

Gut Microbiota as influencer of Vitamin B12 Deficiency Patterns: Possibility of 'Vitamin-enriching-probiotics' as a new frontier

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INTRODUCTION

Vitamin-B12 (Vit-B12) is integral to diverse human biological processes and is primarily acquired from diet.

Vit-B12 deficiency in a population is known to be associated with dietary habits, malabsorption, and some other medical conditions.

Some gut-bacteria can synthesize Vit-B12, while others consume it from the host.

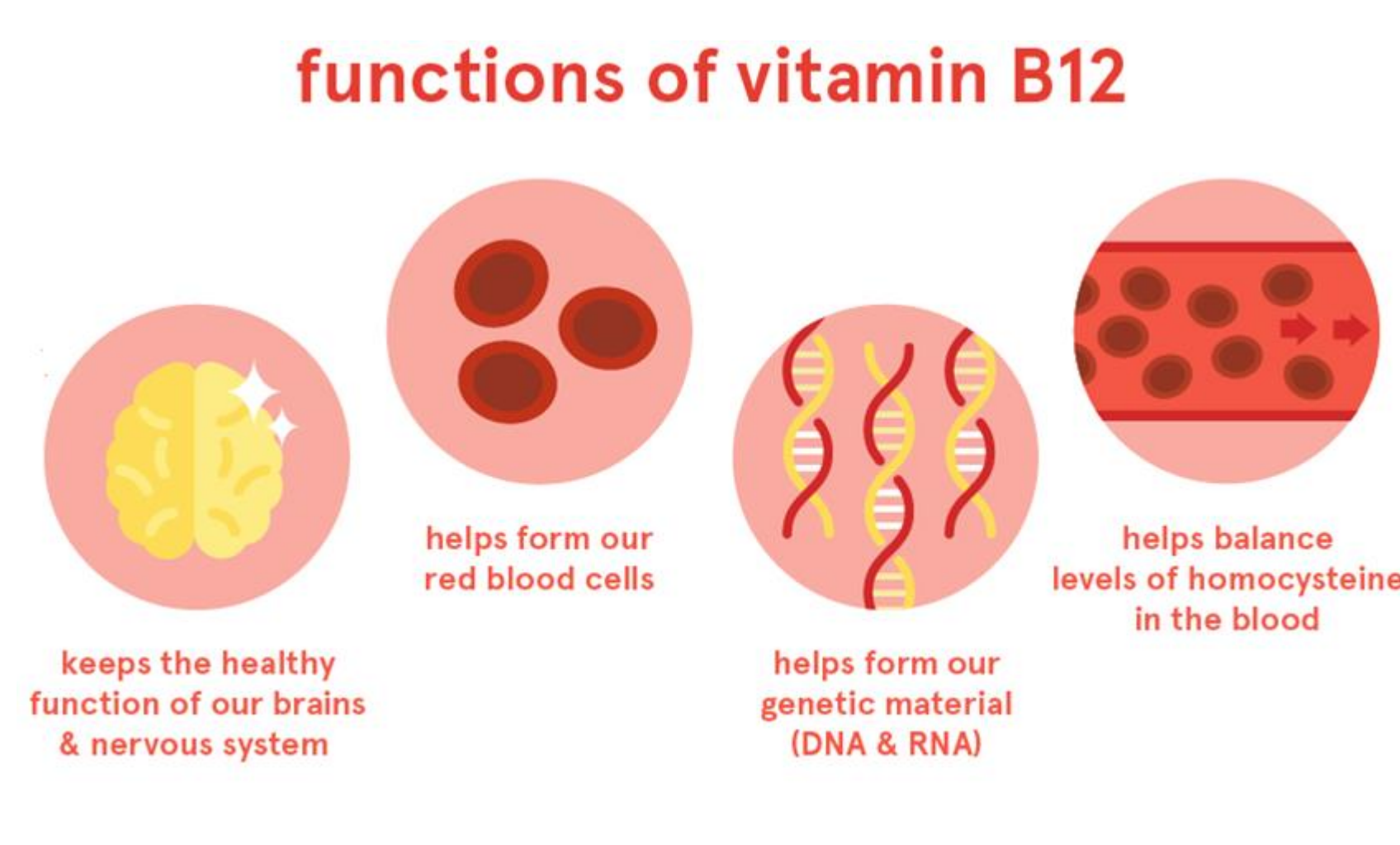
OBJECTIVE

Hypothesis: Besides nutritional aspects and health status, interplay among Vit-B12 synthesizing/ consuming gut microbes may promote or limit Vit-B12 availability at individual and population levels.

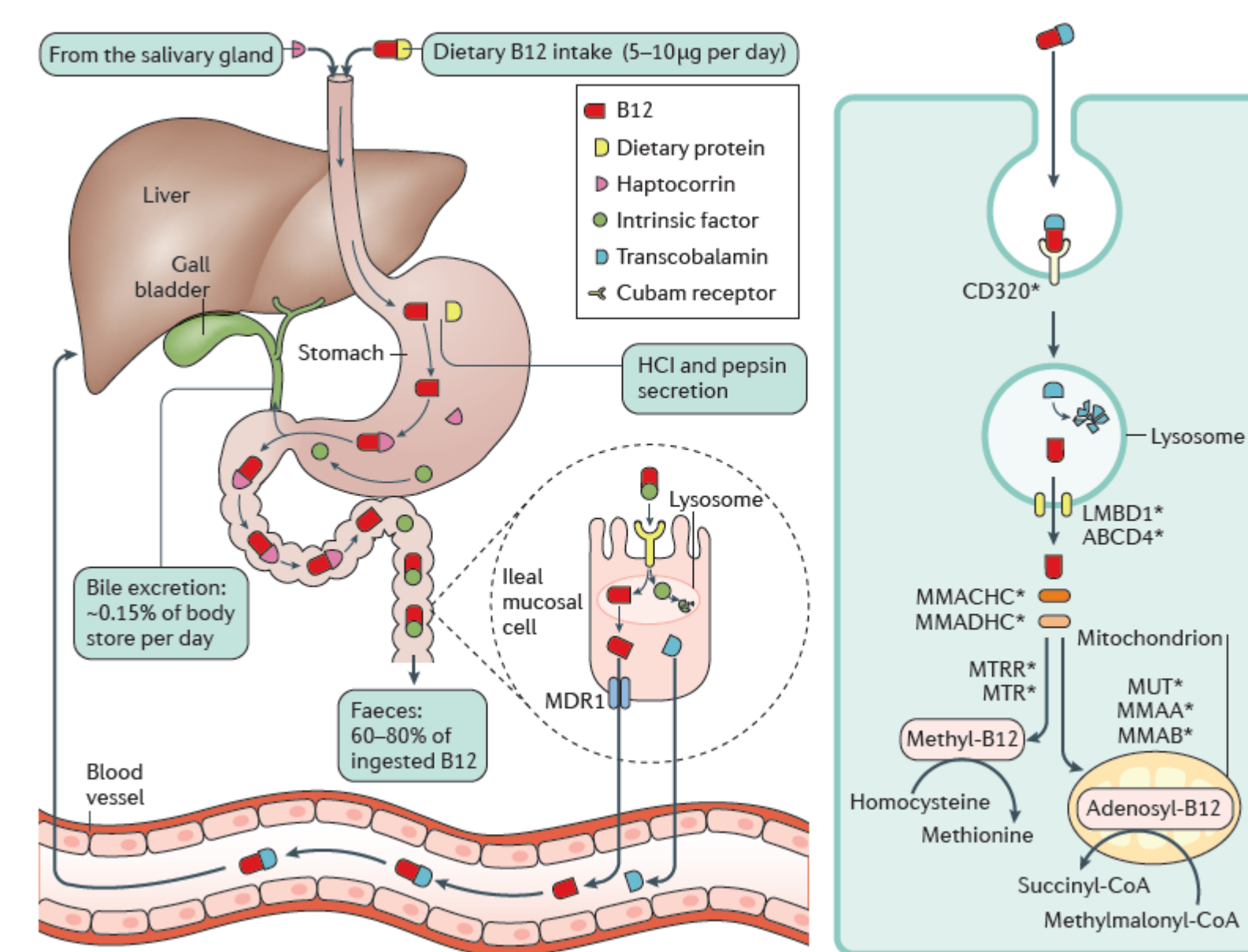
Objective: Evaluate hypothesis via assessing the prevalence of Vit-B12 synthesizing & consuming gut-bacteria and correlating with population-level Vit-B12 deficiency patterns.



