



UNIVERSITI
TEKNOLOGI
MARA

LISTEN TO YOUR ~~HEART~~ GUT



**KALAVATHY
RAMASAMY**

Syarahan UiTM
Profesor

Table of Contents

<i>List of Figures</i>	ix
<i>List of Table</i>	x
<i>List of Abbreviations</i>	xi
<i>Preface</i>	xv
<i>Acknowledgement</i>	xvii

Chapter 1

The Ageing Gut Microbiota: Dysbiosis, Frailty, and Non-Pharmacological Restoration Approaches

1.1	Introduction	1
1.2	Age-Related Gut Microbiota Changes in Community-Dwelling Older Adults	2
1.3	Gut Microbiota Dysbiosis and Intestinal Barrier Dysfunction in Older Adults with Age-Related Disorders	3
1.3.1	Differential Gut Microbiota between Cognitive Frail and Robust Older Adults	3
1.3.2	Gut Barrier Dysfunction and Inflammation in Parkinson's Disease (PD) and Alzheimer's Disease (AD)	6
1.4	Non-Pharmacological Approaches to Restore Gut Microbiota	6
1.5	Conclusion	7
1.6	AGELESS and Community Outreach	7

Chapter 2

The Biotic Family (Probiotics, Prebiotics, Synbiotics, and Postbiotics): Functional Characterisation and Gut Delivery

2.1	Introduction	9
2.2	The 12 Unique Probiotic LAB Strains: From Isolation to Functional Characterisation	11

Preface

The phrase “listen to your gut” is often shared as a metaphorical nudge to trust one’s instincts. Little did I know that this simple idiom would eventually define my entire scientific career. My journey of deciphering the complex microbial pattern of the gut began nearly three decades ago during my postgraduate studies. The foundational concept was that the gut is essentially a microscopic battlefield, and my research then focused on how introducing probiotics could fortify this environment to improve the overall host health. Working alongside my exemplary supervisors, our primary goal was to utilise probiotics as a viable alternative to antibiotics in the poultry industry. Without the ability to see the full microscopic ecosystem during that time, we had to rely on meticulous, traditional microbiology to target and cultivate specific bacteria of interest.

Nevertheless, it was exactly this rigorous, foundational work that inspired my ultimate pivot towards human health, motivating me to isolate unique probiotic strains from local fermented foods for human consumption. Over the years, my team and I at the UiTM were fortunate to pursue research opportunities that expanded upon these early experiences, profoundly shaping my current research focus on the older adults. Today, the scientific landscape is unrecognisable from what it was when I started. Further to the emergence of advanced sequencing technologies, we can now comprehensively map and study the entire gut microbiota. Owing to this technological leap, research in this field is progressing at an unprecedented rate. It is increasingly recognised that the gut is the central regulatory command centre of the human body.

Chapter 1

The Ageing Gut Microbiota: Dysbiosis, Frailty, and Non-Pharmacological Restoration Approaches

1.1 INTRODUCTION

Malaysia is on the verge of becoming an aged nation by 2040. The growing ageing population is interpreted by some as the unstoppable success story of global life expectancy, but in reality, extended lifespan has become a cause for concern, especially given the inevitable increase in the burden of non-communicable diseases. The government is therefore placing strong emphasis on disease prevention rather than treatment alone (Farid, 2026).

For decades, ageing has been viewed as a strictly internal, programmed decline, a slow ticking of the genetic clock within the cells. However, it is now known that we humans do not age alone, as we host trillions of microorganisms, collectively known as the “human microbiota”. The commensal microbes (normal microflora), mainly the gut microbiota, should be essentially in a state of balance (i.e., eubiosis) given their vital roles in physiology, metabolism and immune regulation (Postler & Ghosh, 2020). Nevertheless, ageing disrupts this balance, leading to a compositional shift in the gut microbiota (i.e., dysbiosis) characterised by reduced microbial diversity and a marked depletion of beneficial, short-chain fatty acid (SCFA)-producing microorganisms (Rashidah et al., 2022). This age-related imbalance in gut microbiota is associated with the pathogenesis of neurodegenerative diseases (Cryan et al., 2019). Recently, gut dysbiosis has been recognised as one of the hallmarks of ageing.

Listen to Your Gut establishes the gastrointestinal tract as the centre of human health and the cornerstone of modern preventive medicine. Backed by scientific preclinical evidence, this book demonstrates how the gut microbiota actively regulates homeostasis. It reveals the ability of specific probiotics and postbiotics in restoring gut health, thereby enhancing cognitive function and cardiometabolic health. The book also unveils the future of microbiome-based interventions that is expected to shift towards precision-engineered Next-Generation Probiotics (NGPs) and stable, bioactive postbiotics. Ultimately, ***Listen to Your Gut*** is a testament that a healthy gut is the foundation for lifelong resilience, longevity, and vitality.

Kalavathy Ramasamy is a Professor of Microbiology at the Faculty of Pharmacy, Universiti Teknologi MARA (UiTM). She currently serves as the Vice-President of the Malaysian Society of Lactic Acid Bacteria (MSLAB). Her research focuses on the prevention of age-related diseases using probiotics, prebiotics, postbiotics, and bioactive metabolites, with a special emphasis on their therapeutic impact on the gut-brain and gut-liver axes.

Driven by her journey as a lifelong scholar, she and her research team have contributed to the scientific community with over 180 published journal articles. Her commitment to research and academic excellence has earned her numerous prestigious academic and innovation awards. She is also deeply passionate about nurturing young talent; throughout her career, she has successfully supervised and graduated 26 PhD and 32 MSc students, while continuing to serve as a dedicated mentor to junior lecturers at UiTM.