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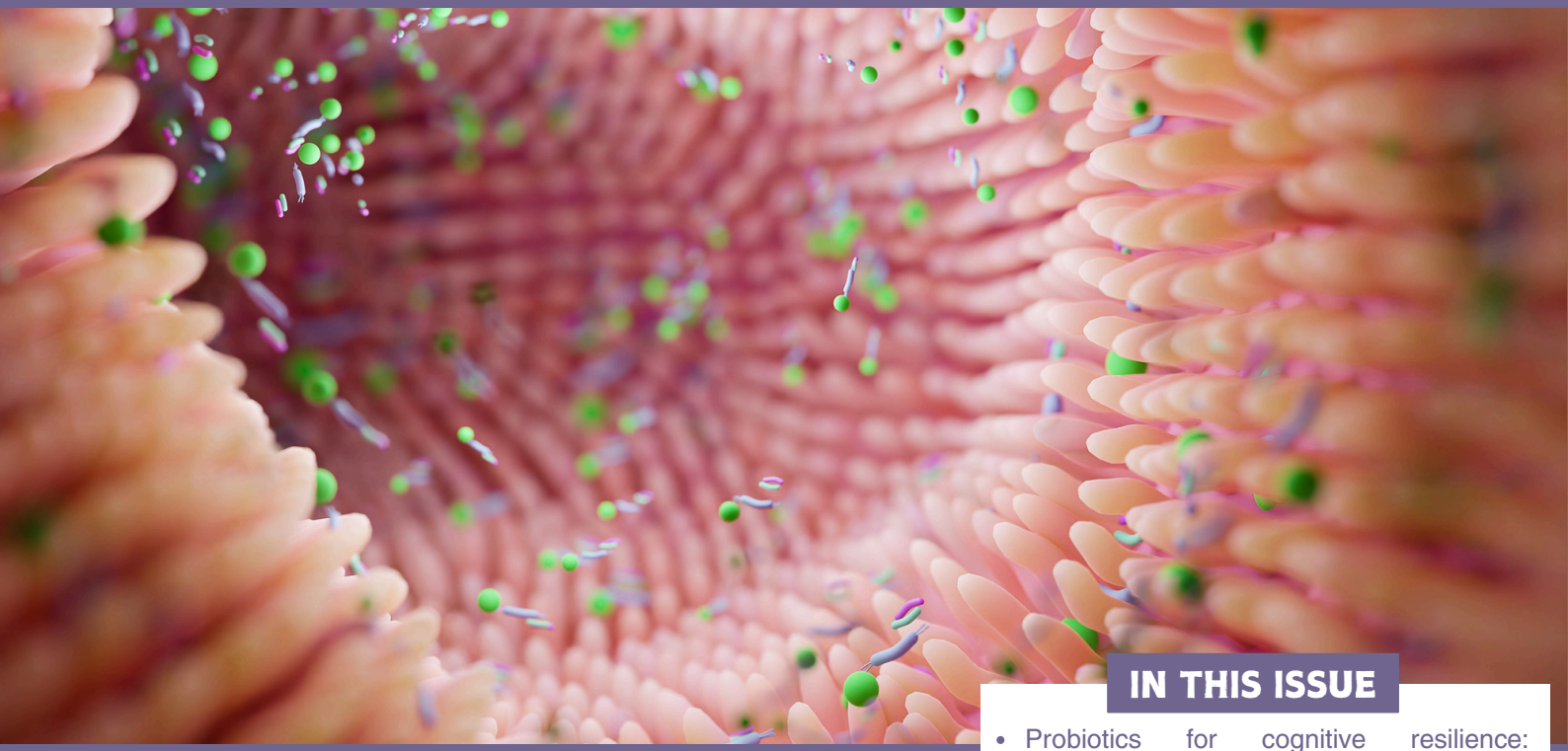
PRESCRIPTION

