

Clinical Reference Guide

TriJuvinate™

Hyaluronic Acid

A. Oral and topical use of Hyaluronic Acid for joint, skin or eye structure and function

1. Altman RD. Intra-articular sodium hyaluronate in osteoarthritis of the knee. *Semin Arthritis Rheum* 2000;(30)2 Suppl(1):11-18..
2. Altman RD. Status of hyaluronan supplementation therapy in osteoarthritis. *Curr. Rheumatol Rep* 2003;5(1):7-14.
3. CPN Laboratories, Czech Republic. Unpublished.
4. <http://www.dotrichardson.com>. Accessed 1/20/04.
5. <http://www.glycoforum.gr.jp/science/hyaluronan/HA01/HA01E.html>.
6. <http://www.horse-journal.com>. Vol. 9, No. 5, May 2, 2002.
7. <http://www.uku.fi/laitokset/anat/PG/hs.htm>. Accessed 1/18/04.
8. <http://www.usat-ntc.com>. Accessed 1/20/04.
9. Magilavy D, Polisson R, Parenti D. Re: Karlsson et al. Comparison of two hyaluronan drugs and placebo in patients with knee steoarthritis. A controlled, randomized, double-blind, parallel-design multicentre study. *Rheum.* 2003;42:1262.
10. Meyer K, Palmer JW. The polysaccharide of the vitreous humor. *J. Biol. Chem.* 1934;107:629-634.
11. Petrella, RJ, DiSilvestro MD, Hildebrand C. Effects of hyaluronate sodium on pain and physician functioning in osteoarthritis of the knee:A randomized, double-blinded, placebo-controlled clinical trial. *Arch Intern Med* 2002;162(3):292-298.
12. Pierce, SW. Rood and Riddle Equine Hospital, Lexington, KY. Unpublished.
13. Sardi, Bill. Knowledge of Health, San Dimas, CA. Unpublished.
14. Wobig M, Bach G, Beks P, Dickhut A, Runzheimer J, Schwieger G, Vetter G, Balazs E. The role of elastoviscosity in the efficacy of viscosupplementation for osteoarthritis

of the knee: a comparison of hylan G-F 20 and a lower-molecular-weight hyaluronan. *Clin Ther.* 1999 Sep;21(9):1549-62.

Gamma Tocopherol

A. Skin structure and function, aging, inflammation, antioxidant activity, immune modulation

1. Ames BN, Shigenaga MK, Hagen TM. Oxidants, antioxidants, and the degenerative diseases of aging. *Proc Natl Acad Sci U S A* 1993;90:7915–22.
2. Bieri JG, Evarts RP. Gamma-Tocopherol: metabolism, biological activity and significance in human vitamin E nutrition. *Am J Clin Nutr* 1974;27:980–6.
3. Brown AJ. Acute effects of smoking cessation on antioxidant status. *Nutr Biochem* 1996;7:29–39.
4. Burton GW, Traber MG, Acuff RV, et al. Human plasma and tissue alpha-tocopherol concentrations in response to supplementation with deuterated natural and synthetic vitamin E. *Am J Clin Nutr* 1998;67:669–84.
5. Carr A, Frei B. The role of natural antioxidants in preserving the biological activity of endothelium-derived nitric oxide. *Free Radic Biol Med* 2000;28:1806–14.
6. Chatelain E, Boscoboinik DO, Bartoli GM, et al. Inhibition of smooth muscle cell proliferation and protein kinase C activity by tocopherols and tocotrienols. *Biochim Biophys Acta* 1993;1176:83–9.
7. Christen S, Hagen TM, Shigenaga MK, Ames BN. Chronic inflammation, mutation, and cancer. In: Parsonnet J, ed. *Microbes and malignancy: infection as a cause of human cancers*. New York: Oxford University Press, 1999:35–88.
8. Christen S, Woodall AA, Shigenaga MK, Southwell-Keely PT, Duncan MW, Ames BN. Gamma-tocopherol traps mutagenic electrophiles such as NO(X) and complements alpha-tocopherol: physiological implications. *Proc Natl Acad Sci U S A* 1997;94:3217–22.
9. Cooney RV, Franke AA, Harwood PJ, Hatch-Pigott V, Custer LJ, Mordan LJ. Gamma-Tocopherol detoxification of nitrogen dioxide: superiority to alpha-tocopherol. *Proc Natl Acad Sci U S A* 1993;90:1771–5.
10. Cooney RV, Harwood PJ, Franke AA, et al. Products of gamma-tocopherol reaction with NO₂ and their formation in rat insulinoma (RINm5F) cells. *Free Radic Biol Med* 1995;19:259–69.

