The Interplay Between Iron Deficiency and Gut Microbiome Status Following Bariatric-Metabolic Surgery: A comprehensive review

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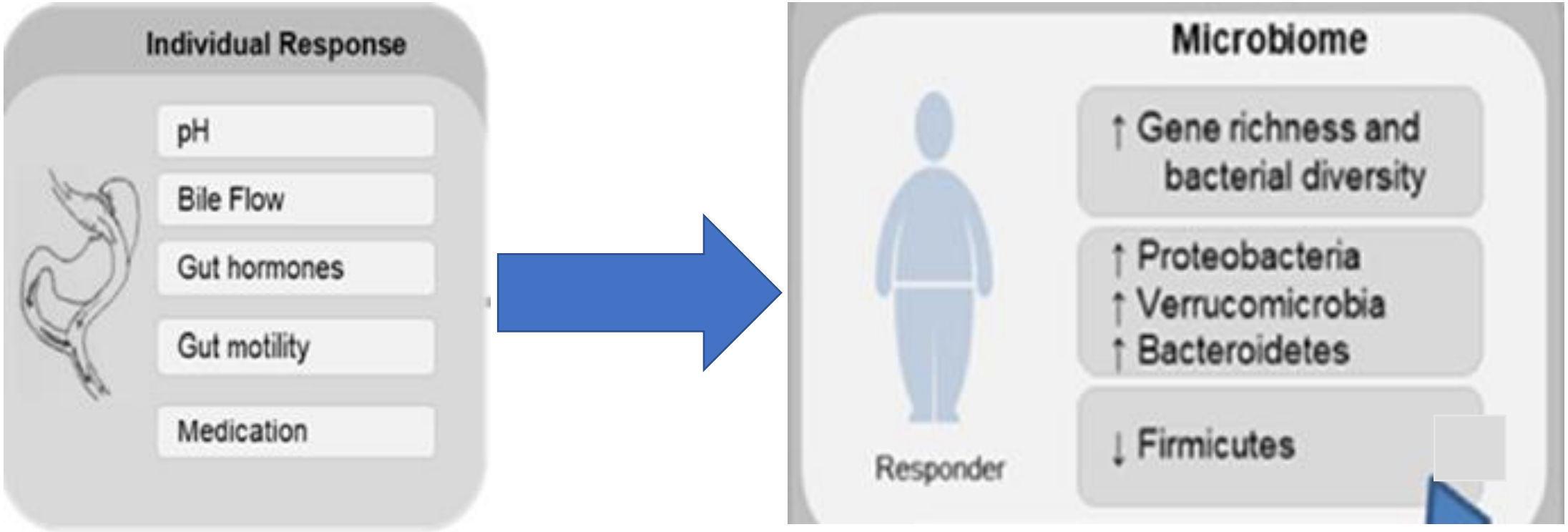
Introduction



Iron deficiency, which results in mycrocytic anemia, is very common after BS and has been reported in 18–53% of patients after RYGB & respectively, in 1-53% of patients after VSG

AIMS

Methods

- This comprehensive review aims to investigate the specific impact of iron status on GM alterations following BMS.

- Embase, Scopus, PubMed/Medline, Google Scholar up to Jan 1, 2024.

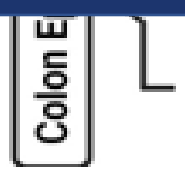
- Search Terms: “gastrointestinal microbiota”, “Iron”, “microbiota”, “gut microbiome”, “bariatric surgery”,

✓ **I have no potential conflict of interest to report**

Results

- The gut microbiome is gaining traction as a target to consider in the pathogenesis of **IDA due to its capacity to modulate iron metabolism.**
- **Specific microbial metabolites** have been shown to impair iron absorption both *in vitro* and *in vivo* through the degradation of **hypoxia inducible factor 2 α subunit**.
- A state of **gut dysbiosis** exists in the large intestine of patients suffering IDA, with **changes in SCFA**, a depletion in the phylum Proteobacteria , and a loss of the family Ruminococcaceae, order Clostridiales, class Clostridia and the genus Faecalibacterium.

the gut barrier



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Oral Fe administration and Microbial changes in colon

A, B; Orally administered iron has a direct impact on alteration of microbial composition in the gut. It can result in reduction in the beneficial microbiota (Bifidobacterium, Lactobacilli) & the expansion of enteric pathogenic profile (E.coli, Enterobacteria, Salmonella, C. difficile).

C; The host metabolism is influenced with an increase in Pro fermentation & reduction in CHO metabolism.

D; Importantly, iron can induce the generation of ROS in the gut, which causes oxidative stress & consequently, intestinal epithelial damage.
In turn, the host intestinal immune system responds with inflammation, intestinal damage & infection.

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CONCLUSION

- Iron deficiency affect not only the human host, but also its gut bacterial partners. Prebiotics, commercially available supplements, were found to stimulate the growth of beneficial bacteria as well as modulate the gut microbiome positively, leading to enhanced calcium, magnesium, and iron absorption.

- **Limitations of the study:**

- To examine the role of micronutrients in modulating the gut microbiota among the bariatric surgery population.
- ADI is not easy to diagnose or treat following BS since it mimics other mineral deficiencies.

- **Future work**

- Further investigations are needed to determine whether GM changes following BS could be correlated with micronutrient deficiencies and adverse medical outcomes.

Warm greeting

from team

Iranian Society of Metabolic & Bariatric


Thank you for your attention

Qustions