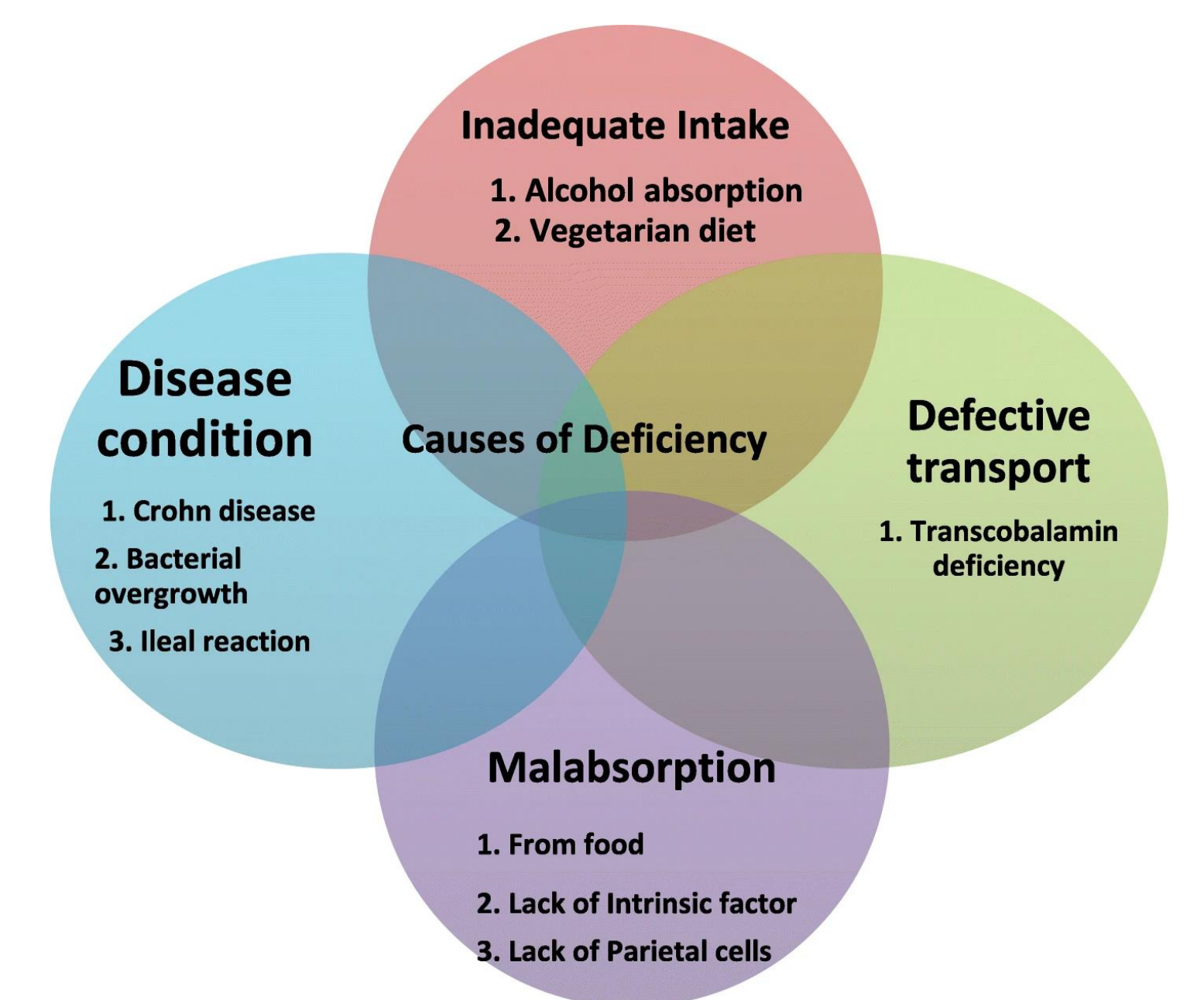
Vit-B12 Sources [1]



