



พลังวิจัยยกระดับอาหารและ ผลิตภัณฑ์เสริมอาหารไทยสู่สากล

ดร. กอบกุล เหล่าแท้ง
ศูนย์พันธุวิศวกรรมและเทคโนโลยีชีวภาพแห่งชาติ
14 มกราคม 2569

Empowering Research for Food & Dietary Supplement Industry

Advanced R&D

Driving frontier research to expand the boundaries of scientific knowledge.

Innovative Solutions

Cultivating an environment to enable cutting-edge research and transformative technologies.

Skill Development

Building expertise across food science, functional ingredients, processing technologies & regulatory compliance

Industry-Centric Adoption

Translating innovation into scalable, industry-ready solutions

Strategic Collaboration

Synergizing expertise and partnerships to accelerate innovation and impact



Turning Research into Real-World Impact

8 Key Voices for product Innovation



Voice of Market & Competitor Insights



Voice of Manufacturer – Midstream
(OEM/ODM/โรงงานผลิต)



Voice of Consumer



Voice of Expert



Voice of Customer



Voice of Regulator
& Standards



Voice of Producer – Upstream



Voice of Sustainability
& Social Impact

Personalized and Holistic Health & Well-being

No one-size-fits-all solutions

Ingredient
Innovation



Food Ingredients



Cosmetic Ingredients



Pet Ingredients



Proactive lifestyle choice

(Microbiome profile, activity, and dietary habits)



