

# GLUCOPROTECT

FORMULA  
for Protection  
against Glycosylation

*L-carnosine | Alpha-lipoic acid | Thiamine (Vitamin B1)*



*Dietary Supplement*

60 tablets



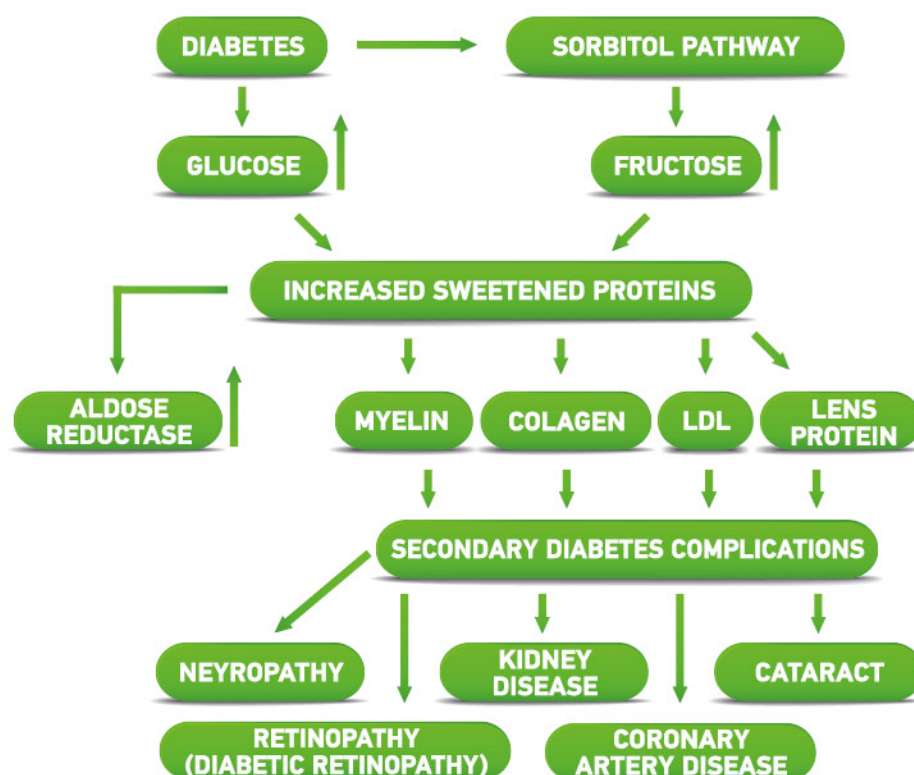
# The consequences of diabetes

The consequences of uncontrolled diabetes vary. Some of the most important are **blindness, renal impairment**, increased risk for the development of **heart disease** and **painful damage of the peripheral nerves**. It is very important for diabetic patients (and those predisposed to diabetes) to understand the ways in which blood glucose causes damages with the purpose to take precautions and inhibit these processes.

The most well-known process is glycation (namely, sugar molecules reacting with proteins to produce non-functional body structures). **Protein glycation entails great risk for the whole body** and it is a **key feature of diabetes complications** (i.e. nerve damage, heart attack and blinding).

Glycation process plays a key role to the damage caused by diabetes. Glycation takes place when glucose interacts with proteins resulting to protein damage from sugars, which are called Advanced Glycation End Products. A very well-known advanced glycation end-products among diabetic patients is **glycosylated / glycated hemoglobin (HbA1c)**.

**HbA1c** emerges when glucose molecules attach to the hemoglobin in blood cells. **Glycosylated proteins** may harm cells in multiple ways including alterations in cellular function, which stimulates the production of inflammatory cytokines.



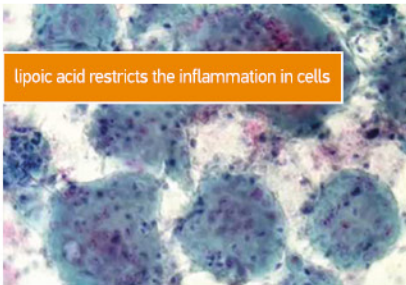
## Inhibition of glycosylation

protects against damages to the kidneys, the nerves and the eyes. A large study on humans showed that every 1% reduction in **HbA1c** reduces the risk for diabetes complications by 21%, diabetes-related deaths by 21%, heart attacks by 14%, and microvascular complications by 37%.

In consonance with studies, **diabetes** causes white blood cells bind to endothelium (namely, to the thin layer of cells inside the arteries). These white blood cells induce local release of proinflammatory chemicals that damage endothelium and accelerate atherosclerosis. Diabetes is closely related to severe coronary artery disease with an increased risk of heart attack. 4 to 6 % of hemoglobin is glycosylated hemoglobin, which corresponds to the average blood glucose between 60 and 120mg/dL.

