Title: The use of post-prandial breath hydrogen to monitor antibiotic-induced changes in the activity of the gut microbiome

Introduction: Small intestinal bacterial overgrowth (SIBO) is a common condition that is associated with a range of non-specific GI symptoms. Patients are often prescribed an empirical trial of antibiotics, however response to treatment can vary. Due to the heterogeneous nature of symptoms experienced, post-prandial breath hydrogen (PPH_2) may assist in identifying beneficial changes in the activity of the gut microbiome in those with a dysbiotic phenotype.

Methods:16 suspected SIBO patients measured their PPH_2 using an at-home, app-connected breath analyzer (AIRE®, FoodMarble). Readings were taken at 0, 30, 60 and 90 min after their morning and evening meals for 7 days pre- and post-treatment. 14/16 patients followed this protocol during antibiotic treatment. Six controls measured their PPH_2 levels for 7 days. Gas normalization was defined as +2 SD of the mean PPH_2 in controls.

Results: Patients produced significantly more PPH_2 ($p=0.003$), 27 ppm ± 22 ppm (mean ± SD) than controls (13 ppm ± 7 ppm). 5/14 patients saw a transient increase ($p=0.2$) of 23 ppm ± 23 ppm (mean delta ± SD) of PPH_2 during treatment. Post treatment, patients produced significantly less PPH_2 ($p=0.00001$), 17 ppm ± 13 ppm, more closely matching that of healthy controls, **Fig 1**.

Discussion: For the first time, PPH_2 was tracked before, during and after antibiotic treatment. PPH_2 was significantly greater in patients. Interestingly, for some patients, PPH_2 increased during the treatment period which is likely due to a dynamic rearrangement of certain microbial populations. Post-treatment, the level of PPH_2 in patients was more similar to that of healthy volunteers. The collection of PPH_2 data may be useful to identify those who produce elevated gas levels due to a dysbiosis and to determine normalization of their microbiome in response to antibiotics.

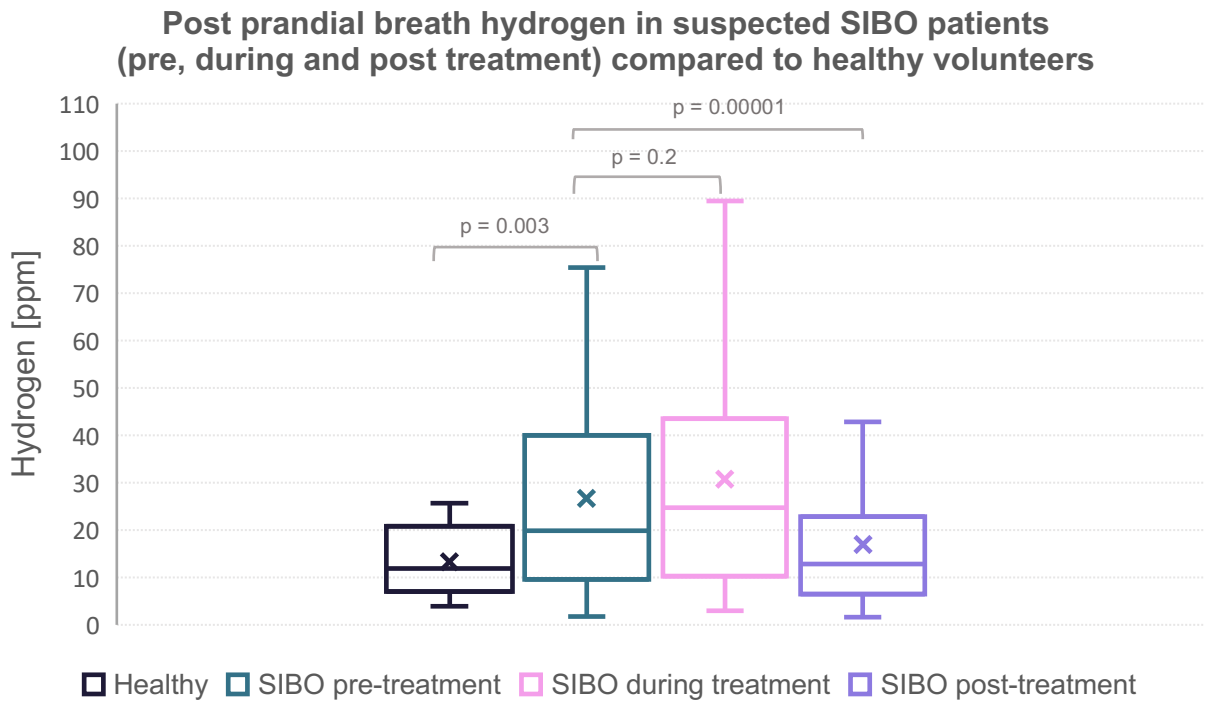

Fig 1: *Post prandial breath hydrogen of suspected SIBO patients (n=16) before, during and after antibiotic treatment compared to healthy controls (n=6).*