Sports Nutrition



Immune Care



Joint Care



Bright Vision



Metabolism



Weight Management



Sleep and Relaxation



Smart Choice

Specific Life Stages & Conditions



Men Care



Women Care



Children Care



Active Aging Care



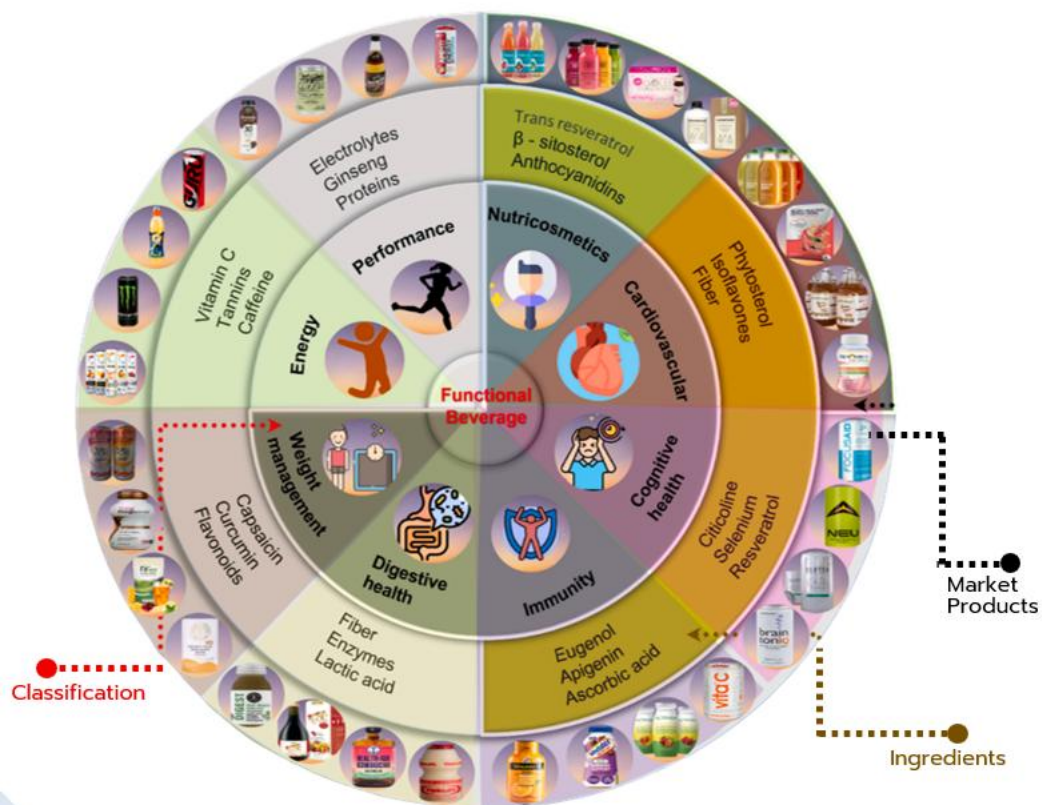
➔ **Optimum Health goal**

Personalized foods
Personalized supplements

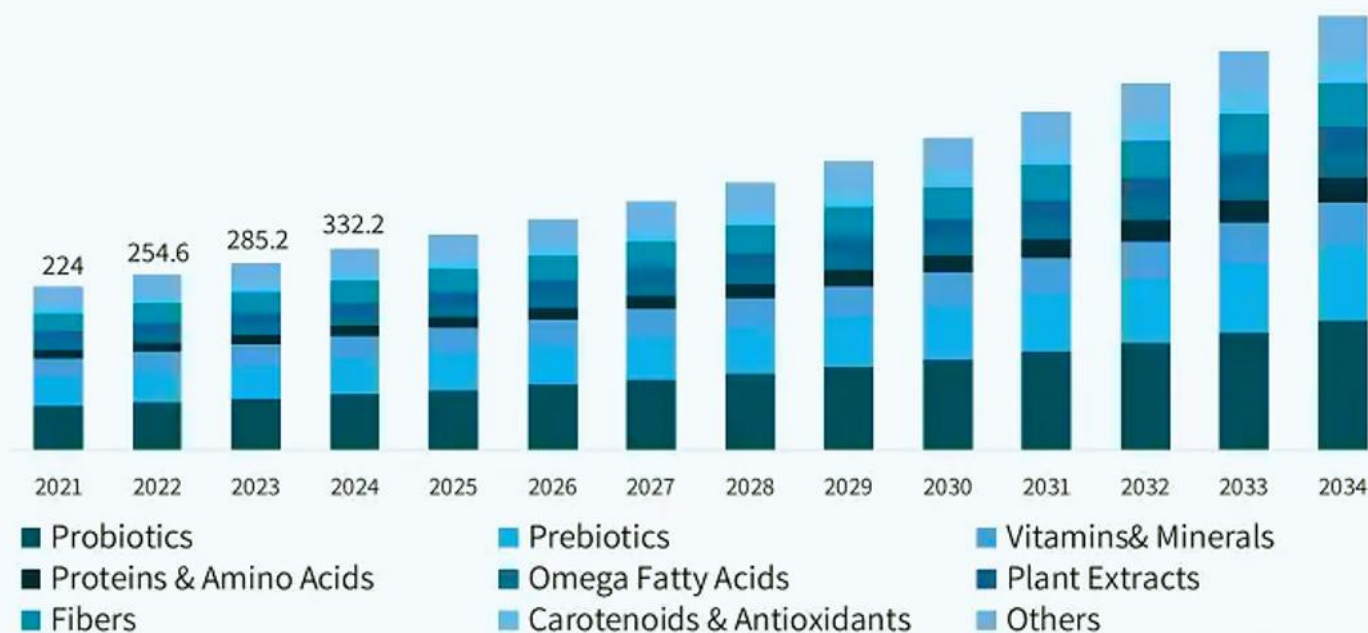
➔ **Smart Longevity**

Functional Foods

Functional foods are foods that offer health benefits beyond their nutritional value



Functional Foods Market Size, By Ingredient Type, 2021-2034 (USD Billion)



Source: www.gminsights.com



Functional Ingredient Trends 2026

Holistic Self-care
Shifting functional categories
towards wholesome
enjoyment & value of
connection

<https://www.foodnavigator.com>



Gut-axis Frontier
gut microbiome vs. pre- pro-
& postbiotics



Functional Nutrition
Proteins(Next-gen plant-based 2.0 &
dynamic and evolving animal-based)



Mental Health & Cognitive Revolution
From coping to resilience
(Adaptogens & Nootropics)



Science-backed Longevity
Cellular health, Metabolic balance,
Cognitive function & Healthy ageing



Underserved Women's Health
Hormonal support & Mental
wellbeing



Confectionery, snack,
gummies, chocolate,
functional sweets



Yogurts, Pudding,
Mousses



Beverages
(Prebiotic Cola)

Scientific insights for accelerating innovative ingredients discover



AI-powered Discovery

- Novel bioactive compounds
- Upcycled ingredient
- Integrating nutrition, data science, AI & bioinformatics



Nutraceutical Formulation

- Promising bioactives and other compounds from plants and other food sources.
- In silico discovery for downstream experiments
- Hard-to-copy supplement



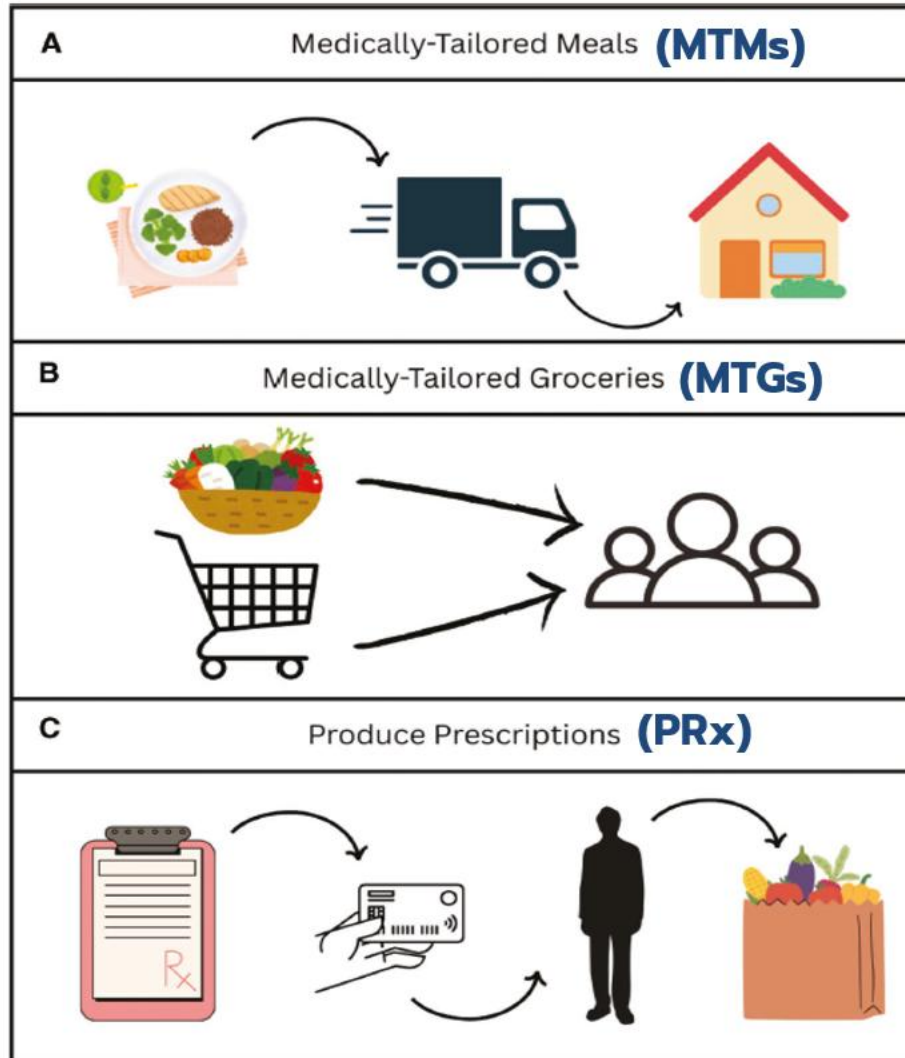
Science-backed evidence

- Safety
- Efficacy
- Synergistic effect
- Function, pathway, metabolism



FOOD is Medicine (FIM): Nutritional Therapy

Home-centric Living: Food program, Guidelines, and Social media



Transforming Knowledge into Globally Competitive Thai Products

Key Trusted Areas

- Functional foods
- Herbal extracts and botanicals
- Dietary supplements and nutraceuticals
- Food technology and processing innovation

