The Gut Microbiome and Individual-Specific Responses to Diet

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Background

- Nutritional content and the time at which one eats are important variables that impact human health.
- Precision nutrition: using individualized data (including the gut microbiome) to understand and personalize patient care.
- Review seeks to summarize these advances, the challenges of implementation, and how these findings can be used as a tool to advance human health

The Gut as a Second Brain

- Could the gut instinct actually be a real phenomenon?
    - YES!
    - One such example of this is jet lag. When a patient becomes jet lagged and offsets their normal habitual feeding patterns, the gut microbiome enters a state of dysbiosis. In this state, the person is more likely to experience glucose intolerance and obesity as the gut microbiome ceases working as a cohesive unit with the rest of the digestive system.

Figure 1

- Dietary Crosstalk: essentially your gut "talking" to other parts of your body including your brain.
- Signaling Hub: the gut has been found to carry out downstream signaling to many other organ systems depending on what has been consumed.
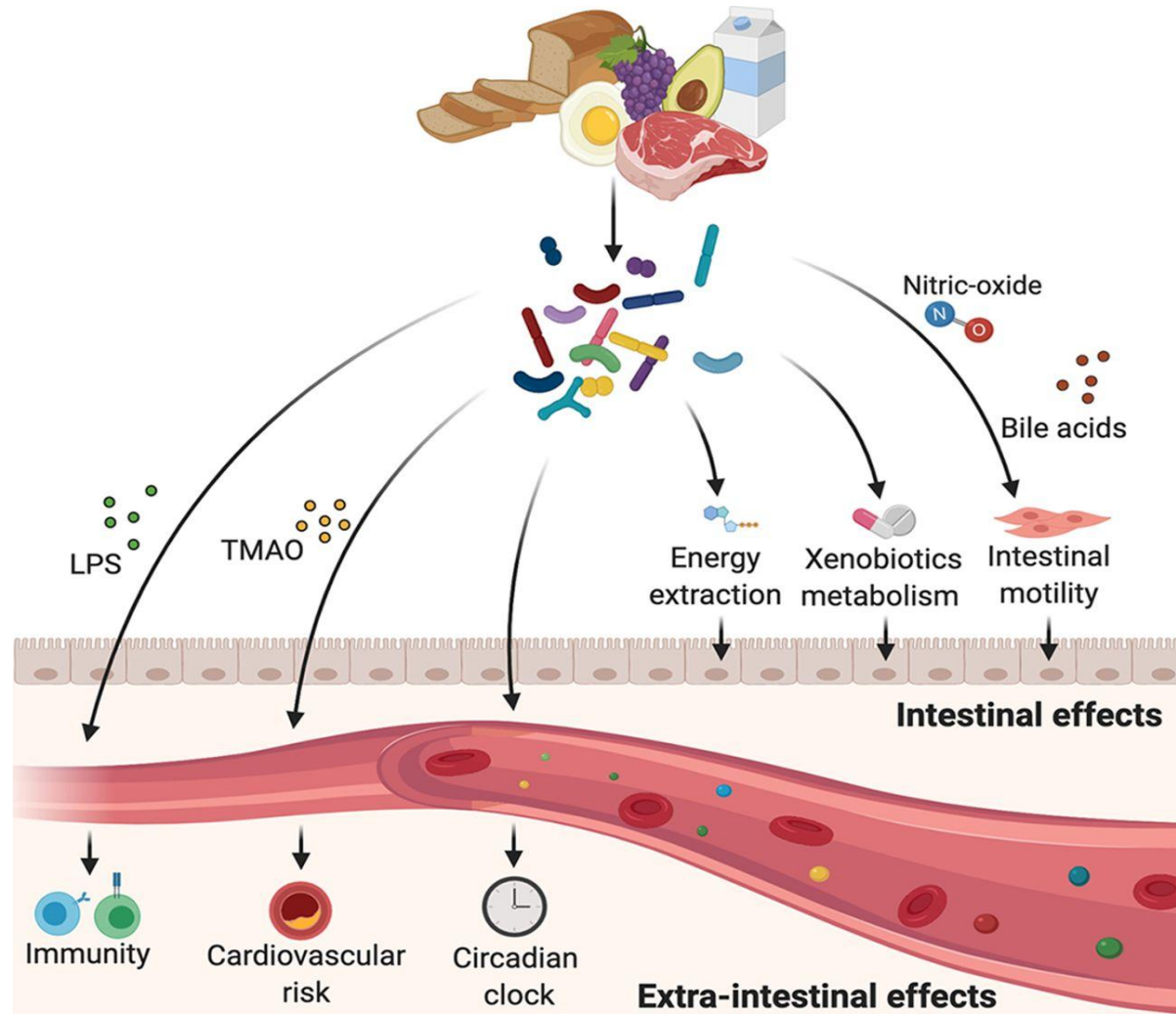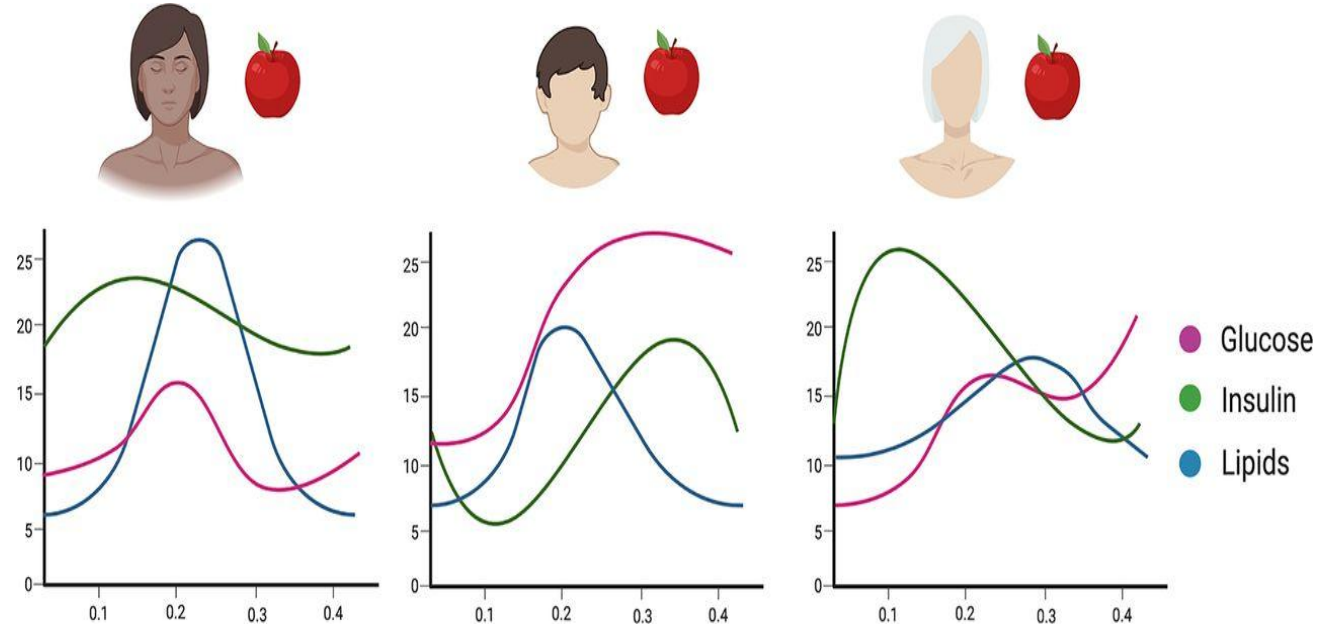 - EX: Ketogenic Diet

Figure 2

- Postprandial response: the bodies response after a meal.
  - Variable from person to person depending on diet, age, physical activity, and the microbiome
- Understanding this at the individual level could help prevent the weight loss-weight gain cycle.

Applications

- Utilization of machine learning to personalize the diet recommendations
- Better glucose management
- New therapeutic approaches to help treat and management chronic human disease.