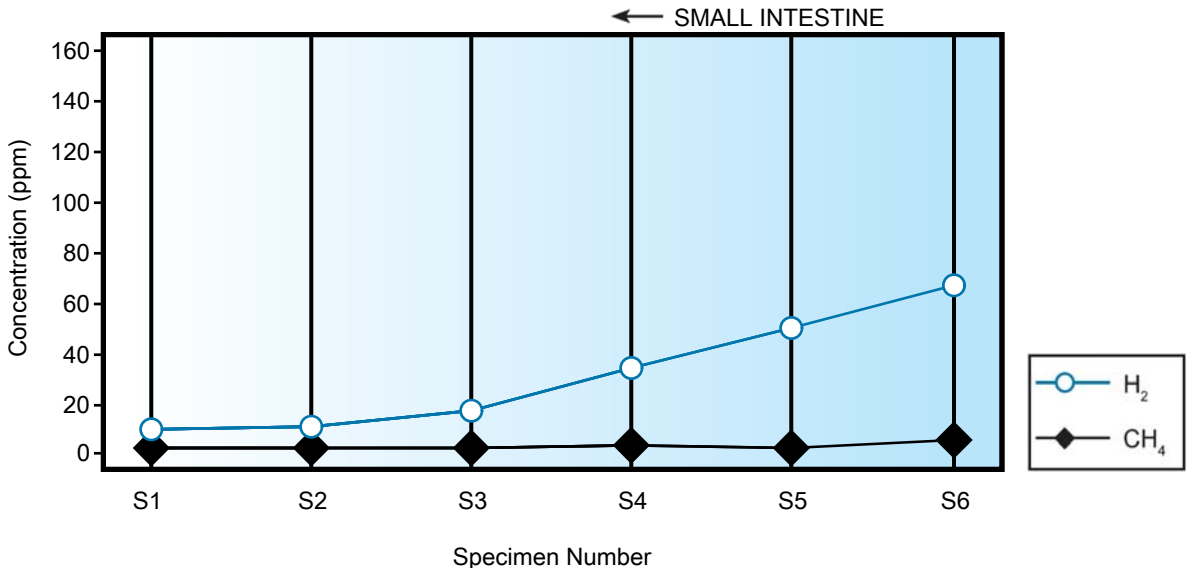
LABTESTSDIRECT
MAKING HEALTH ONLINE EASY

TEST PATIENT

Small Intestinal Bacterial Overgrowth (SIBO) 2 Hour- Breath

Methodology: GC-TDC/SSS

Hydrogen (H_2) and Methane (CH_4) Breath Gases



Hydrogen (H_2), Methane (CH_4), and Carbon Dioxide (CO_2) (ppm)						
	Baseline 0 min (S1)	20 min (S2)	40 min (S3)	60 min (S4)	90 min (S5)	120 min (S6)
H_2	9	10	16	33	49	66
CH_4	<2	<2	<2	3	<2	5
H_2 + CH_4	NR	NR	NR	36	NR	71
CO_2**	✓	✓	✓	✓	✓	✓
Actual Collection Times						
Actual Time	7:00	7:20	7:40	8:00	8:30	9:00
Actual Interval	0 min	20 min	40 min	60 min	90 min	120 min

**CO_2 is measured for quality assurance. ✓ indicates the CO_2 level is acceptable. X indicates room air contamination exceeding acceptable limits.

Evaluation for Hydrogen (H_2)

Hydrogen increase over baseline by 90 minutes

	Result		Expected Value
Change in H_2	40	H	<20 ppm

A rise of ≥ 20 ppm from baseline in hydrogen by 90 min should be considered a positive test to suggest the presence of SIBO.

Evaluation for Methane (CH_4)

Peak methane level at any point

	Result	Expected Value
CH_4 Peak	5	<10 ppm

A peak methane level ≥ 10 ppm at any point is indicative of a methane-positive result.

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Commentary

SIBO INTERPRETATION GUIDELINES

GENERAL CONSIDERATIONS FOR BREATH TESTING

Small intestinal bacterial overgrowth (SIBO) is a heterogeneous syndrome characterized by an increase in the number and/or the presence of atypical microbiota in the small intestine. NutriPATH's SIBO breath test relies on measurement of gases produced by microbiota in the intestine - hydrogen (H_2) and methane (CH_4) - following ingestion of lactulose in a fasting state.