Plant-Based Production
& Extraction



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a member of NSTDA

Upcycling & Biomass
Valorization



Microbial & Enzyme
Bioprocessing

Physical & Advanced
Processing

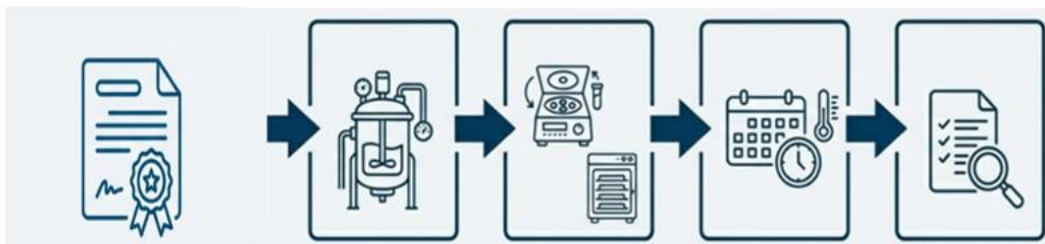


Chemical & Chemo-
Enzymatic Synthesis

Cell-Based & Tissue
Culture Systems



Scientific Evidence for Market Approval



EFFICIENCY
& HEALTH CLAIM

SAFETY

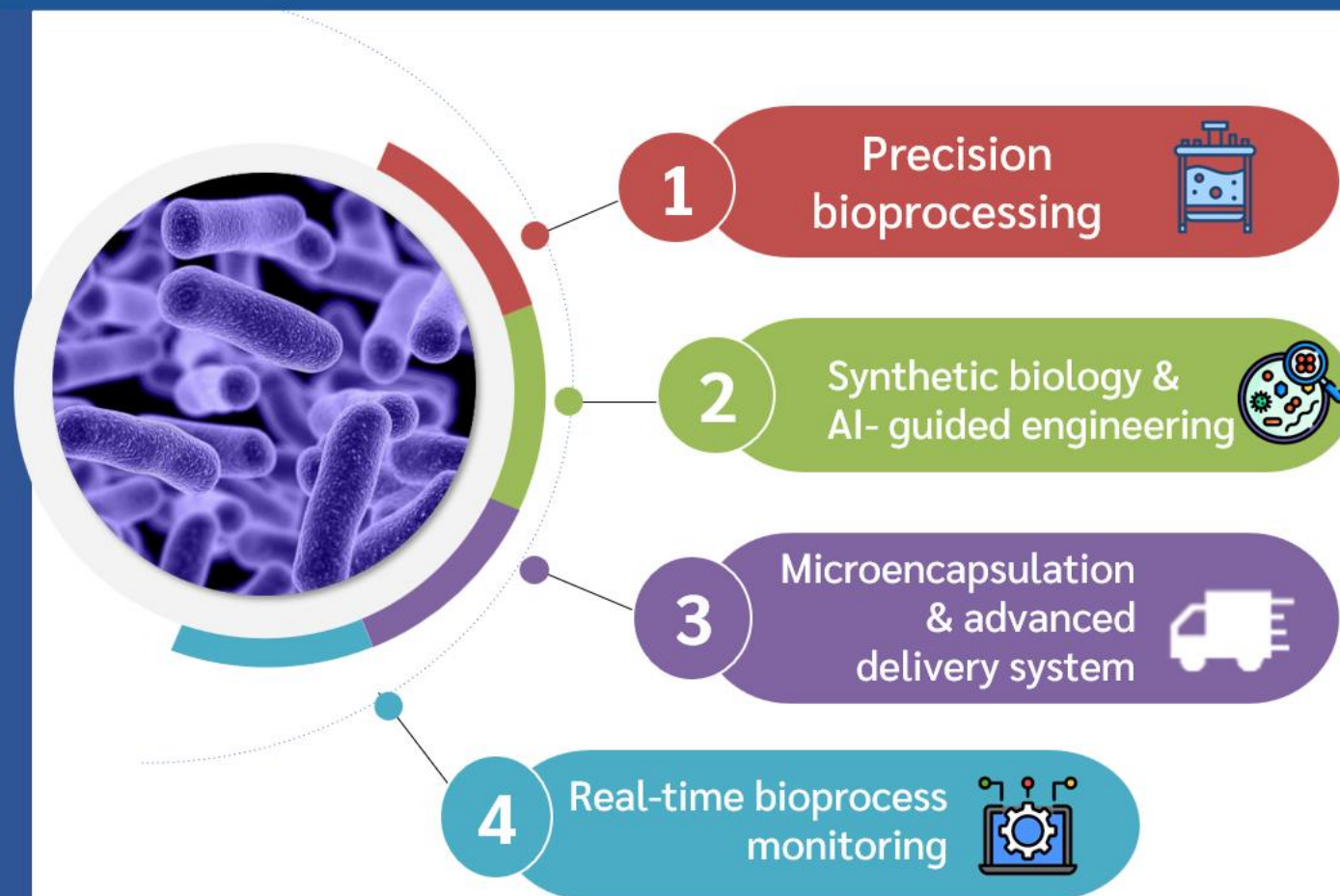
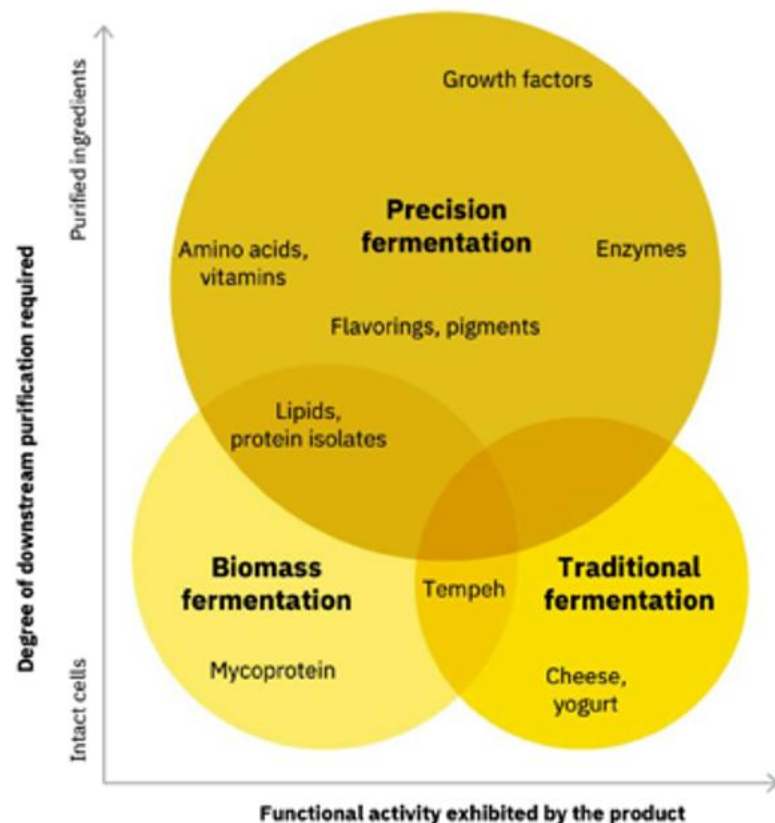
QUALITY & STANDARD

