

Vitalan Stool Diagnostics

Bile Acids – Not only Fat Digestion

What are Bile Acids ?

Bile Acids are derived from Cholesterol resp. Cholic Acid, divided into Primary (Cholic, Desoxycholic, Chenodesoxycholic, Lithocholic, all water soluble), Secondary (Primary conjugated with Glycine, Taurine, all fat soluble), Tertiary (Secondary conjugated with Ursine, solves Bilestones). The Total of 3-4 g of Bile Acids circulates 6 times/day through the Enterohepatic Cycle (Forming and Secretion by Liver, Sampling and Excretion by Gall Bladder, Fat Emulgation Activity in Duodenum and Jejunum, Resorption of 80% in Ileum, Elimination of 20% in Stool).

Gall Bladder Activity is regulated by Cholezystokinin, in strongly correspondance with Pancreas.

Influences on Enterohepatic Cycle are done by gut pH (inactivation of Bile under pH= 7), by gut Flora (inactivation by Bacteroides and Clostridia), by Food (binding by fiber), by low Resorption (Bile Loss Syndrome in Gut Inflammation), by high Secretion (Chologenic Diarrhea binding with Colestyramine), the liver have a high potential to compensate losses.

Fat Digestion

Fat Digestion takes place in 2 distinct phases: first the big fat drops (formed from Triglycerides) from ingested food are divided/emulgated in small fat drops by Bile Acids, second the small fat drops (Micelles) are divided in Glycerine and Fatty Acids by Lipase from Pancreas. Only these can be resorbed in Small Intestine. After Resorption they are resynthesised in Liver to Triglycerides, to be transported in blood to the Fat Tissue.

Bile Acids as Indicator

Bile Acids are a direct indicator of Liver Secretion, of Gall Bladder Function as well as a indirect indicator to judge the function of small intestine by their Resorption or by Fat Digestion.

Low levels indicates: low Choleresis (low Formation and/or Secretion by Liver Inactivity, Cirrhosis, Ikterus), Cholestasis (Dyskinesia, Spasm, Stenosis, Carcinoma, Stones, Parasites, Stress, Anovulants, Inflammation of Gall Bladder).

High levels indicates: bile malabsorption by Ileum Resection, Bypass, Inflammation (Allergy, Intolerance, SBOG, Radiation), Overstimulation (alcohol, coffee, cholagoga), Chologenic Diarrhea and Urticaria.

Clinical Symptoms

Bloating, Heartburn, Flatulency, Nausea, Constipation, Diarrhea, Abdominal Pain

Stool Analysis performs Total Bile Acids and Total Fat (resp. Pancreatic Elastase).

Further Diagnostics cover Enteropathogenic Bacteria, Parasites, Viruses, Yeast; Inflammation (Histamine for Food Intolerance, Serotonine for Food Allergy resp. Blood Diagnostics, Antigliadine, Calprotectine, M2PK, Environmental Burden, SBOG)

Differential Diagnosis of Steatorrhea

<i>Stool Fat</i>	<i>Bile Acids</i>	<i>Diagnosis</i>	<i>Therapy</i>
Normal Range < 3,5%	Normal Range 0,7-2,0	Physiological	No
Normal Range	Decreased <0,7	Bile Underfunction	Cholagoga *
Normal Range	Increased >2,0	Bile Overfunction	Cause Elimination **
Increased > 3,5%	Normal Range	Malnutrition	Nutrition Counseling
Increased	Decreased	Maldigestion	Cholagoga *
Increased	Increased	Malabsorption	Cause Elimination ***

Legend: * = e.g....., Further Diagnostics to clear Gall Bladder

** = Lowering Bile Stimulants (Alcohol, Coffee, Cholagoga, Stress)
Further Diagnostics to clear Gut Inflammation

*** = Nutrition Counseling, Further Diagnostics to clear Gut Inflammation

Therapy

Therapy consists mainly in Nutrition Counseling (lowering Fat consumption to 50-60 g/day) and clearing Cause (see "Indicator").

To raise low Bile Acids: intake of Choloretika, Cholagoga, Cholespasmolytika (e.g.....)

To lower high Bile Acids: intake of Bile Binder (e.g. Colestyramine).