The role of personalized nutrition to modulate gut microbiota for disease prevention

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I. INTRODUCTION

The human body hosts a diverse community of microorganisms, with the gastrointestinal tract being the most densely colonized, hosting a thousand microbial species collectively referred to as the **GUT MICROBIOTA**.

Recent studies have demonstrated that the gut microbiota maintains **multidirectional and communicational connections** with various organs through metabolic, endocrine, neural, humoral, and immunological pathways.

Alterations in this **GUT-ORGAN AXIS** can lead to a wide range of health issues, beyond gastrointestinal disorders to affect other organ systems.

Emerging evidence highlights the intricate **relationship** between **diet and microbiota** in the **onset and progression of diseases. Personalized nutrition** has gained attention as a strategy to **identify specific microbiome traits** that **predict responses to dietary components.**

II. RESULTS & DISCUSSION

II.A GUT-ORGAN AXIS

It has been discovered the continuous influence of gut microbiota in different organs of the human body.

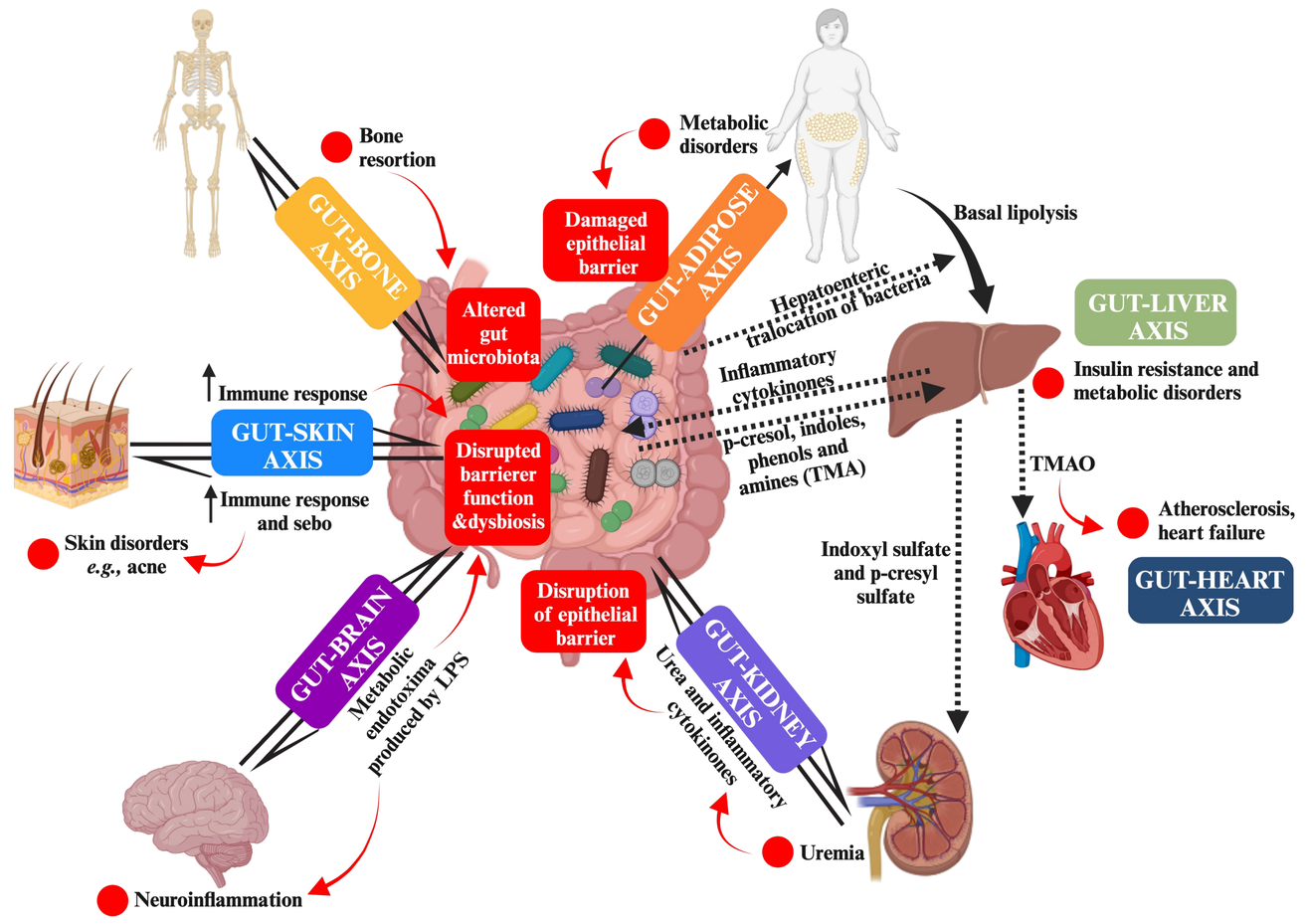


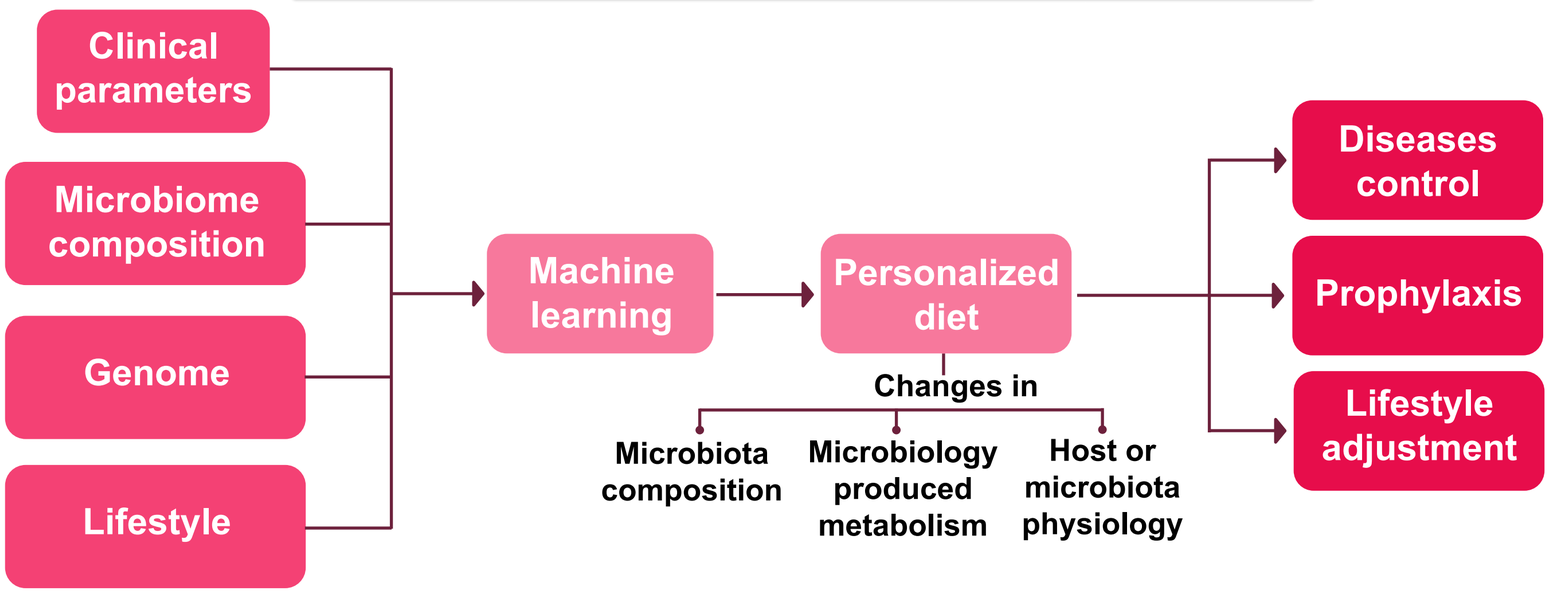
Figure 1. Visual representation of gut-organ axis. *Abbreviations: TMA: trimethylamines; TMAO: trimethylamine oxides; LPS: lipopolysaccharides.*

II.B DIET INFLUENCING GUT-ORGAN AXIS

Emerging studies are underscoring the modulating ability of nutrients to produce bacterial changes.

Nutrient	Bacterial changes	Biological significance
Dietary fiber	↑ *Ruminococcus* species ↑ *Bifidobacterium* species	Energy harvesting and derivation of essential nutrients
Oligosaccharides	↑ *Faecalibacterium* species ↓ *Clostridium* and *Bacterioides* species	Reduction of LPS; protection of gut wall permeability; increment of SCFAs.
Saturated fatty acids	↑ *Bilophila wadsworthia*	Inflammation of intestinal mucosa.

FUTURE WORK & CONCLUSIONS



Personalized nutrition holds promise for designing targeted dietary interventions that promote favorable health outcomes by modulating the gut microbiota.

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