QUALITY & STANDARD

ENVI-FRIENDLY



Innovative Production Strategies for Revolutionizing FI through Bioprocessing

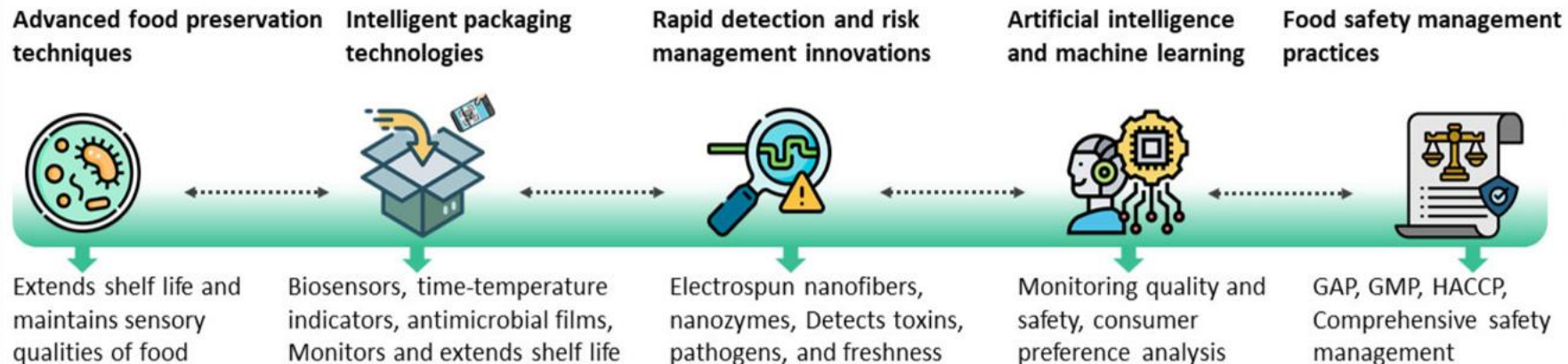


Driving Innovation Towards Global-Standard Efficiency, Quality & Safety

Advanced Analytical Testing for Product Innovation

- Comprehensive testing to ensure the safety and quality of products
- Analytical methods to quantify nutrients and active ingredients accurately
- Microbiological testing to detect contaminants and maintain hygiene
- Stability testing to evaluate product performance over time
- Regulatory-compliant testing protocols for domestic and international markets
- Testing for Pre- & Post-marketing

Personalized Gut Health





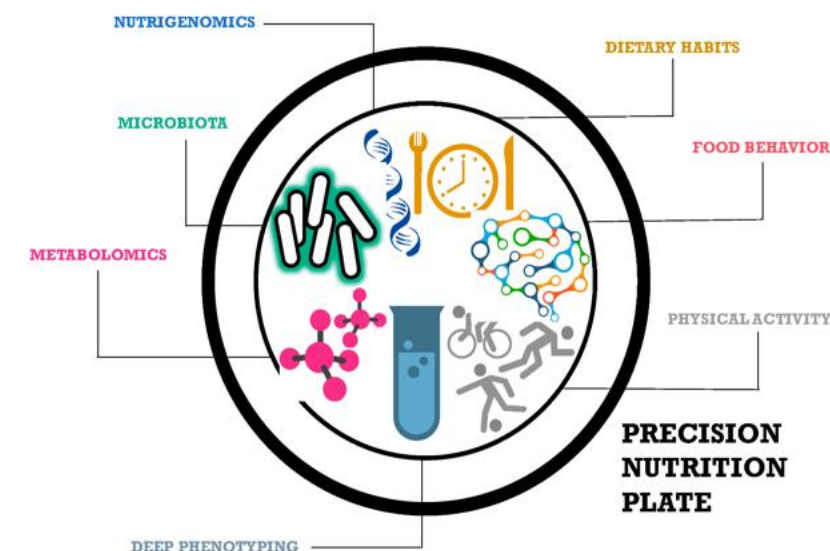
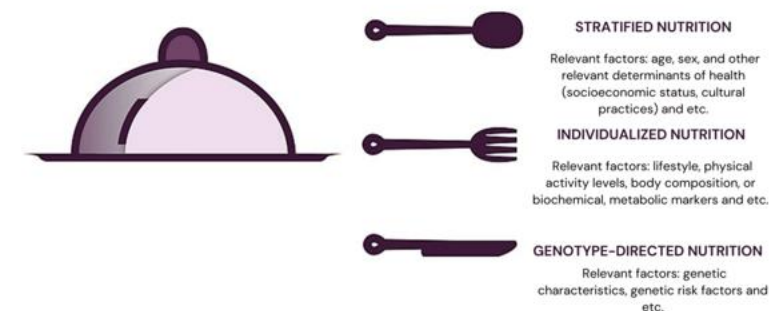
PRECISION NUTRITION



Source: Rabobank 2019



PRECISION NUTRITION LEVELS

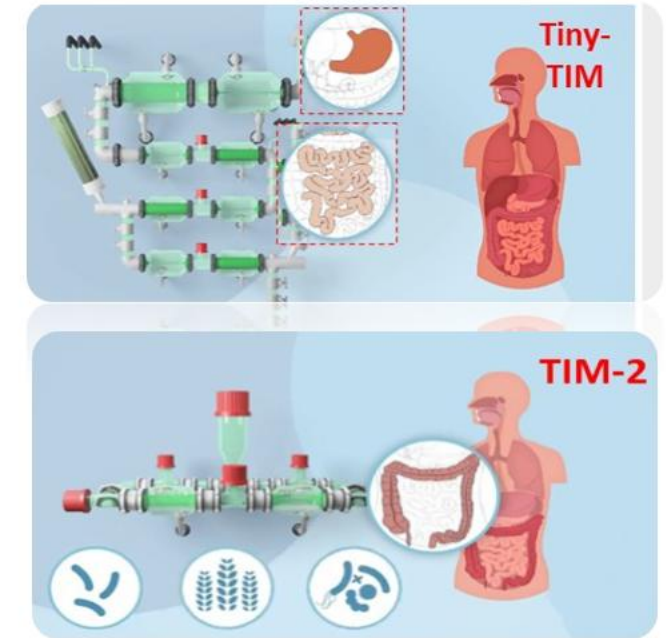


Advanced Simulated Gut Models

Food Digestion Platforms



Modified from ASM Journals. Microbiology and Molecular Biology Reviews.
Vol. 86, No. 4. Stress Response in Bifidobacteria