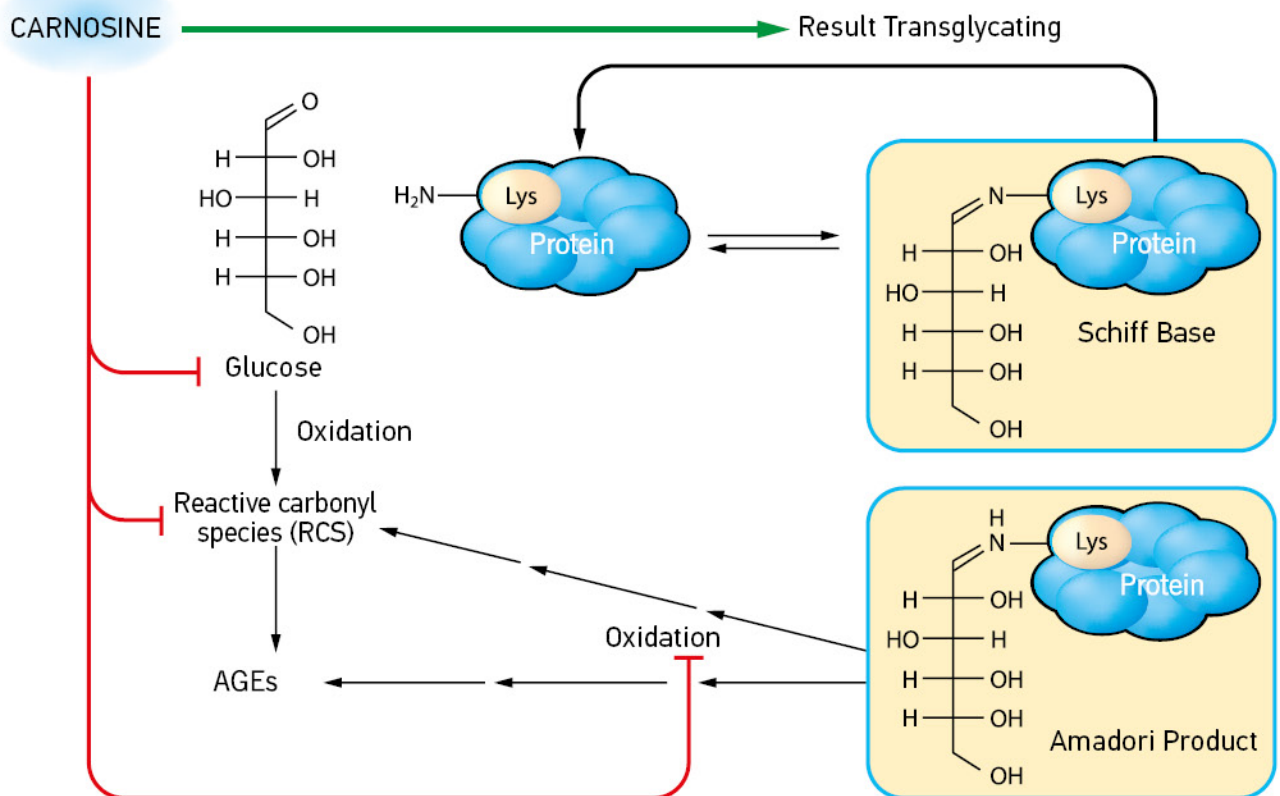
# Glucoprotect Formula

Thanks to its composition of **lipoic acid**, carnosine and thiamine, **GLUCOPROTECT** deals with glycosylation and limits the formation of AGE (Advanced Glycation End Products).



