KDD Research & Innovation

MENA Microbiome Conference | Doha, 17–18 October 2026

Dr. Wilbert Sybesma • Dr. Swati Sarabhai • P. Wolfram Alderson

Feeding the Gut

Food innovation for metabolic health and healthy ageing

1 The challenge—and the food-industry opportunity

Higher ultra-processed-food intake is associated with chronic disease and mortality. Diets high in added sugar and unhealthy fats and low in fibre can disrupt microbial function and the gut barrier.

Policy responses include school-food standards, taxes, labelling, marketing restrictions and whole-food subsidies.

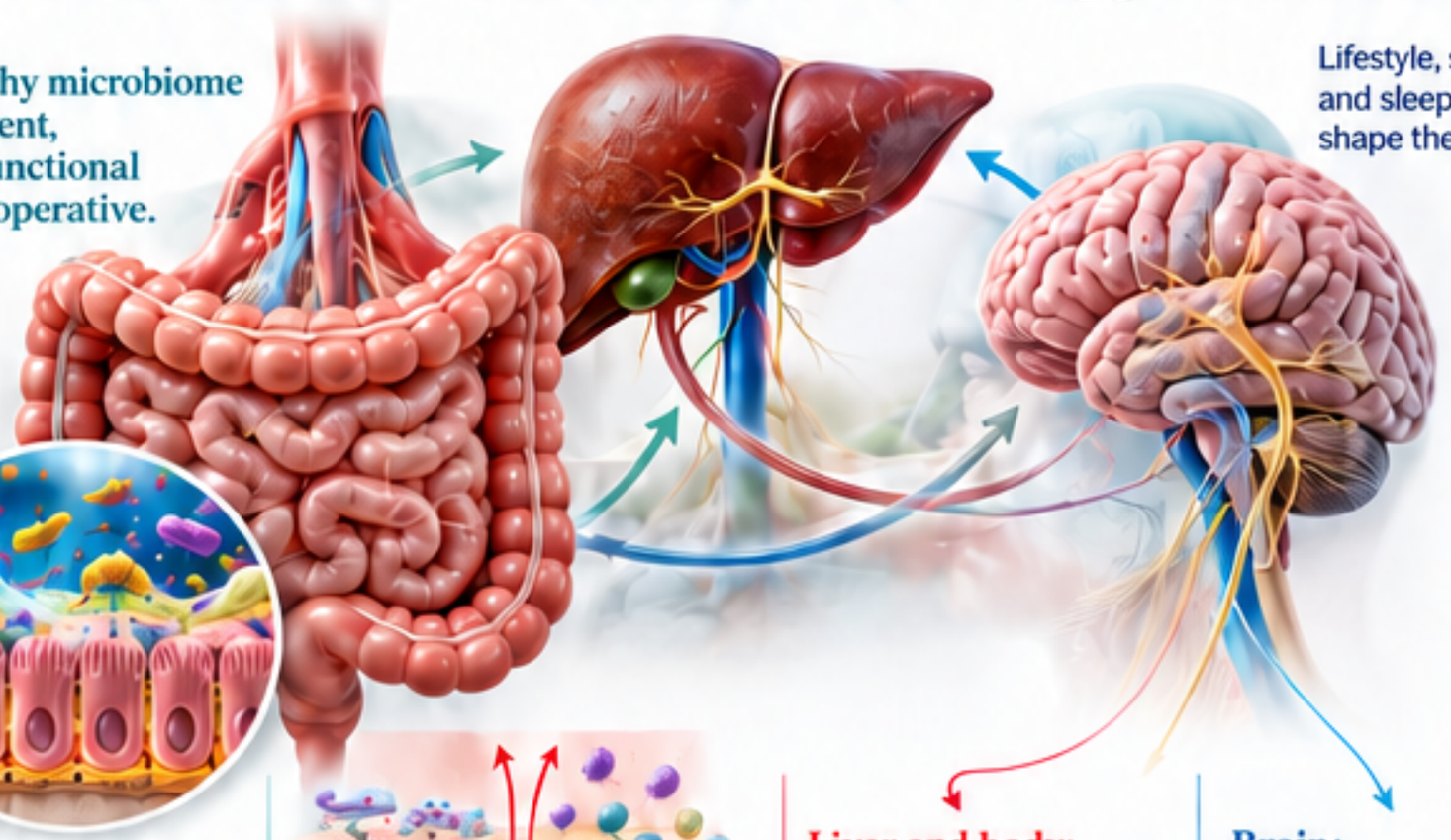
Processing with purpose can improve nutrition.

Move from reactive compliance to proactive prevention through healthier product design.

2 Feed the Gut • Protect the Liver • Support the Brain

A healthy microbiome is resilient, multifunctional and cooperative.

Lifestyle, stress and sleep also shape the gut.



Gut: fibre and microbial cooperation support short-chain fatty acids, mucus, tight junctions and immune balance.

Barrier disruption can allow bacterial components such as LPS into circulation, promoting low-grade systemic inflammation.

Liver and body: inflammation and altered microbial signalling may contribute to insulin resistance, fatty liver and cardiovascular risk.

Brain: microbial metabolites, immune signals, hormones and the vagus nerve connect gut and brain.

3 Re-engineering food with the Metabolic Matrix

39 criteria across 5 progressive levels

Tier III: Reduce potential harm

Tier II: Address nutritional deficiencies

Tier I: Add metabolic and sustainability benefits

Assess ingredients and processing → **Identify redesign options** → **Verify and reassess**

Non-compensatory: beneficial ingredients cannot offset harmful attributes.

Maintain taste, texture, safety, affordability and commercial feasibility.

4 Two design priorities

Fibre quality and food structure

Source, structure, viscosity, fermentability and bulking capacity matter. Intact plant matrices moderate nutrient release; diverse fibres provide substrates across the colon.

Food technology can rebuild fibre architecture: arabinoxylan–pectin matrices altered fermentation and SCFA patterns in an in-vitro study with three donors.

Safe live dietary microbes

Fermented-food interventions report greater microbial diversity and reduced inflammation. Observational studies link higher intake with better health.

Viability, safety and product context matter; no universal daily microbial threshold is established.

5 KDD Science into everyday products

No-added-sugar flavoured beverages

Vitamins A, C, D and B6

No-added-sugar protein milk and coffee drinks

20 g protein

No-added-sugar ice cream

Fibre-enriched

Product attributes are presented in the source deck.

Kuwait • **Established 1962** • Over **1 billion** packs annually • **More than 35,000 retailers**

6 Validate benefits. Build capability. Scale.

LEAN-PREP: 6-month randomized trial: 232 adults with obesity using semaglutide or tirzepatide. Four arms: medication only, resistance exercise, higher protein, or both. Primary outcome: MRI quadriceps muscle size. **Trial design—not results.**

KDD, DDI, KFAS and Kuwait Ministry of Health collaboration also examines metabolic benefits of no-added-sugar ice cream.

Technology transfer: learn principles, assess portfolios, prioritize reformulation, test projects and train teams for independent use.

We invite companies and health authorities to collaborate with us and apply the Metabolic Matrix in new product development, validate compliant products in human clinical trials and scale successful innovations.

Metabolic health for the many

wolfram.alderson@kddc.com | ssarabhai@kddc.com

kddc.com | metabolicmatrix.info | metabolica.global

Selected sources from the presentation: Harlan 2023; Marcelino 2023; Armet 2022; Bulut 2023; Wastyk 2021; Al-Ozairi 2024; Alawadhi 2026.