

ROLE OF LIVER ENZYMES FOR A HEALTHY LIFE : A REVIEW

Nilani.P, Amber.S, Arshal.M, Duraisamy.B, Damodaran.P

ADDRESS JSS COLLEGE OF PHARMACY, Off Campus of JSS University, Rocklands, Ootacamund, Tamilnadu.

Author for communication :- Dr. Nilani.P Assistant Professor, Department of Pharmacognosy, JSS College of pharmacy, Rocklands, Ootacamund, Tamilnadu 643001. Email: p.nilani@jsscpooty.org

The liver is the body's most important organ after the heart, performing many important functions including metabolism, detoxification and formation of important compounds including blood clotting factors. It also filters, regulates and stores blood. Stress, poor diet, and over-medication are common problems which may lead to stress and functional damage to the liver. As a result, it may affect memory, sleep, thyroid, body weight and other body functions.

The human liver contains thousands of enzymes, which are special types of protein cells that help necessary chemical reactions to take place. Liver enzymes trigger activity in the body's cells, speeding up and facilitating naturally occurring biochemical reactions, and maintaining various metabolic processes within the liver. A wide range of health problems can lead to elevated liver enzymes. Some common causes include, Adrenal insufficiency (inadequate levels of hormones released by the adrenal gland), Alcohol abuse, Autoimmune disorders of the liver and bile ducts, such as autoimmune hepatitis, Celiac disease, Diabetes, Elevated triglycerides (fat tissues) and infections such as viral hepatitis and mononucleosis. Several conditions are linked with elevated liver enzyme levels, including hepatitis, cirrhosis, nonalcoholic fatty liver disease, adverse reactions to medication and obesity. Physicians can detect elevated liver enzyme levels through several liver function tests. Several causes and diseases can be at the root of elevated liver enzyme levels, so it is important to consult a physician to determine the best treatment plan. However, in some instances, elevated liver enzyme level can be lowered with natural treatments.

Liver Enzymes Four separate liver enzymes are included on most routine laboratory tests. They are aspartate aminotransferase (AST or SGOT) and alanine aminotransferase (ALT or SGPT), which are known together as transaminases and alkaline phosphatase (AP) and gamma-glutamyl transferase (GGT), which are known together as cholestatic liver enzymes. Elevations of these enzymes can indicate the presence of liver disease.

Liver enzyme functions

An elevated liver enzyme reading may be an indication of a liver disorder, damage to liver cells, or an obstruction to the biliary tract (gallbladder and bile ducts). This list of enzymes and their functions outlines possible indications when elevated amounts of liver enzymes are detected: Alanine transaminase (ALT): An enzyme that helps metabolize protein. When the liver is damaged, ALT is released in the bloodstream. An increase in ALT levels may indicate hepatocellular disease, active cirrhosis, metastatic liver tumor, infection or toxic hepatitis, severe burns, pancreatitis, myocardial infarction (heart attack), trauma, severe burns, acute hemolytic anemia, crushing injuries, gangrene or shock. Alkaline phosphatase (ALP): An enzyme needed in small amounts to trigger specific chemical reactions. Normally present in the liver, bone, kidney, and intestine, higher than normal levels may indicate disorders as common as gallstone disease, alcohol abuse, and drug-induced hepatitis, or in less common disorders, such as primary biliary cirrhosis or biliary tumors. Aspartate transaminase (AST): This enzyme plays a role in the metabolism of the amino acid alanine. An increase in AST levels may indicate hepatocellular disease, active cirrhosis, metastatic liver tumor, infection or toxic hepatitis, severe burns, pancreatitis, myocardial infarction (heart attack), trauma, severe burns, acute hemolytic anemia, crushing injuries, gangrene or shock. Gamma-glutamyl transferase (GGT): The GGT enzyme plays a role in metabolism, specifically in the transference of certain chemical groups from one molecule to another. Higher than normal levels may indicate liver or bile duct injury. Lactate dehydrogenase (LDH): An enzyme found in blood and body tissues, LDH is involved in energy production in cells. Elevated levels of LDH may indicate liver damage. Albumin is another protein made in liver. An albumin test measures how well the liver is making the proteins that the body needs. Low albumin levels can be a sign of liver damage. Albumin also helps the immune system fight infections. Bilirubin is a yellow fluid made in the body when red blood cells break down. A bilirubin test measures the level of bilirubin in the blood. If liver is damaged, bilirubin can leak out of the liver into blood and urine and can cause jaundice .