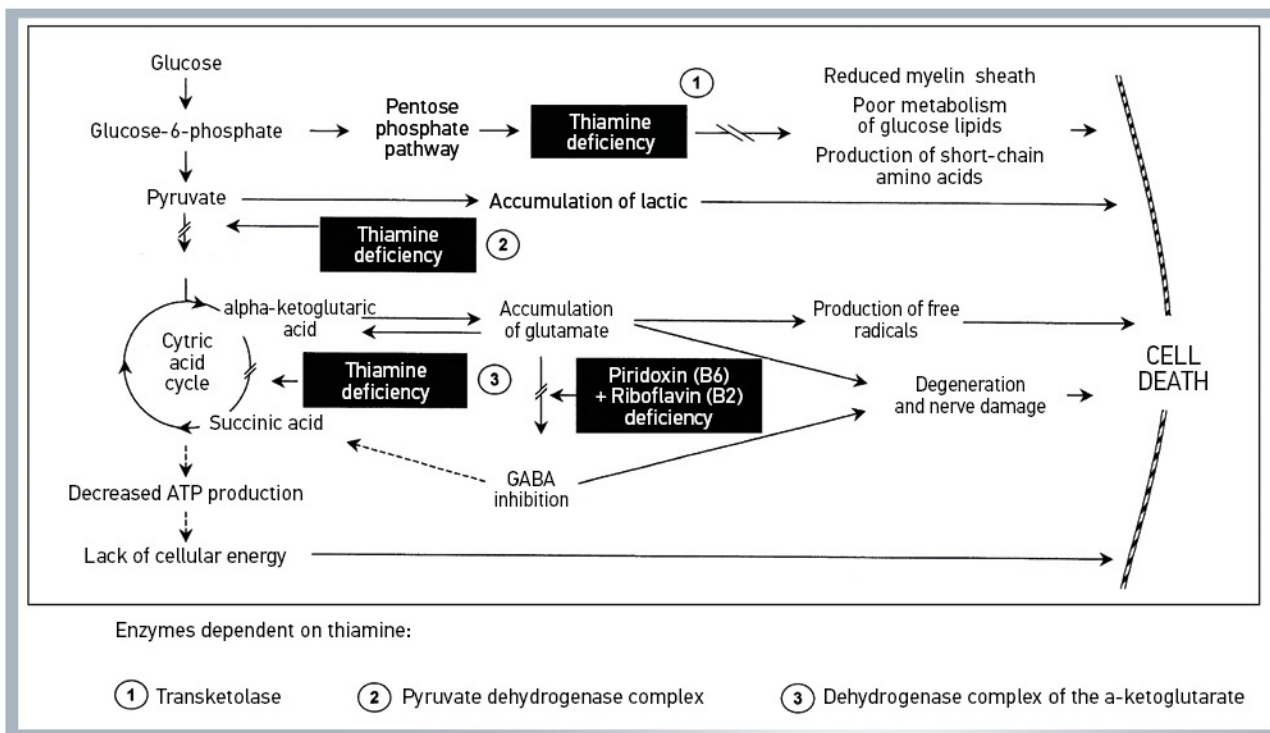
As a powerful antioxidant with double nature (lipophilic and hydrophilic) **lipoic acid** limits oxidation and protects the sensitive body structures that are being harmed.

**Carnosine** is an inhibitor of glycosylation that reduces the formation of AGE. Studies have shown that there is less amount of carnosine in the cells of diabetic patients, just like in those of the older people.



Chronic hyper glycaemia in patients with diabetes mellitus contributes to pathogenesis of microvascular disease. Vascular damage that relates to diabetes may affect the heart (cardiomyopathy), the kidneys (nephropathy/kidney disease), retina (retinopathy), and the peripheral nervous system (neuropathy). In diabetic patients, hyper glycaemia alters the function of bone marrow-derived endothelial progenitor cells (EPC), which are vital to the growth of blood cells. It is of interest to note, that a higher daily intake of **thiamine** from nutrition has been associated with higher EPC circulation and healthier vascular endothelial in 88 patients with type 2 diabetes mellitus.

An inverse correlation has also been shown between **thiamine** concentrations in blood in diabetic patients and the presence of the soluble vascular cell adhesion molecule -1 (sVCAM-1), as a marker of vascular dysfunction. Early indicators of diabetic nephropathy include the presence of serum albumin in urine, which is known as microalbuminuria.



COMPOSITION IN ACTIVE INGREDIENTS	Per daily dose (1 tab)	% RDA
L-Carnosine	250mg	
α-Lipoic Acid	200mg	
Thiamine (B1)	25mg	2272,23%