: **TIM (TNO Intestinal Model)** TNO (Netherlands)

: **SHIME®**
(Simulator of the Human Intestinal Microbial Ecosystem)
ProDigest (Belgium)

: **IViDiS** (In Vitro Digestive System, Semi-dynamic/static system),
CSIRO (Australia)

: **GI-Sim** (Sweden)

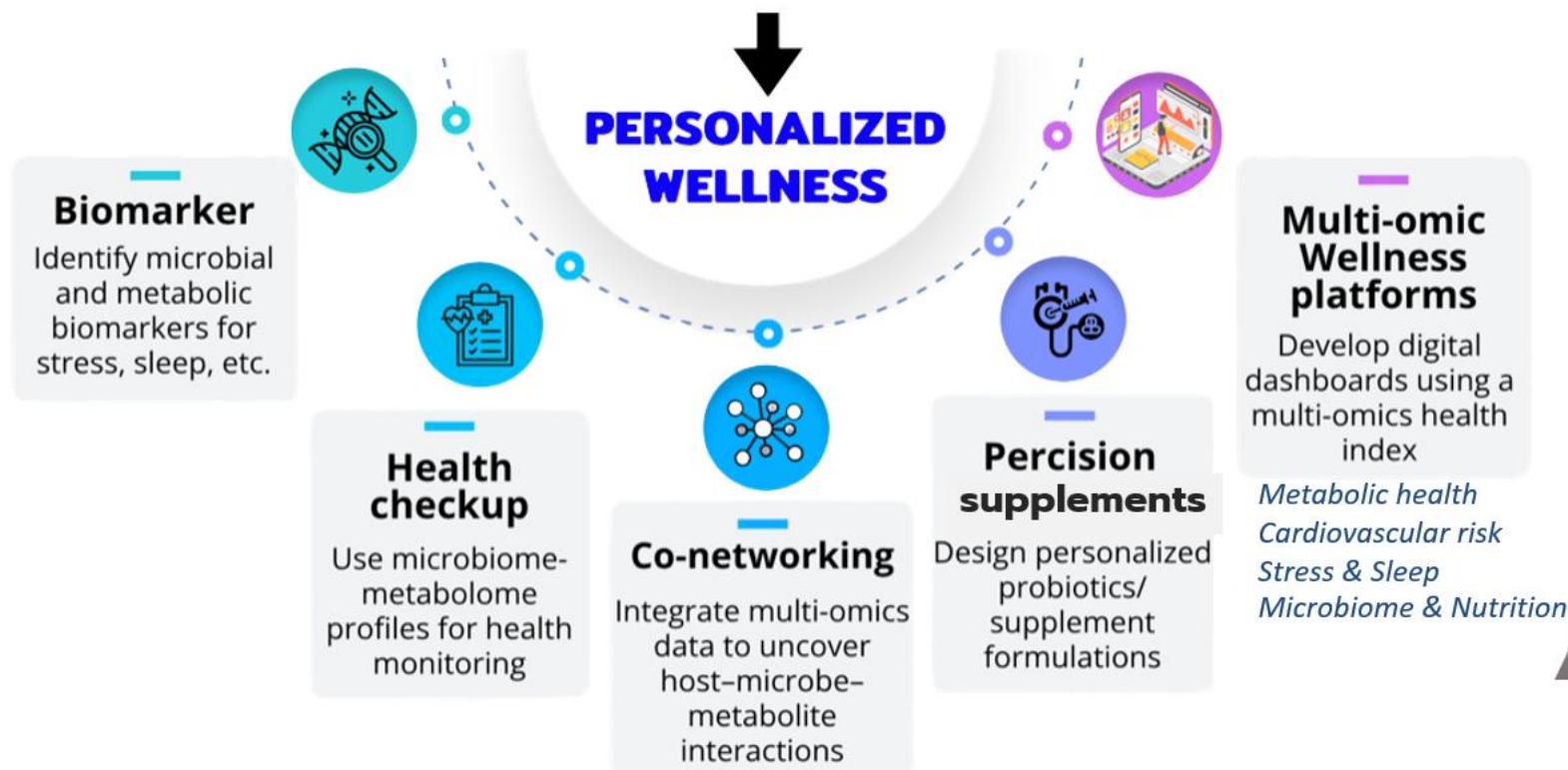
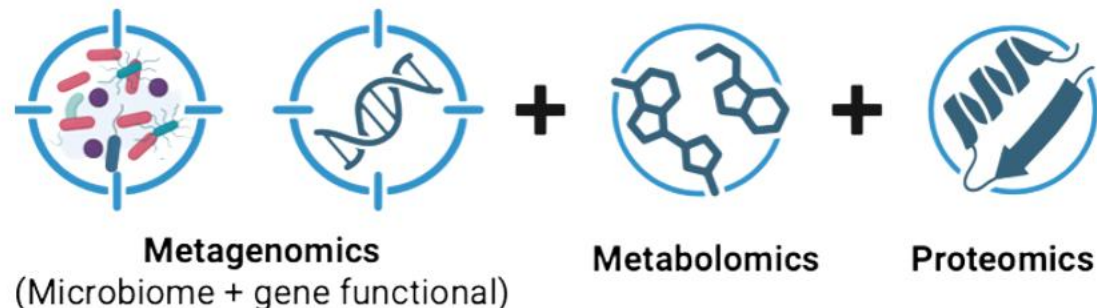
Multi-Omics Technology for Personalized Wellness