Functions [2]

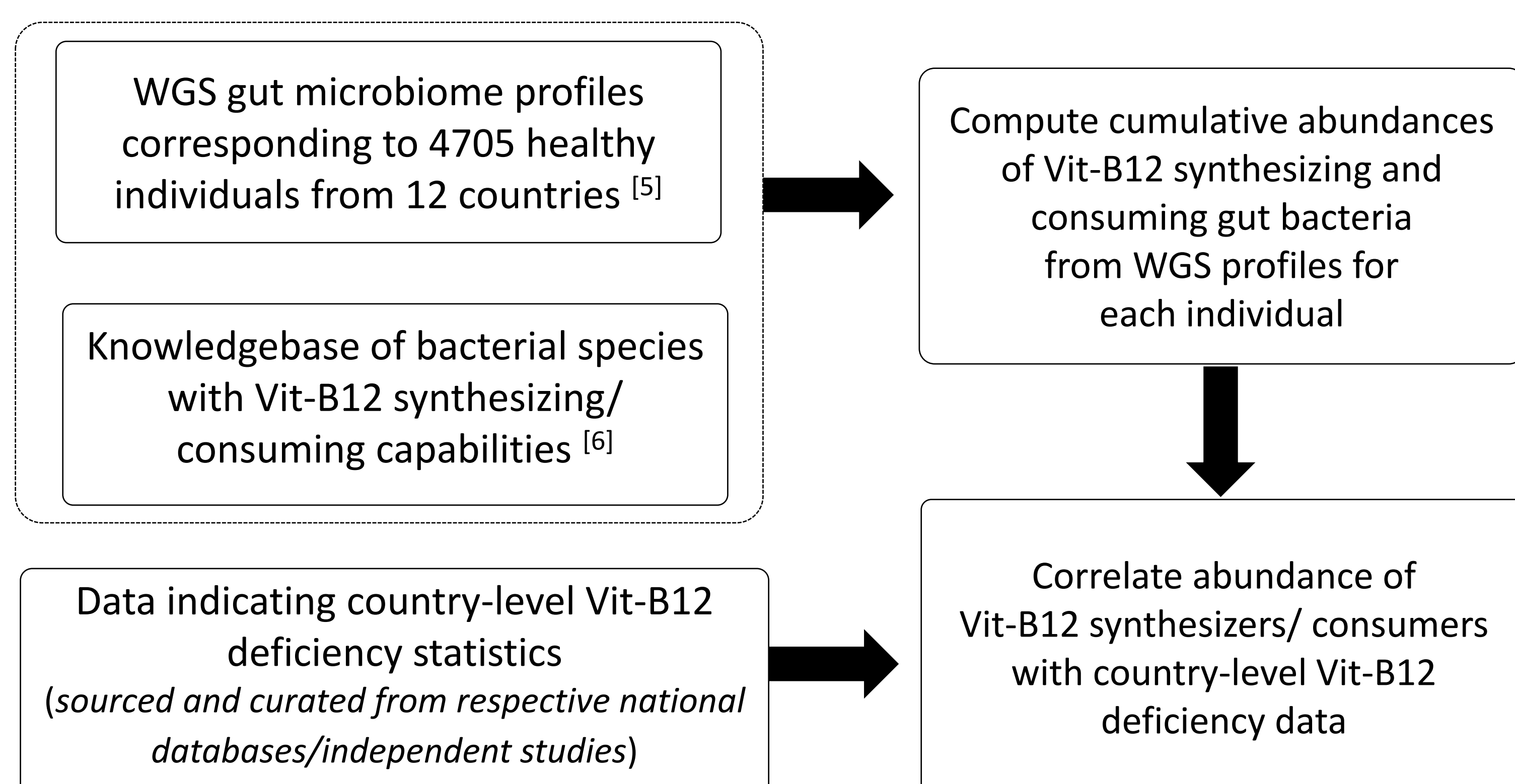


Absorption and metabolic