respir Med 2021
Chronic obstructive pulmonary disease (COPD)	Barnes J Allergy Clin Immunol 2016	Wei Front Microbiol 2023	Karim Respir Med 2021
Bone density loss	Ilesanmi-Oyelere Immun Ageing 2019	Kiel Front Endocrinol 2023	Shieh J Clin Invest Insight 2020

Introduction

45 References

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3	Symptoms range from the less severe	Steptoe A, Hamer M, Chida Y. The effects of acute psychological stress on circulating inflammatory factors in humans: a review and meta-analysis. Brain Behav Immun. 2007;21(7):901-912. doi:10.1016/j.bbi.2007.03.009.
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8	If you have digestive issues	Hanski C, Barker JNWN, Wright AL, et al. Atopic dermatitis and intestinal permeability: increased baseline permeability in infants who later develop eczema. J Allergy Clin Immunol. 2000;106(4):692–697. doi:10.1067/mai.2000.109380.
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10		Xavier RJ, Podolsky DK. Unravelling the pathogenesis of inflammatory bowel disease. Nature. 2007;448(7152):427-434.
11		Kuitert LM, Dooley AN, Bischoff J, et al. Seasonal intestinal inflammation in subjects with birch pollen allergy. J Allergy Clin Immunol. 2004;114(3):383-386.
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13	**If you are experiencing a**	van der Have Miersma Dohlmann A, Aerts R, et al. Extraintestinal symptoms accompanying ulcerative colitis: associations with disease activity and inflammation. J Crohns Colitis. 2016;10(6):639-646. doi:10.1093/ecco-jcc/jjw036.
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22		Kim J, Kim BE, Leung DYM. Pathophysiology of atopic dermatitis: clinical implications. Allergy Asthma Proc. 2019;40(2):84-92. doi:10.2500/aap.2019.40.4202.
23		Liu Y, Wang H, Taylor M, et al. Classification of human chronic inflammatory skin disease based on single-cell immune profiling. Sci Immunol. 2022;7(70):eabl9165. doi:10.1126/sciimmunol.abl9165.
24	**If you have cancer, a**	Visser M, Bouter LM, McQuillan GM, Wener MH, Harris TB. Elevated C-reactive protein levels in overweight and obese adults. JAMA. 1999;282(22):2131-2135. doi:10.1001/jama.282.22.2131.
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27		Michels N, van Aart C, Morisse J, Mullee A, Huybrechts I. Chronic inflammation towards cancer incidence: a systematic review and meta-analysis of epidemiological studies. Crit Rev Oncol Hematol. 2021;157:103177. doi:10.1016/j.critrevonc.2020.103177.

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32	**There is a very long**	Pajares M, Rojo AI, Manda G, Boscá L, Cuadrado A. Inflammation in Parkinson's disease: mechanisms and therapeutic implications. Cells. 2020;9(7):1687. doi:10.3390/cells9071687.
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42		Ameho S, Klutstein M. The effect of chronic inflammation on female fertility. Reproduction. 2025;169(4):e240197. doi:10.1530/REP-24-0197.

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CHAPTER 1:

Deep Ties

The Gut-Immune Connection

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CHAPTER 2:

Early Origins

Understanding Root Causes and Our Evolutionary Past

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Toxic Environments

The Price We Pay to be Evolutionary Pioneers

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END TABLE		

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124		Masson CJ, Mensink RP. Exchanging saturated fatty acids for (n-6) polyunsaturated fatty acids in a mixed meal may decrease postprandial lipemia and markers of inflammation and endothelial activity in overweight men. J Nutr. 2011;141(5):816-821. doi: 10.3945/jn.110.136432
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CHAPTER 6:

Timing Is Everything

Leveraging Our Circadian Rhythm

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Body and Mind Healing

Nourishing the Soul through Connection

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The Plant Powered Plus Protocol

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Additional Relevant Research

To support the microbiome-first framework outlined in Plant Powered Plus, we conducted a dedicated mechanistic research study on 38TERA Daily Microbiome Nutrition (DMN). This product is recommended on Page 173 and therefore we are sharing this additional supportive evidence behind that recommendation.