METABOSERP

powered by **foodSERP**



BIOTEC
a member of NSTDA

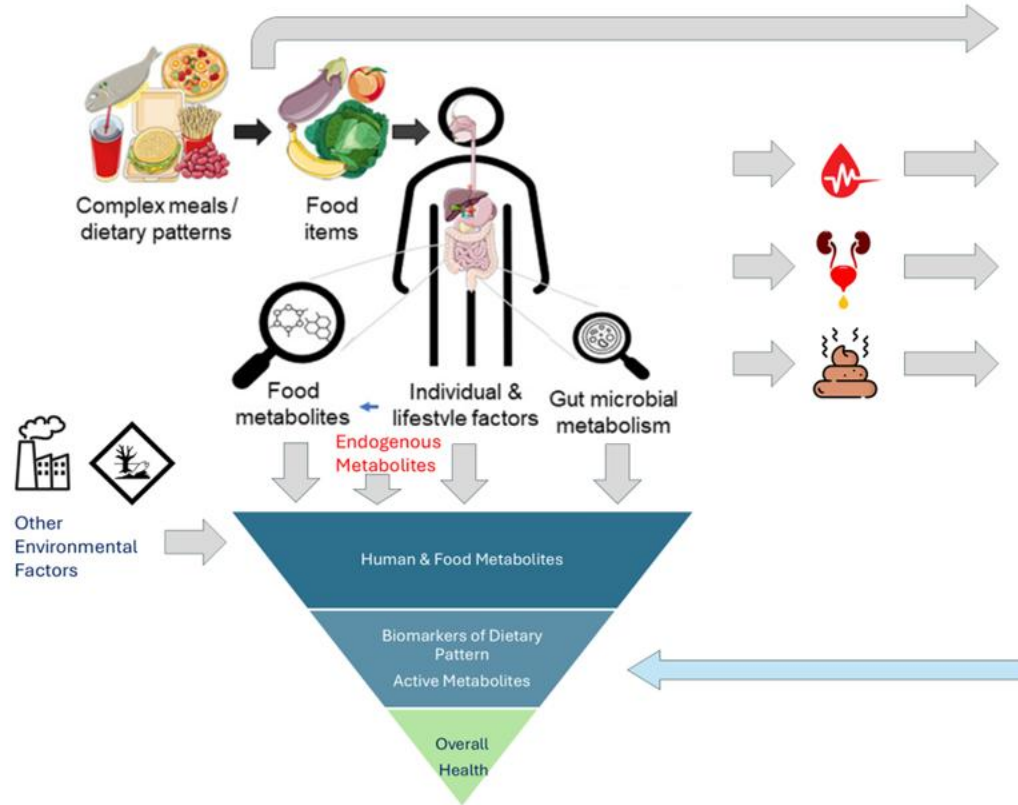


Nutrimetabolomics: Personalized Nutrition/Longevity



METABOSERP

powered by **foodSERP**

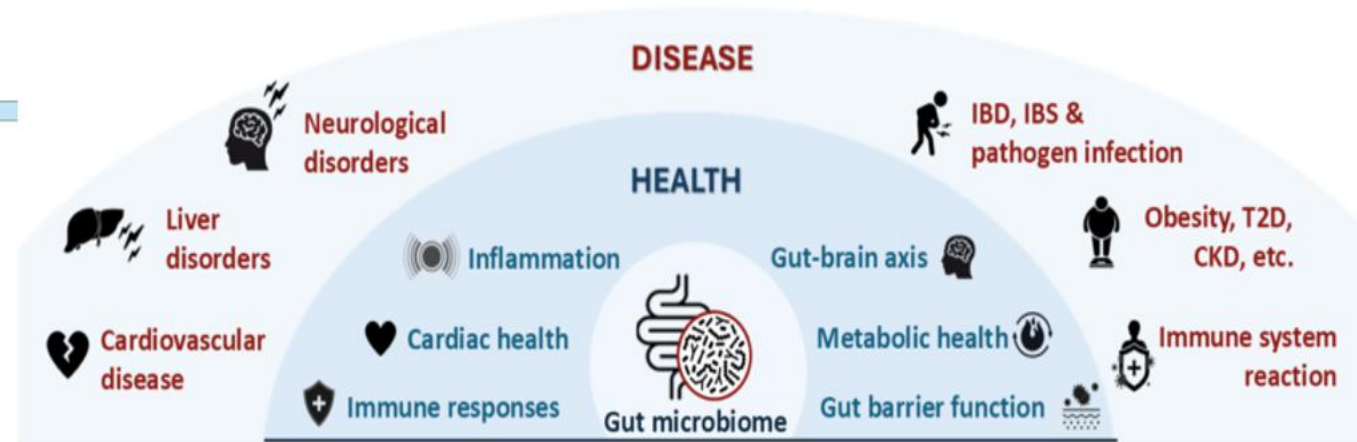


foodSERP

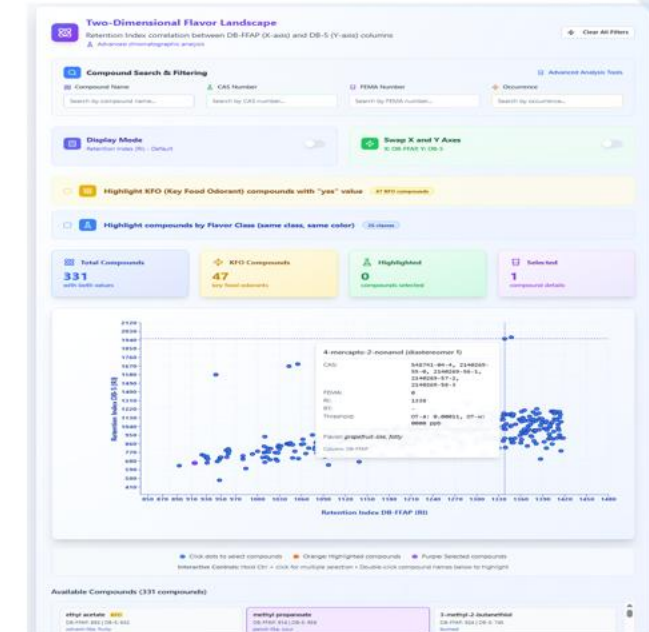
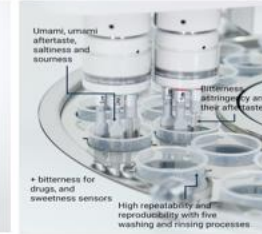
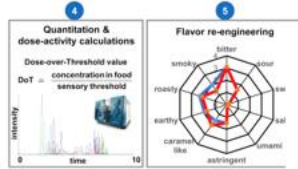
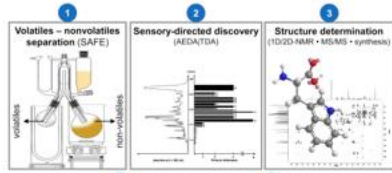
Targeted and Untargeted Metabolomics