**IT IS INDICATED FOR**  
● protection against glycosylation / glycation.

**DOSAGE**  
● Take 1 tablet daily (after meal).

**Bibliography:** 1. Ametov AS, Barinov A, et al. The sensory symptoms of diabetic polyneuropathy are improved with alpha-lipoic acid: The SYDNEY trial. *Diabetes Care*. 2003 Mar;26(3):770-6. 2. Cameron NE, Cotter MA, et al. Effects of alpha-lipoic acid on neurovascular function in diabetic rats: Interaction with essential fatty acids. *Diabetologia*. 1998 Apr;41(4):390-9. 3. Doggrell SA. Alpha-lipoic acid, an anti-obesity agent? *Expert Opin Investig Drugs*. 2004 Dec;13(12):1641-3. 4. Hipkiss AR. Glycation, ageing and carnosine: are carnivorous diets beneficial? *Mech Ageing Dev*. 2005 Oct;126(10):1034-9. 5. Jakus V. The role of nonenzymatic glycation and glyco-oxidation in the development of diabetic vascular complications. *Cesk Fysiol*. 2003 May;52(2):51-65. 6. Janssen B, Hohendorf D, et al. Carnosine as a protective factor in diabetic nephropathy: Association with a leucine repeat of the carnosinase gene CNDP1. *Diabetes*. 2005 Aug;54(8):2320-7. 7. Kawabata T, Packer L. Alpha-lipoate can protect against glycation of serum albumin, but not low density lipoprotein. *Biochem Biophys Res Commun*. 1994 Aug 30;203(1):99-104. 8. Lee YT, Hsu CC, Lin MH, Liu KS, Yin MC. Histidine and carnosine delay diabetic deterioration in mice and protect human low density lipoprotein against oxidation and glycation. *Eur J Pharmacol*. 2005 Apr 18;513(1-2):145-50. 9. Lum H, Roebuck KA. Oxidant stress and endothelial cell dysfunction. *Am J Physiol Cell Physiol*. 2001 Apr;280(4):C719-C741. 10. McFarland GA, Holliday R. Retardation of the senescence of cultured human diploid fibroblasts by carnosine. *Exp Cell Res*. 1994 Jun;212(2):167-75. 11. Melhem MF, Craven PA, et al. Alpha-lipoic acid attenuates hyperglycemia and prevents glomerular mesangial matrix expansion in diabetes. *J Am Soc Nephrol*. 2002 Jan;13(1):108-16. 12. Nagamatsu M, Nickander KK, et al. Lipoic acid improves nerve blood flow, reduces oxidative stress, and improves distal nerve conduction in experimental diabetic neuropathy. *Diabetes Care*. 1995 Aug;18(8):1160-7. 13. Pfister F, Riedl E, Wang Q, et al. Oral carnosine supplementation prevents vascular damage in experimental diabetic retinopathy. *Cell Physiol Biochem*. 2011;28(1):125-36. 14. Rashid I, van Reyk DM, Davies MJ. Carnosine and its constituents inhibit glycation of low-density lipoproteins that promotes foam cell formation in vitro. *FEBS Lett*. 2007 Mar 6;581(5):1067-70. 15. Suzuki YJ, Tsuchiya M, et al. Lipoate prevents glucose-induced protein modifications. *Free Radic Res Commun*. 1992;17(3):211-7. 16. Yan H, Harding JJ. Carnosine protects against the inactivation of esterase induced by glycation and a steroid. *Biochim Biophys Acta*. 2005 Jun 30;1741(1-2):120-6. 17. Ziegler D, Gries FA. Alpha-lipoic acid in the treatment of diabetic peripheral and cardiac autonomic neuropathy. *Diabetes*. 1997a Sep;46 Suppl 2:S62-S66. 18. Ziegler D, Schatz H, et al. Effects of treatment with the antioxidant alpha-lipoic acid on cardiac autonomic neuropathy in NIDDM patients: A 4-month randomized controlled multicenter trial (DEKAN Study). *Deutsche Kardiologie Autonome Neuropathie*. *Diabetes Care*. 1997b Mar;20(3):369-73. 19. Wong CY, Qiuwaxi J, Chen H, et al. Daily intake of thiamine correlates with the circulating level of endothelial progenitor cells and the endothelial function in patients with type II diabetes. *Mol Nutr Food Res*. 2008;52(12):1421-1427. (PubMed) 20. Rabbani N, Alam SS, Riaz S, et al. High-dose thiamine therapy for patients with type 2 diabetes and microalbuminuria: a randomised, double-blind placebo-controlled pilot study. *Diabetologia*. 2009;52(2):208-212. (PubMed) 21. Babaei-Jadidi R, Karachalias N, Ahmed N, Battah S, Thornalley PJ. Prevention of incipient diabetic nephropathy by high-dose thiamine and benfotiamine. *Diabetes*. 2003;52(8):2110-2120. (PubMed)

**PRECAUTIONS** • The product should not be taken in the following cases: (1) Hypersensitivity to α-lipoic acid or L-Carnosine or thiamine (B1). (2) If you are taking medication for blood sugar and /or use insulin, you should check your blood sugar levels of ten in order to avoid hypoglycemia. • Do not exceed the recommended daily dose. • Dietary supplements should not be used as a substitute of a balanced diet. • Keep away from young children. • This product is not intended for the prevention, cure or treatment of a human disease. • Consult with your doctor if you are pregnant, breast-feeding, taking pharmaceutical treatment or having health problems.

**Notification number of the EMEA:** 11359 / 12-2-2015 / Medicines Agency (EMA) does not serve as a distribution permit from the European Medicines Agency (EMA)