Study Design and Rationale

The research was conducted in 2025 by ProDigest (Belgium) using the validated M-SHIME® (Mucosal Simulator of the Human Intestinal Microbial Ecosystem), an advanced laboratory model that closely replicates conditions of the human colon, including both luminal (gut contents) and mucosal (gut lining) environments.

The model was inoculated with gut microbiota from five healthy adult donors to reflect real-world interindividual variability. DMN was administered over a 15-day period at two dosing levels:

Standard dose: 5.6 g/day (once daily)

High dose: 11.2 g/day (twice daily)

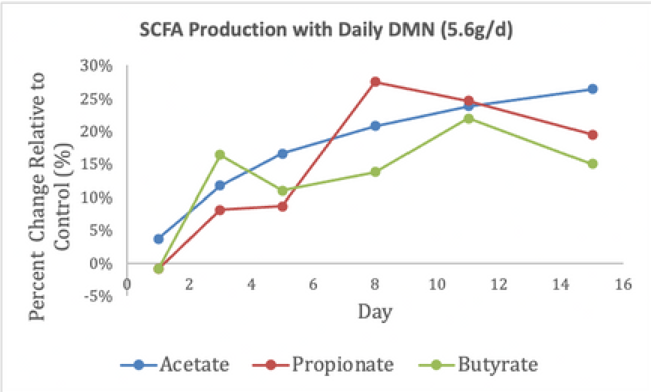
Key outcomes measured included short-chain fatty acid (SCFA) production, microbial composition (via shotgun metagenomics), toxic fermentation byproducts (ammonium), and immune signaling markers.

Key Findings

1. Rapid and Sustained Increases in Beneficial SCFAs

DMN produced a coordinated rise in all three major SCFAs:

- Acetate increased within 3 days
- Propionate rose significantly by Day 8
- Butyrate, critical for gut barrier integrity and immune tolerance, increased by over 20% at standard dose and by 130% at the higher dose



Importantly, SCFA production continued to rise despite a constant daily dose, indicating microbiome adaptation—the microbes became more efficient at fermenting substrates over time.

2. Reduction in Harmful Fermentation Byproducts

DMN shifted microbial metabolism away from proteolytic fermentation, resulting in a 23–24% reduction in ammonium, a toxic byproduct associated with dysbiosis, mucosal irritation, and inflammation.

3. Favorable Microbiome Remodeling

Supplementation led to consistent enrichment of health-associated taxa:

⇧ Bifidobacterium: foundational fiber-fermenting organisms.

⇧ Akkermansia muciniphila: a keystone species linked to gut barrier integrity, metabolic health, and immune regulation.

⇩ Bilophila wadsworthia: an inflammation-associated bacterium linked to high-fat, low-fiber diets, was significantly suppressed.

4. Anti-Inflammatory Immune Signaling

Microbial changes were accompanied by meaningful shifts in immune markers:

- TNF-α decreased by 17%. TNF-α is a key pro-inflammatory immune signal that drives tissue damage when overactive.
- IL-10 increased by 15%. IL-10 is a key anti-inflammatory immune signal that promotes immune calm and healing.

At the higher dose, reductions in TNF-α were amplified and MCP-1, a chemokine involved in chronic inflammation, was also significantly reduced—supporting a clear dose-response effect.

Why This Matters

Together, these findings demonstrate that DMN addresses multiple hallmarks of modern microbiome dysfunction: inadequate SCFA production, toxic fermentation byproducts, loss of beneficial microbes, and low-grade inflammation. The results mechanistically support the book's central premise that feeding the microbiome—consistently and comprehensively—is foundational to gut, immune, and whole-body health.

This research complements human clinical trials on DMN's core ingredients (including Solnul resistant potato starch and Actazin green kiwifruit powder), which have independently shown improvements in microbial composition, bowel function, and digestive health in human studies.

Learn More at https://www.38tera.com.