MetaboSERP®

- GC-SQ
- GC-QQQ
- GC-QTOF
- LC-QQQ
- LC-IM-QTOF



Flavor & Texture Innovation



Aroma and Taste Analysis

- Sensory Panels
- Flavor Profiling
- Quantification and analysis of odour molecules by gas chromatography olfactometry (GC-O)
- Measurement of volatile organic compound fingerprints, and dynamic flavor release phenomena by GC-O/TOF

Training

- GC-O Training Course
- Flavor Recognition Training Course



Applications

- Investigation and Identification of Flavor defects in Products
- Flavor reformulation
- Key Food Odour and Taste Compounds
- Shelf-Life investigation



NSTDA-Food & Functional Ingredient Innovation



BIOTEC
a member of NSTDA

Functional Foods - Foods for Specific Groups-Precision Nutrition
Food Safety - Food Security - Food Packaging

Functional Foods & Feeds

Well-Being (Health Benefits) Anti-Cancers, Anti-Hypertension, Anti-Oxidants, Anti-Inflammatory, Immune Simulation, Gut Health-Modulation (Prebiotics, Probiotics), Growth Promotion, Disease prevention

Emerging Food Technology

Cultured Meats, Cultured Meat
Synbio & Precision Fermentation
Personalized Nutrition

Flavor & Texture Innovation

Food Odor Flavors, Palatants, Flavor Enhancers, Taste Modulation Solutions, Flavor Formulation
Elderly, plant-based foods



Alternative Proteins & Foods for Specific Groups

Infant, Adult, Elderly Foods, Diabetes Diet, Medicinal Foods High Protein Foods, Vegetarian, Plant-Based Products Precision / Personalized Nutrition

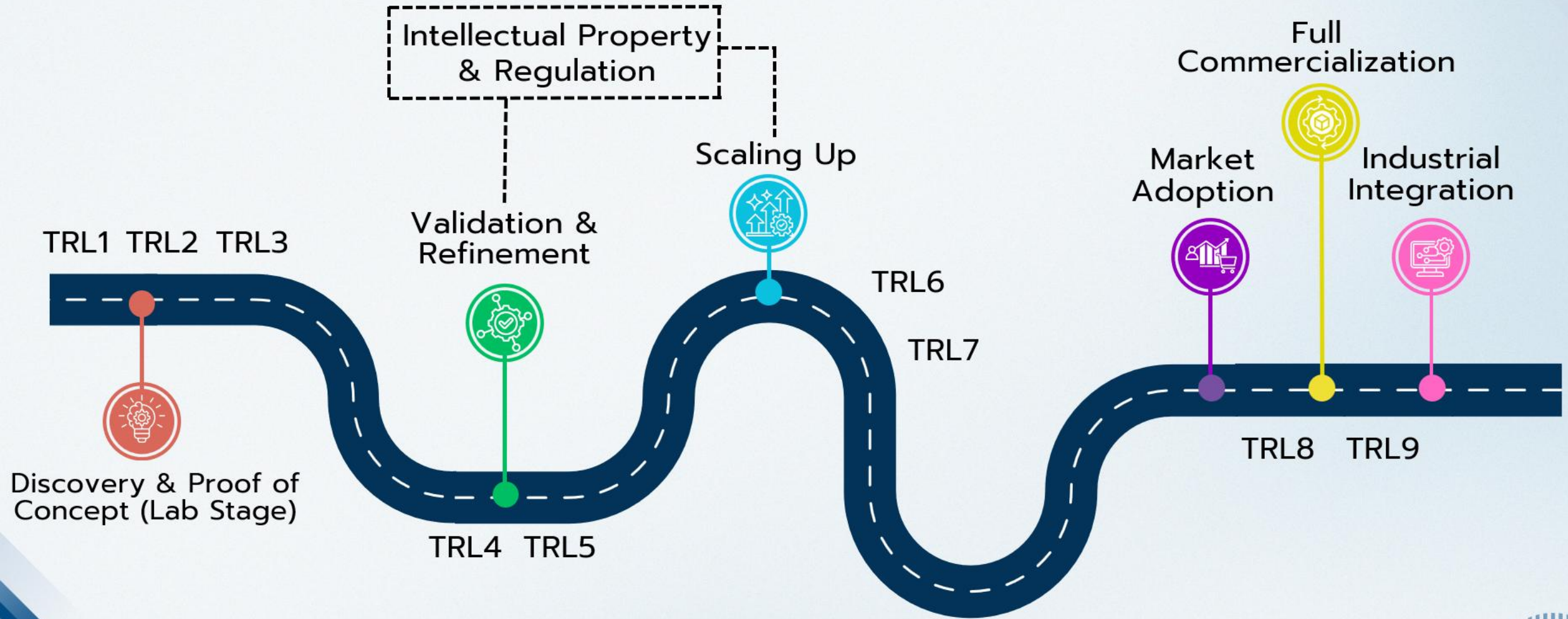
Food Security, Safety, and Sustainability

Risk Assessment Analysis, Toxicity Evaluation, Microbial safety, Probiotic safety evaluation