11. Food and Nutrition Board, Institute of Medicine. Dietary reference intakes for vitamin C, vitamin E, selenium and carotenoids. Washington, DC: National Academy Press, 2000:186–283.
12. Giovannucci E. Gamma-Tocopherol: a new player in prostate cancer prevention? *J Natl Cancer Inst* 2000;92:1966–7.
13. Goss SP, Hogg N, Kalyanaraman B. The effect of alpha-tocopherol on the nitration of gamma-tocopherol by peroxynitrite. *Arch Biochem Biophys* 1999;363:333–40.
14. Helzlsouer KJ, Huang HY, Alberg AJ, et al. Association between alpha-tocopherol, gamma-tocopherol, selenium, and subsequent prostate cancer. *J Natl Cancer Inst* 2000;92:2018–23.
15. Hoglen NC, Waller SC, Sipes IG, Liebler DC. Reactions of peroxynitrite with gamma-tocopherol. *Chem Res Toxicol* 1997;10:401–7.
16. Jiang Q, Elson-Schwab I, Courtemanche C, Ames BN. Gamma-Tocopherol and its major metabolite, in contrast to alpha-tocopherol, inhibit cyclooxygenase activity in macrophages and epithelial cells. *Proc Natl Acad Sci U S A* 2000;97:11494–9.
17. Kristenson M, Zieden B, Kucinskiene Z, et al. Antioxidant state and mortality from coronary heart disease in Lithuanian and Swedish men: concomitant cross sectional study of men aged 50. *BMJ* 1997;314:629–33.
18. Kwon G, Corbett JA, Hauser S, Hill JR, Turk J, McDaniel ML. Evidence for involvement of the proteasome complex (26S) and NF(B in IL-1 β -induced nitric oxide and prostaglandin production by rat islets and RINm5F cells. *Diabetes* 1998;47:583–91.
19. Liebler DC, Burr JA. Oxidation of vitamin E during iron-catalyzed lipid peroxidation: evidence for electron-transfer reactions of the tocopheroxyl radical. *Biochemistry* 1992;31:8278–84.
20. Lykkesfeldt J, Christen S, Wallock LM, Chang HH, Jacob RA, Ames BN. Ascorbate is depleted by smoking and repleted by moderate supplementation: a study in male smokers and nonsmokers with matched dietary antioxidant intakes. *Am J Clin Nutr* 2000;71:530–6.
21. Lyle BJ, Mares-Perlman JA, Klein BE, et al. Serum carotenoids and tocopherols and incidence of age-related nuclear cataract. *Am J Clin Nutr* 1999;69:272–7.
22. Potischman N, Herrero R, Brinton LA, et al. A case-control study of nutrient status and invasive cervical cancer. II. Serologic indicators. *Am J Epidemiol* 1991;134:1347–55.

23. Shi H, Noguchi N, Niki E. Comparative study on antioxidant activity of alpha- and gamma-tocopherols in mouse brain homogenates. *Free Radic Biol Med* 1999;27:s44 (abstr).
24. Shigenaga MK, Christen S, Lykkesfeldt J, et al. Time course of tyrosine and gamma-tocopherol nitration and antioxidant status in zymosan-induced peritonitis. *Free Radic Biol Med* 1998;25:S67 (abstr).
25. Sjöholm A, Berggren PO, Cooney RV. Gamma-Tocopherol partially protects insulin-secreting cells against functional inhibition by nitric oxide. *Biochem Biophys Res Commun* 2000;277:334–40.
26. Stone WL, Papas AM, LeClair IO, Min Q, Ponder T. The influence of dietary iron and tocopherols on oxidative stress in the colon. *Cancer Detect Prev* 1998;22:S110 (abstr).
27. Stone WL, Papas AM. Tocopherols and the etiology of colon cancer. *J Natl Cancer Inst* 1997;89:1006–14.
28. Tabatabaie T, Waldon AM, Jacob JM, Floyd RA, Kotake Y. COX-2 inhibition prevents insulin-dependent diabetes in low-dose streptozotocin-treated mice. *Biochem Biophys Res Commun* 2000;273:699–704.
29. Tasinato A, Boscoboinik D, Bartoli GM, Maroni P, Azzi A. D-alpha-Tocopherol inhibition of vascular smooth muscle cell proliferation occurs at physiological concentrations, correlates with protein kinase C inhibition, and is independent of its antioxidant properties. *Proc Natl Acad Sci U S A* 1995;92:12190–4.
30. Vatassery GT, Johnson GJ, Krezowski AM. Changes in vitamin E concentrations in human plasma and platelets with age. *J Am Coll Nutr* 1983;2:369–75.
31. Weber C, Podda M, Rallis M, Thiele JJ, Traber MG, Packer L. Efficacy of topically applied tocopherols and tocotrienols in protection of murine skin from oxidative damage induced by UV- irradiation. *Free Radic Biol Med* 1997;22:761–9.
32. Yochum LA, Folsom AR, Kushi LH. Intake of antioxidant vitamins and risk of death from stroke in postmenopausal women. *Am J Clin Nutr* 2000;72:476–83.
33. Zheng W, Blot WJ, Diamond EL, et al. Serum micronutrients and the subsequent risk of oral and pharyngeal cancer. *Cancer Res* 1993;53:795–8.