A normal transit time of lactulose (10 g) in healthy fasting patients from the mouth to the junction between the small and large intestine (oro-cecal transit time, or OCTT) is approximately 90 minutes. In general, transit times have been found to vary in humans. Given such findings, transit time should be taken into consideration when interpreting breath testing.

To preclude elevated breath levels of hydrogen and methane prior to the ingestion of lactulose (at baseline), impeccable patient preparation and sample collection are imperative. Falsely elevated findings may result from incomplete avoidance of high-fiber foods, residual fiber in the intestine due to delayed transit time, residual oropharyngeal (mouth and throat) bacteria, exposure to tobacco smoke, or napping during collection.

LOW BREATH GASES -A breath test finding with no CH4 and low H2 throughout the entire test may to be due to an abundance of hydrogen sulfide (H_2S)-producing bacteria, which compete for available hydrogen for production of the H_2S gas.[1]

Commentary

EVALUATION FOR HYDROGEN (H_2)

In healthy humans, hydrogen gas is exclusively produced by intestinal bacteria - primarily a result of carbohydrate fermentation by anaerobic bacteria in the colon. In SIBO, fermentation of the malabsorbed lactulose substrate by bacteria residing in the small intestine results in elevated concentration of exhaled hydrogen (H_2).

A rise of H2 of ≥20 ppm over baseline in the first 90 minutes of testing is positive for SIBO.[1]

- A rise of H2 of ≥20 ppm over baseline in those samples collected after 90 minutes maybe positive for SIBO in patients with slower transit time or constipation.
- ELEVATED BASELINE - The clinical significance of elevated baseline H_2 levels in patients reporting adherence to fasting and dietary guidelines is not known. In a symptomatic patient, some clinical groups with expertise in SIBO management may consider an elevated hydrogen baseline a positive test.
- Approximately 8 to 27% of individuals do not produce H_2 due to the presence of methanogenic microbiota which consume hydrogen molecules to produce methane gas. As a result, low H_2 findings through all time points in a symptomatic patient may reflect a false negative result. In this instance, clinical attention should be shifted to evaluation of CH_4.

Commentary

EVALUATION FOR METHANE (CH_4)

Utilization of breath methane levels for SIBO assessment is controversial largely due to a lack of validation related to diagnostic specifics such as timing and magnitude of increase; however, CH_4 measurements are increasingly obtained to address other clinical questions. Recent evidence has associated CH_4 production with the pathogenesis of common clinical conditions, such as obesity, irritable bowel syndrome (IBS), and constipation.

> A peak methane level > 10 ppm at any point is indicative of a methane-positive result.

- The peer-reviewed literature suggests an association with certain clinical conditions and methanogen overgrowth at levels as low as 3 ppm, CH_4 values between 3 and 9 may indicate the need for clinical intervention in the symptomatic patient.
- ELEVATED BASELINE - An elevated baseline may be a more common pattern with CH_4 positive tests primarily due to the ability of methanogenic organisms to ferment in the absence of an ingested carbohydrate substrate.

Methane gas itself may slow intestinal transit, and patients with CH_4-predominant bacterial overgrowth have been found to be five times more likely to have constipation compared to individuals with H_2 - predominant overgrowth. Moreover, the severity of constipation has been found to directly correlate with the CH_4 level.

TOTAL HYDROGEN AND METHANE (H_2 + CH_4)

Prior to the 2017 North American consensus paper on breath testing, it was common to report a positive result for SIBO with a rise in the combined sum of H_2 and CH_4. The North American consensus group does not offer guidelines for a combined value. The combined values are provided for clinicians who wish to have it displayed in this manner.

CO_2

Carbon Dioxide (CO_2) is measured in every sample. CO_2 levels exceeding acceptable limits indicate room air contamination likely at the time of sample collection. If CO_2 levels exceed acceptable limits, sample integrity is questionable and results are designated as non-reportable (NR).

SAMPLE COLLECTION INFORMATION

Actual Time

The actual time of collection of samples is provided to enhance clinical interpretation. The actual times reported are utilized to determine the actual interval for comparison to the recommended interval.

Actual Interval

The actual interval can be compared to the recommended collection interval. If the recommended collection interval is not followed correctly, interpretation should be made within the context of the altered collection schedule. Generally, deviations of a few minutes will not significantly alter the interpretation.