

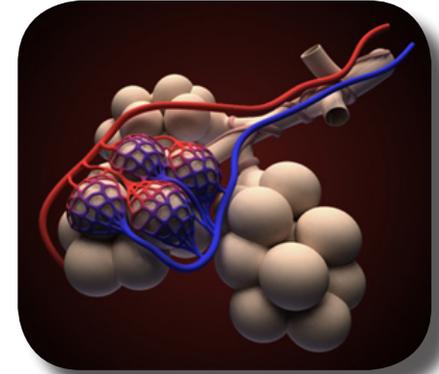
# Breath-Tests and Digestive Problems

“...improved analytical instrumentation and a greater understanding of its limitation have transformed the H<sub>2</sub> breath test from an investigative curiosity to a mainline clinical tool.”

- Noel W. Solomons, M.D., Current Concepts in Gastroenterology, Vol. 8/1: 30-34 and 37-40, 1983

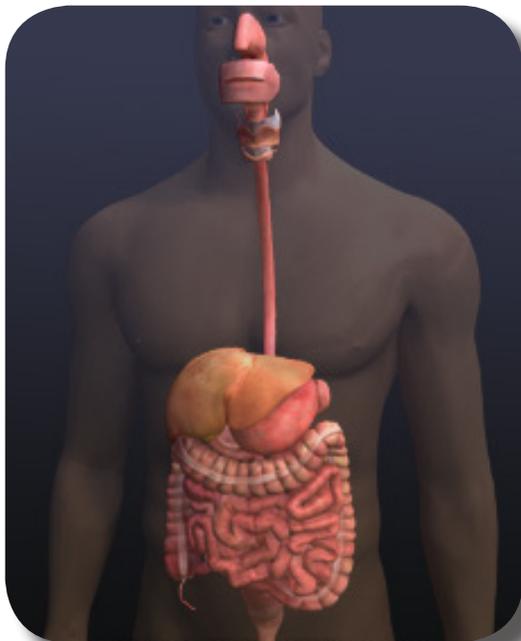
## WHAT DO BREATH-TESTS HAVE TO DO WITH DIGESTIVE PROBLEMS?

When some bacteria digest (or ferment) food substances, they produce acids, water and gases. The major gases which are produced by bacteria include, primarily, carbon dioxide (CO<sub>2</sub>), hydrogen (H<sub>2</sub>), methane (CH<sub>4</sub>) and small concentrations of aromatic gases. Carbon dioxide is produced by all cells during metabolism, but only bacteria can produce H<sub>2</sub> and CH<sub>4</sub> as metabolic by-products, and this is accomplished primarily by bacteria which thrive in the absence of oxygen (called anaerobic bacteria). So, if either H<sub>2</sub> or CH<sub>4</sub> are produced biologically, it tells us that some food substance is exposed to bacterial fermentation.



In the digestive tract, bacteria are normally limited to the colon. Most of the bacteria contained in food are killed by the acidity of the stomach, so the small intestine usually has few bacteria. In some conditions, called “bacterial overgrowth”, bacteria exist in high concentrations in the small intestine. Their presence in that area can interfere with the absorption of some vitamins and other essential foodstuffs, so it is important to diagnose the condition.

The colon is concerned with conserving water and salt by reabsorbing them from the luminal contents. However, the colon is involved in other functions, some of which depend on having a high bacterial-count.



Fiber, very popular in breakfast cereals, is not digested in the small intestine, so it undergoes bacterial fermentation in the colon. Short-chain fatty acids (SCFA) produced by that process are absorbed in the colon, and are beneficial to health. It is becoming apparent that substantial amounts of starch (10-20% of foods like legumes) escape digestion in the small intestine and are broken down in the colon, thus, adding to the efficiency of energy production by such foodstuffs.

In addition, colonic bacteria contribute to fecal bulk, and the short-chain fatty acids mentioned above reduce colonic pH. These factors may reduce the likelihood of diarrhea, confer some degree of protection against other severe colon problems, and enhance the colonic absorption of metal ions like calcium, magnesium and zinc. Thus, fermentation in the colon is normal, and it is important.

Gases which are produced in the colon are reabsorbed and equilibrated with the blood leaving that area. They appear in the lung and cross the capillary membrane into the alveoli, from which they are expired during breathing. The alveolar air can be collected with QuinTron collection devices and analyzed on BreathTracker or MicroLyzer instrumentation.

