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Nutritional Support for Liver Detoxification

The liver is a vital accessory organ to the digestive system, as it manufactures bile, makes and breaks down hormones (cholesterol, oestrogen, testosterone), supports immunity, regulates blood sugar levels and processes all food, nutrients, alcohol, drugs that enter the blood stream.

Besides it's digestive and metabolic roles, it is a powerful **DETOXIFIER**. A multitude of toxins assault us daily. Some are derivatives of body processes, for example the formation of ammonia during protein metabolism. Some toxins we consume by choice such as pharmaceutical drugs, caffeine and alcohol. Then there are the toxins we breathe in and eat that are unknown to us, for example, pesticides, exhaust fumes, food additives and pollutants from paint and cleaning solutions. The liver works with the digestive, urinary and respiratory system to eliminate these toxins from the body and to keep them out of the blood.

Liver Detoxification occurs in a two-step process:

Phase 1 (or subtraction phase) - chemicals and hormones that are fat-soluble must first be converted to water-soluble molecules and are processed via a group of 100 different enzymes - collectively known as the cytochrome P450 system - where they work to subtract molecules from substances and break them up into smaller more useful units. After these enzymes have broken down some of the substances, some very toxic end products (metabolites) remain and they must quickly be shunted to the **phase 2** pathways in order to make them safer for the body to use. Heavy metals in particular can make these enzymes dysfunctional.

Phase 2 (or addition/conjugation phase) - where new substances are added or conjugated to the toxic and good metabolites produced in **phase 1** in order to make them easier to transport, more stable and/or more functional for the body. This is achieved by seven pathways (seen below) where particular enzymes are available for the addition of a 'special substance' to create a new safer substance. These are mostly amino acids like glycine and taurine, and other substances, like glutathione, sulphate, and methyl.

Conjugation pathways:

- Glycine
- Taurine
- Glutathione
- Sulphation
- Methylation
- Glucoronidation
- Acetylation

Once they are processed into small enough bi-products that are water-soluble, they can be eliminated through the kidneys, and any larger ones are excreted in the stool.

Many of the inflammatory conditions like chronic fatigue, headaches, arthritis, cardiovascular disease and premature ageing can be linked to an overload of toxins and a sluggish / poorly functioning liver. As it one of the most overworked organs, optimum nutrition is required to enable the liver to detoxify efficiently. **So how can we support it?**

Decrease toxic load from the intestines

To help decrease the toxic load for the liver to deal with it is important to eat a healthy balanced diet that is; low in refined carbohydrates & saturated fats; high in fibre and lean protein, omega fats and full of plant matter. Prebiotic & Probiotic foods are also key, as having healthy gut flora is a vital part of detoxification.

Endogenous antioxidants (made by our body)

Your body makes five types of endogenous antioxidants: superoxide dismutase, also called SOD, alpha lipoic acid, or ALA, coenzyme Q10, or CoQ10, catalase and glutathione peroxidase. SOD, catalase and glutathione peroxidase are the three most important of these because the body can produce more of them when certain free radicals are present. However, it is vital that we consume

Foods that support in liver detoxification

- **A significant amount of energy** is required for detoxification, therefore we need a good supply of **B-vitamins:** From: yeast, wholegrains, green leafy vegetables, nuts, wheatgerm, animal products, such as meat, fish and eggs for B12.

- **Brassicas:** Provide phytonutrients like indoles that stimulate phase 1: cabbage, broccoli, brussel sprouts etc.

- **Limonene** containing foods that induce phase 1 & 2: found in oranges, tangerines (but not grapefruit), caraway and dill seeds.

- **Antioxidant support** – Vitamins C, E, bioflavonoids, carotenoids, glutathione and selenium are essential for protecting the liver from the free radicals produced during the neutralisation of toxins.
    - **Carotenoids** – Beta-carotene. Best to obtain from dietary sources, rich and varied diet of fruit and vegetables should provide an adequate supply.
    - **Bioflavonoids** – found mainly in fruit, vegetables, legumes and tea.
    - **Vitamin C** – Protects fats and cell membranes from oxidative damage. Co-factor in both Phase I and Phase II detoxification. Found in peppers, cabbage, tomatoes, green leafy vegetables, oranges, blackcurrants etc.
    - **Vitamin E** – olive oil, wheatgerm, nuts, seeds, avocadoes.
    - **Selenium** – Brazil nuts, oysters, fish, seeds, chicken and mushrooms.

- **Include adequate amounts of protein-rich foods** in the diet. These provide the amino acids required for Phase II detoxification. From: Lean meat, fish, dairy produce, eggs, beans, pulses, nuts, and seeds.

- **Glutathione**: is a potent antioxidant and required by the Phase II glutathione conjugation detoxification pathway. Found in: Fresh fruit and vegetables, walnuts, dairy, cooked fish and meat.

- **Sulphur-containing** foods help stimulate Phase II detoxification. Found in: Egg yolks, red peppers, garlic, onions, broccoli, brussel sprouts.

- **Bi-functional support for detoxification** - Substances that do this support optimal activity of both Phase I and Phase II. Several phytonutrients have been found to do this:
    - **Ellagic Acid:** found in pomegranate and many berries.
    - **Catechins:** found in green tea and grapes. Green tea catechins have also been shown to promote healthy microflora, pH and bowel function.