Latest news and updates from the Faculty of Pharmacy, Universiti Teknologi MARA



IN THIS ISSUE

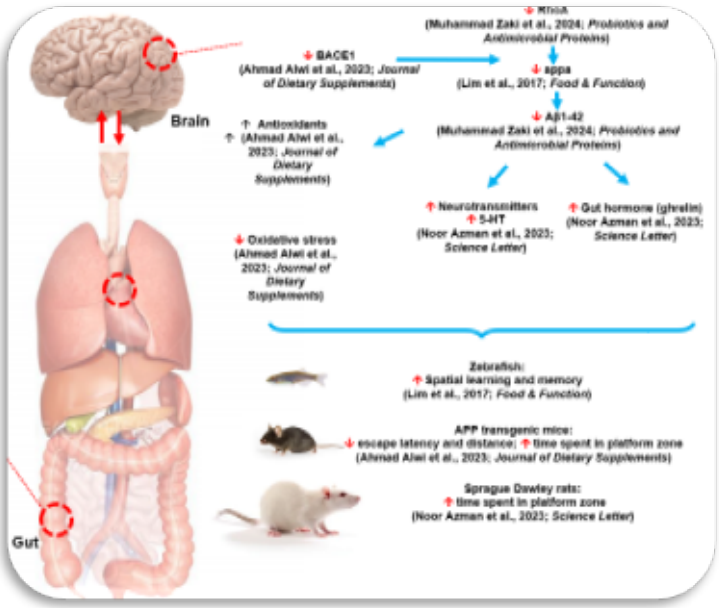
PROBIOTICS FOR COGNITIVE RESILIENCE:

Resetting the gut and recharging the mind

By: Prof. Dr. Kalavaty Ramasamy, Assoc. Prof. Dr. Siong Meng Lim, and Prof. Dato' Dr. Abu Bakar Abdul Majeed

Longer life expectancy has seen many ageing nations, including Malaysia, in the face of the inevitable increased burden of late-life diseases (especially deterioration of cognitive function) that will have a huge impact on our society. It is increasingly recognised that ageing increases the likelihood of a frail gut with presentations of low-grade chronic inflammation (i.e., inflammaging), impaired immune response (i.e., immunosenescence) and reduced gut microbiota diversity (i.e, dysbiosis). Our findings from the AGELESS cohort and systematic review indicated increased pathobionts and reduced protective bacteria in the gut of the older adults (Rashidah et al., 2022). We have also identified faecal calprotectin as a potential intestinal inflammatory marker in older adults (Ahmad Fadzuli et al., 2024).

That said, there remains good news for the older adults in that they may benefit from microbial restoration through non-pharmacological approaches like diet (Mediterranean diet) and microbiome-based supplements (probiotics) (Hairul Hisham et al., 2025). As part of the efforts in uncovering superior probiotic strains with beneficial effects, our research team has been actively exploring the neuroprotective potential of lactic acid bacteria (LAB) isolated from Malaysian fermented food or milk products. We had uncovered 12 unique LAB strains [pediococci (seven) and lactobacilli (five)] with probiotic characteristics (i.e., bile tolerance, acid tolerance, adhesion to enterocytes amongst others) (Ramasamy et al., 2012). Interestingly, the LAB also exhibited antimicrobial activity against gram negative and positive pathogens. Most importantly, safety assessments of our LAB [i.e., *Lactobacillus plantarum* LAB12 (currently known as *Lactiplantibacillus plantarum* LAB12 based on the recent re-classification of the Lactobacillus genus into 25 genera) indicated biocompatibility in vitro and no treatment related adverse effects in vivo (Fareez et al., 2019). Our in vivo study of LPS-induced neuroinflammation in ICR mice revealed that L. fermentum LAB9-fermented cow's milk significantly increased antioxidants and reduced oxidative stress (Musa et al., 2017). We went on to uncover that the excellent neuroprotective effects of the LAB, especially *Pediococcus acidilactici* LAB4, *P. pentosaceus* LAB6, *L. fermentum* LAB9 and *L. plantarum LAB12* could be mediated, at least in part, through RhoA inactivation (Muhammad Zaki et al., 2024), reduced acetylcholinesterase and pro-inflammatory cytokines (Musa et al., 2017), downregulation of beta-site APP cleaving enzyme-1 (BACE1) gene (Ahmad Alwi et al., 2023) as well as increased mitochondrial enzymes, 5-hydroxytryptamine (5-HT) level and gut hormones (Noor Azman et al., 2023). Our preliminary study of the caecal content of LAB12-fed LPS-challenged memory impaired rats also revealed the positive changes to the colonic microbiota against dysbiosis (unpublished).



These findings implied the beneficial effects of probiotics in restoring the imbalanced gut microbiota which may in turn confer neuroprotection through the Microbiota-Gut-Brain Axis. This warrants future assessments on how probiotics and their postbiotics affect the blood-brain barrier and intestinal epithelial barrier.

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Questions

Let's dive deeper into the article and evaluate your comprehension. We have three questions for you here.

About the Main Author

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Professor Dr. Kalavathy Ramasamy is a passionate researcher on probiotics and prebiotics as functional food. She has published various studies regarding this topic. Her research interests include anticancer agents and the underlying mechanisms, and microbial metabolites as neuroprotective agents. She obtained her PhD in Microbiology from Universiti Putra Malaysia and has worked in UiTM for more than 20 years.