Testing elevated liver enzymes

Having elevated liver enzymes is not an indication of a specific liver disease. It is not uncommon to have elevated liver enzymes, in order to determine the underlying cause, additional tests are usually necessary including physical Examination, Ultrasound, CAT scan (computed axial tomography), Liver Biopsy and Liver Blood tests . Much can be done to help lower your elevated liver enzymes naturally, including dietary changes, herbal cleanses and probiotic supplementation. Treating Elevated Liver Enzymes Liver enzymes normally remain within the cells of the liver. When there is trouble with the liver, these enzymes spill over into the bloodstream and are detected with a liver enzyme lab test. There are many things that can stress the liver and raise the enzyme levels. Medications such as antibiotics, cholesterol-lowering drugs, pain relievers, infections, obesity, alcohol and diabetes are a few of the most common causes of elevated liver enzymes. Fortunately, changing our association with these stressors can also reduce the elevated liver enzymes. The first step is to determine what is causing elevated liver enzymes and to treat elevated liver enzyme levels is to properly diagnose the underlying cause by consulting with a Physician. Certain prescription and over-the-counter medications can cause negative consequences to the liver. Alcohol is processed in the liver and can be very damaging if abused. Discontinue drinking alcohol is advisable. Obesity has been linked to liver damage. One can lower elevated liver enzymes through moderate weight loss. Following the steps below will lower enzyme levels and help strengthen the liver. Discontinue over-the-counter medications. Medications, even over-the-counter, raise liver enzyme levels and interfere with liver function. Consult the physician about discontinuing prescription drugs until liver enzyme levels are under control, especially cholesterol-lowering drugs, which have a greater negative impact on the liver. Reduce consumption of fatty foods and increase portions of fresh fruits and vegetables, which have high levels of antioxidant vitamins that help the liver fight toxins. Exercise daily. Adding a simple, brisk walk daily routine which will improve blood circulation. The liver needs a continual fresh supply of blood to bring it nutrients that are needed for it to function well.

Avoid, or strictly limit, alcohol consumption. Drink alcohol daily can cause a significant rise in liver enzymes. Drink more water. Water helps flush toxins out of the body, and toxins can bog down the liver and impair its function. Consider a liver detoxification program. A liver detoxification program treats elevated liver enzymes through

colonics, enemas, changes in diet and herbal supplements. Seek a doctor for prescription medication. If liver enzyme levels are not controlled naturally, and they will help to lower liver enzyme levels and treat the underlying cause.

Liver And Colon Are Related

These organs work hand in hand to keep your entire body functioning at peak performance levels. Colon and liver share a blood supply which runs throughout the entire portal system. Good digestive health is vital to overall health and wellness. Eating foods that are friendly towards digestive system is of vital importance.

Herbal Supplements - Lowering your elevated liver enzymes naturally

***(This information should not be used as medical advice)**

High enzymes can be treated with herbal supplements and many research work had been done in this field to confirm the effect of herbal supplements in treating higher enzyme levels. Some of the recommended and reported supplements are listed below:

Alpha Lipoic Acid , Green Tea , Fish - sardines, Almonds, Spinach Blueberries, Green tea, Whey protein, Whole grain breads (not enriched wheat),Cranberries, Soybeans, Walnuts, Pumpkin seeds , Tomato ,Oats, Garlic, Broccoli, Carrots, Grapefruit, Beans and Olive oil.

Treatment for elevated liver enzymes can also involve Milk thistle (silymarin) is one popular option. It should not be used excessively, and the individual should also consider any contraindications (for existing medical conditions, other herbs, or medicines, etc.) as well as possible side effects. More than 120 scientific studies have shown that milk thistle extract regenerates, regulates and strengthens liver functions. Because free radicals attack the liver, primarily the fat tissue in the liver, the antioxidant qualities of milk thistle are extremely beneficial. Milk thistle stimulates your body to produce superoxide dismutase, which is one of two primary antioxidants the body can manufacture. Garlic lowers harmful LDLs (low-density lipoproteins) and triglycerides (blood fats) and aids in cancer prevention by raising the body's level of glutathione transferase, a liver enzyme known to detoxify the body of carcinogens.