events [3]



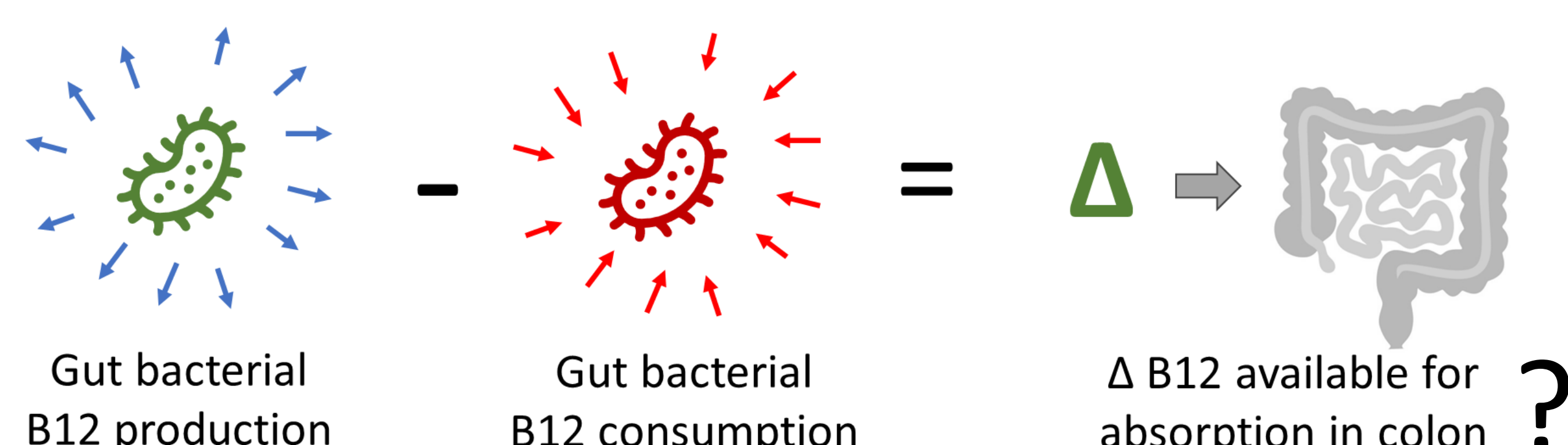
Causes of Deficiency [4]