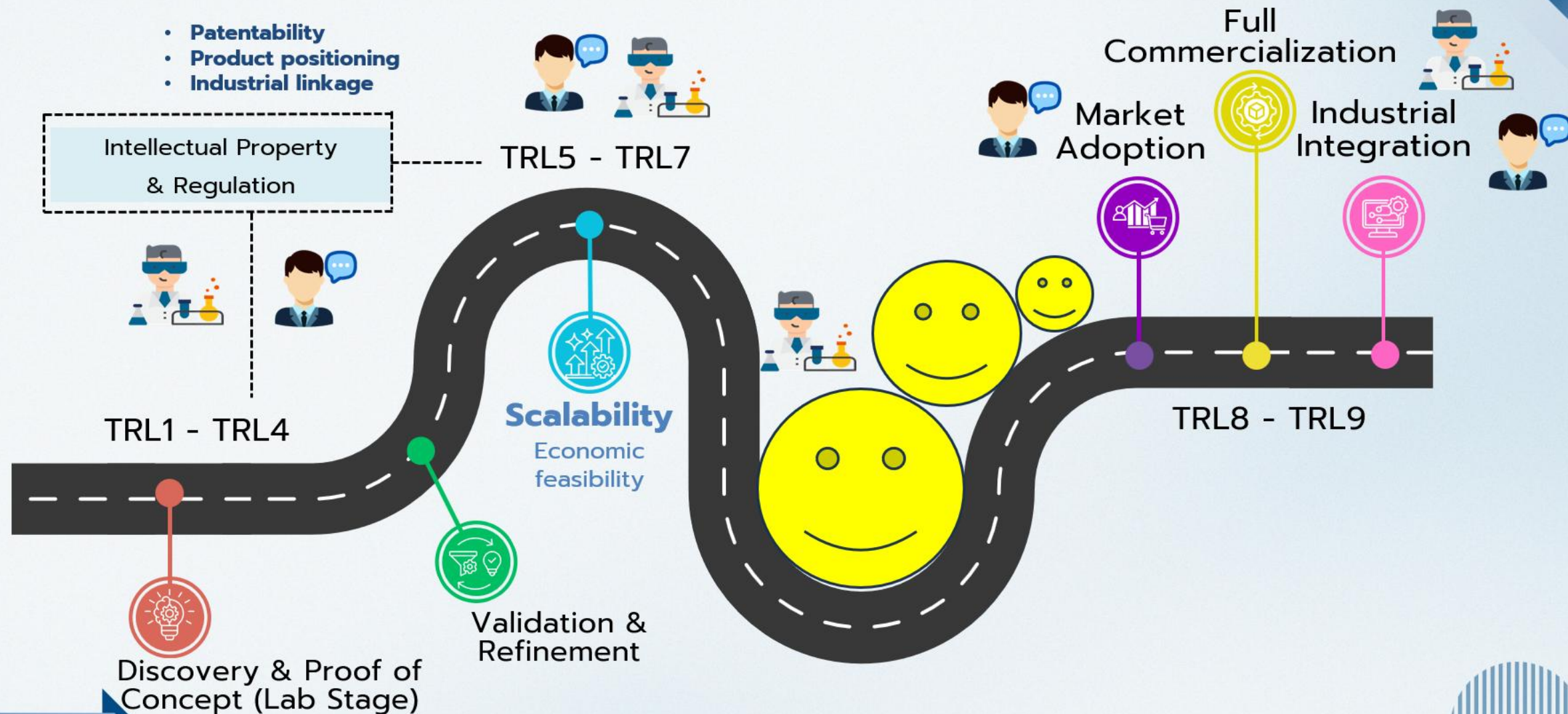
Food Packaging

Shelf-Life Extension, Biodegradable, Sustainable, Green Processing

Conventional Research Approach



Quick-win Research Approach



TECHNOLOGY & FACILITIES



SERVICE PLATFORM



PRODUCT GROUPS



Functional Foods



Functional Ingredients



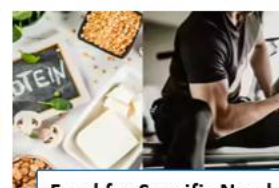
Alternative Proteins



Food for Elderly



Food for Patients



Food for Specific Needs



Health & Wellness



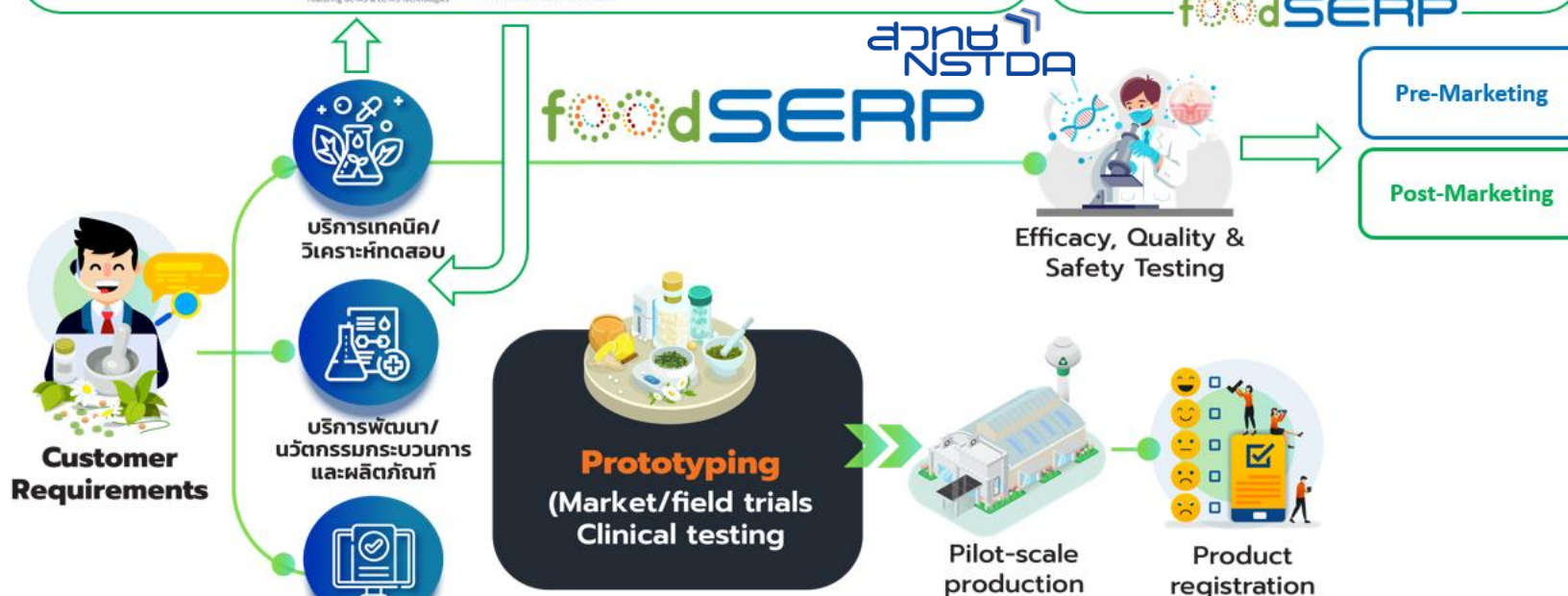
Precision Nutrition



Pet Foods



Pet Care





Translating Thai wisdom into modern science for food and FI innovation

- **Developing unique Thai value propositions** through indigenous ingredients, traditional wisdom and modern science
- **Meeting the demands** of health-conscious global consumers, transparent solution & trustworthy
- **Evidence-based claims and consumer trust**
- **Strengthening collaboration & ecosystem**
- **Encouraging enterprises (SMEs)** to adopt research-driven product design and branding strategies
- **Linkage to stakeholders** for commercialization



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*Accelerating innovation toward a sustainable future
and creating real-world impact*

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ขอบคุณค่ะ

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