Conclusion

Nutrition, balanced diet and positive life style are vital importance for a healthy liver. 80-90% of the blood leaving the stomach and intestines carries nutrients to the liver. The liver then has to detoxify and further convert these nutrients into substances which the body can readily utilize. The healthier the food we consume, the less detoxification and converting the liver has to do. Therefore, the liver can remain healthier naturally.

According to many physicians as well as the National Liver Foundation and Dr Sandra Cabot an optimal diet for a healthy liver includes:

Plenty of fruits and vegetables

A Balanced Diet with a fat : carbohydrate : protein ratio of 30 : 50 : 20

Plenty of fluids

Diet with antioxidants

Avoid -processed foods , fried foods and alcohol.

Cleanse the liver at least twice a year

Participation in a moderate daily exercise program

Learning to distress or positive life style via deep breathing and meditation.

Normal Liver Function Levels.

Test Class	Specific Liver Enzyme	Test Results
Normal Test Results	ALT	7 to 55 units per liter (U/L)
	AST	8 to 48 U/L
	Albumin	3.5 to 5.0 grams/deciliter

		(g/dL)
	Bilirubin	0.1 to 1.0 mg/d
Mild/Moderate Elevation	ALT	56 to 105 units per liter (U/L)
	AST	50 to 125 U/L
	Albumin	3.5 to 5.0 grams/deciliter (g/dL)
	Bilirubin	1.0 to 2.0 mg/dL
Severe Elevation	ALT	110 to 350+ units per liter (U/L)
	AST	130 to 250+ U/L
	Albumin	10+ grams/deciliter (g/dL)
	Bilirubin	2.5+ mg/dL

Note: These values are not the sole indicators to diagnose liver disease, liver damage or liver disorders. The entire clinical picture must be examined as well as the results of these tests by consulting a Physician.

References

1. Anderson, F. H., Lecheng, Z., Rock, N. R. and Yoshida, E. M. (2000) An assessment of the clinical utility of serum ALT and AST in chronic hepatitis C. *Hepatology Research* 18, 63–71.
2. Cadiot, G., Ink, O., Boutron, A., Hanny, Ph., Laurent-Puig, P. and Buffet, C. (1989) Mitochondrial aspartate aminotransferase in nonalcoholic cirrhosis. *Gastroenterology* 97, 240–241.
3. Cohen, J. A. and Kaplan, M. M. (1979) The SGOT/SGPT ratio—an indicator of alcoholic liver disease. *Digestive Diseases and Sciences* 24, 835–838.

4. Conigrave, K. M., Degenhardt, L. J., Whitfield, J. B., Saunders, J. B., Helander, A. and Tabakoff, B. (2002) CDT, GGT, and AST as markers of alcohol use: The WHO/ISBRA collaborative project. *Alcoholism: Clinical and Experimental Research* 26, 332–339
5. Giannini, E., Risso, D. and Testa, R. (2001) Transportability and reproducibility of the AST/ALT ratio in chronic hepatitis C patients. *The American Journal of Gastroenterology* 96, 918–919.
6. Imperial, T. F., Said, A. T., Cummings, O. W. and Born, L. J. (2000) Need for validation of clinical decision aids: Use of the AST/ALT ratio in predicting cirrhosis in chronic hepatitis C. *The American Journal of Gastroenterology* 95, 2328–2332.
7. Reedy, D. W., Loo, A. T. and Levine, R. A. (1998) AST/ALT ratio ≥ 1 is not *diagnostic of cirrhosis in patients with chronic hepatitis C*. *Digestive Diseases and Sciences* 9, 2156–2159.
8. Williams, A. L. B. and Hoofnagle, J. H. (1988) Ratio of serum aspartate to alanine aminotransferase in chronic hepatitis; relationship to cirrhosis. *Gastroenterology* 95, 734–739.
9. *A Barefoot Doctor's Manual*, the American translation of the official Chinese Paramedical Manual, Running Press, Philadelphia (1990).
10. Neufeld, W.P., MD *The Liver Causes Heart Attack*, Morning Dawn Publishing Company, Surrey, B.C., Canada (1987).