METHODS

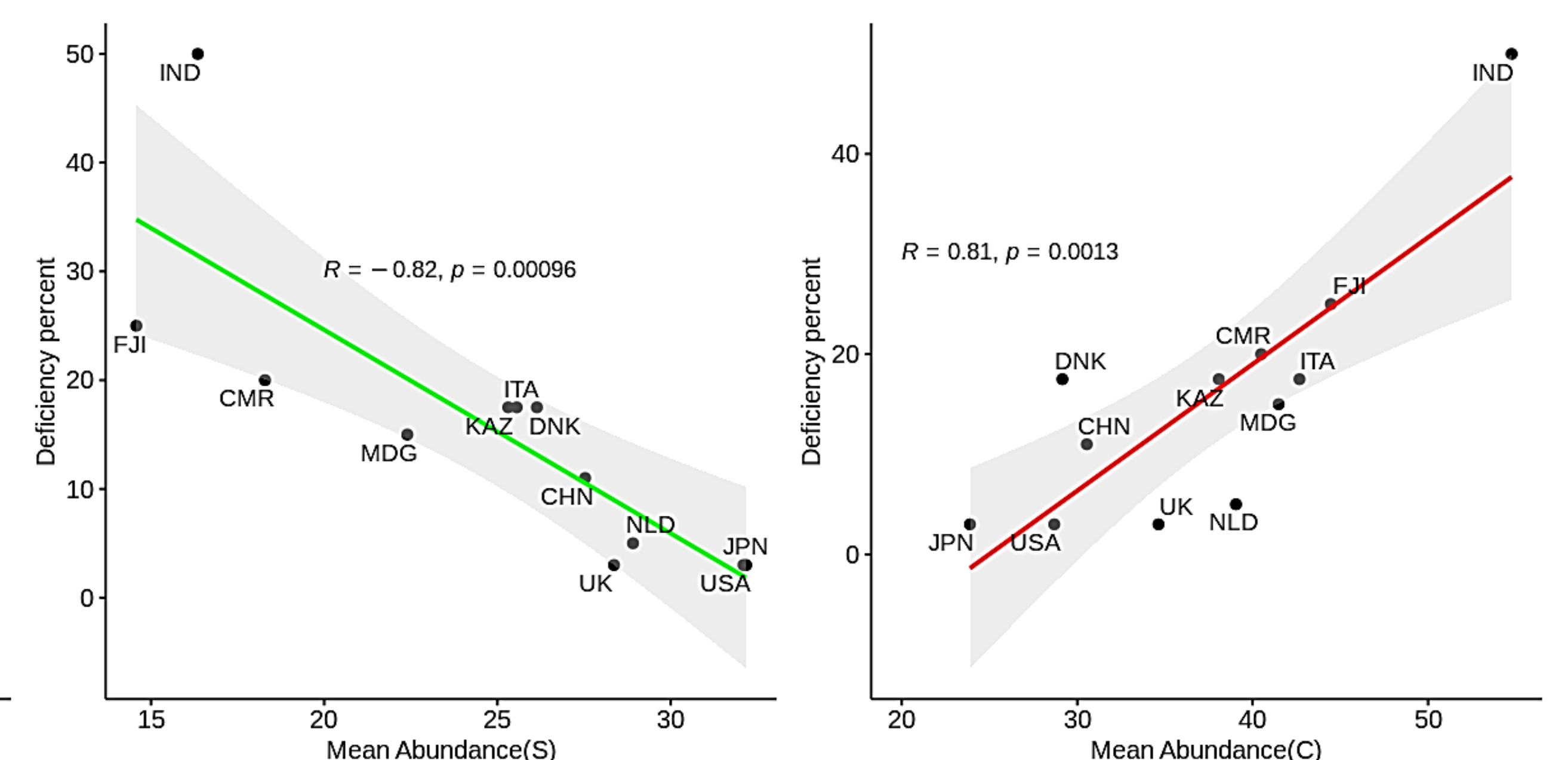


DISCUSSION

- Conventional knowledge points at minimal/ no absorption of Vit-B12 in the colon, suggesting limited scope of gut microbial contribution towards host Vit-B12 levels
- Our results, in contrast, indicate that **proportions of Vit-B12 synthesizing/ consuming gut bacteria may be directly impacting host Vit-B12 levels**
- In context of recent findings suggesting 'colonic absorption' of Vit-B12^[7], our results assume significance



RESULTS



- Mean abundance of Vit-B12 synthesizing gut bacteria shows statistically significant negative correlation with country-level Vit-B12 deficiency data, whereas abundance of Vit-B12 consuming gut bacteria shows a statistically significant positive correlation
- Relatively lower proportions of Vit-B12 synthesizing gut bacteria observed in individuals from the developing world

SIGNIFICANCE

- First study to explore association(s) between gut-microbiome structure and Vit-B12 deficiency patterns
- Opens-up possibility for a new class of 'vitamin-enriching-probiotics' which can potentially address vitamin deficiencies via gut-bacteria modulation

References

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