SCHEER
GUT ESSENTIALS

Bile Flow

SUPPORTS HEALTHY STOMACH ACID PRODUCTION FOR OPTIMAL DIGESTION



A targeted blend of nutrients to support bile production, flow, and overall biliary health.

SUPPORTS BILE PRODUCTION & FLOW

PROMOTES FAT DIGESTION & ABSORPTION

SUPPORTS ENTEROHEPATIC CIRCULATION

Bile functions as the body's "detergent" emulsification and absorption of lipids, critical for fat digestion and assimilation. Bile is produced by the liver, and is temporarily stored in the gall bladder. Bile is released into the small intestine in response to hormones, such as cholecystokinin, when fat enters the intestine.

Bile consists of a mixture of bile salts, bile acids, cholesterol, bilirubin and phospholipids chiefly phosphatidylcholine. The ratio of individual lipids is critical to maintain a stable micellar concentration. The molar ratios are typically 5:15:80 for cholesterol/phosphatidylcholine/bile salts.

If the bile concentration becomes too high, cholesterol will precipitate and gallstones will form in the gall bladder, a condition known as cholelithiasis.

Bile Formation

Bile salts and acids represent oxidized derivatives of cholesterol. About 80% of the cholesterol in the body will eventually be disposed of as cholic acid. The primary bile acids, cholic acid and chenodeoxycholic acid, possess a carboxylic acid side chain which confers hydrophilic properties to the lipophilic sterol ring and creates detergent-like molecules.

The liver attaches taurine and glycine to bile acids to create bile salts (taurocholate or taurochenodeoxycholate and glycocholate or glycodeoxycholate, respectively). Bacterial enzymes in the colon can convert these to secondary bile acids, deoxycholate and lithocholate.

Bile and Digestion

Bile is needed for efficient uptake of oily nutrients (fats). When bile acids and bile salts first encounter ingested fats, they act as emulsifiers to create suspensions which can be broken down enzymatically.

The process involves several important steps:

1. The combined action of bile salts and pancreatic lipase initiates hydrolysis of triglycerides to free fatty acids and diglycerides, resulting in the formation of emulsions containing other lipid-soluble nutrients, including vitamins and carotenoids. The particle size of these emulsions ranges from 200 to 5,000 nm in diameter.

2. Lipase is then able to hydrolyze both di- and triglycerides to monoglycerides and free fatty acids. Lipase requires a smaller protein called colipase, another pancreatic product, to bind to triglycerides and activate the lipase.

3. Upon further release of bile salts, the lipid aggregates become smaller, from 3 to 10 nm in diameter. The normal endpoint of triglyceride digestion is a product containing 70% free fatty acid anions, 25% beta monoglycerides and 5% cholesterol.

Enterohepatic Circulation

Beets are a concentrated source of Betaine, which functions in the methylation of homocysteine, converting it into methionine and dimethylglycine.

An elevated level of homocysteine, termed homocysteinemia, is a risk factor for cardiovascular complications.

Dimethylglycine, in turn, functions as a methyl donor, thus aiding in both the detoxification and immune pathways.

References:

- Boyer JL. Bile formation and secretion. Comprehensive Physiology.
- Hofmann AF. The continuing importance of bile acids in liver and intestinal disease. Archives of Internal Medicine.
- Dawson PA, Karpen SJ. Intestinal transport and metabolism of bile acids. Journal of Lipid Research.
- Chiang JYL. Bile acid metabolism and signaling. Comprehensive Physiology.
- Ridlon JM, Kang DJ, Hylemon PB. Bile salt biotransformations by human intestinal bacteria. Journal of Lipid Research.
- Di Ciaula A, Garruti G, Lunardi Baccetto R, et al. Bile acid physiology. Annals of Hepatology.
- Day CR, Kempson SA. Betaine chemistry, roles, and potential use in liver disease. Biochimica et Biophysica Acta..

Enterohepatic Circulation

Bile salts do not cross the mucosal barrier into the lymphatic system but rather they are reabsorbed as micelles in the lower region of the small intestine.

Most of the bile salts released into the intestine are reabsorbed in the lower ileum where bacteria can reduce free bile acids to lithocholate and deoxycholate. The absorbed bile acids and salts are transported via the portal vein to the liver as complexes with serum albumin.

The liver efficiently extracts them, conjugates them with amino acids and again secretes them as bile, which is returned to the gall bladder to continue to aid digestion.

Bile salts are recirculated 2–3 times through the liver with each meal.

Supplement Facts

Serving Size: 2 Capsules

	Amount Per Serving
Proprietary Blend	**850 mg**
Ox Bile Extract *(Bovine)*	*
Pancrelipase *(Pancreas, porcine)*	*
Beet Extract *(Beta vulgaris) (root)*	*
Superoxide Dismutase (SOD) *(from vegetable culture)*	*
Catalase *(from vegetable culture)*	*

* Daily Value not established.

SUGGESTED USE: Two (2) capsules with meals or as otherwise directed by a healthcare professional.

Caution
Not recommended for pregnant or lactating women.
Keep Out of Reach of Children. Store in a cool, dry area. Sealed with an imprinted safety seal for your protection.

To place your order for **Bile Restore** or for additional information please contact us at:

supplements.rachelscheer.com