B. Cardiovascular Function

1. Kontush A, Spranger T, Reich A, Baum K, Beisiegel U. Lipophilic antioxidants in blood plasma as markers of atherosclerosis: the role of alpha-carotene and gamma-tocopherol. *Atherosclerosis* 1999;144:117–22.

2. Kushi LH, Folsom AR, Prineas RJ, Mink PJ, Wu Y, Bostick RM. Dietary antioxidant vitamins and death from coronary heart disease in postmenopausal women. *N Engl J Med* 1996;334:1156–62.
3. Li D, Saldeen T, Romeo F, Mehta JL. Relative effects of alpha- and gamma-tocopherol on low-density lipoprotein oxidation and superoxide dismutase and nitric oxide synthase activity and protein expression in rats. *J Cardiovasc Pharmacol Ther* 1999;4:219–26.
4. Ohrvall M, Sundlof G, Vessby B. Gamma, but not alpha, tocopherol levels in serum are reduced in coronary heart disease patients. *J Intern Med* 1996;239:111–7.
5. Sabate J. Nut consumption, vegetarian diets, ischemic heart disease risk, and all-cause mortality: evidence from epidemiologic studies. *Am J Clin Nutr* 1999;70(suppl):500S–3S.
6. Saldeen T, Li D, Mehta JL. Differential effects of alpha- and gamma-tocopherol on low-density lipoprotein oxidation, superoxide activity, platelet aggregation and arterial thrombogenesis. *J Am Coll Cardiol* 1999;34:1208–15. (Published erratum appears in *J Am Coll Cardiol* 2000;35:263).
7. Stampfer MJ, Hennekens CH, Manson JE, Colditz GA, Rosner B, Willett WC. Vitamin E consumption and the risk of coronary disease in women. *N Engl J Med* 1993;328:1444–9.
8. Upston JM, Terentis AC, Stocker R. Tocopherol-mediated peroxidation of lipoproteins: implications for vitamin E as a potential antiatherogenic supplement. *FASEB J* 1999;13:977–94.
9. Witting PK, Bowry VW, Stocker R. Inverse deuterium kinetic isotope effect for peroxidation in human low-density lipoprotein (LDL): a simple test for tocopherol-mediated peroxidation of LDL lipids. *FEBS Lett* 1995;375:45–9.

C. Metabolic Activity

1. Behrens WA, Madère R. Alpha- and gamma tocopherol concentrations in human serum. *J Am Coll Nutr* 1986;5:91–6.
2. Behrens WA, Madere R. Mechanisms of absorption, transport and tissue uptake of *RRR*-alpha-tocopherol and D-gamma-tocopherol in the white rat. *J Nutr* 1987;117:1562–9.
3. Clement M, Bourre JM. Graded dietary levels of *RRR*-gamma-tocopherol induce a marked increase in the concentrations of alpha- and gamma-tocopherol in nervous tissues, heart, liver and muscle of vitamin-E-deficient rats. *Biochim Biophys Acta* 1997;1334:173–81.

4. Handelman GJ, Machlin LJ, Fitch K, Weiter JJ, Dratz EA. Oral alpha-tocopherol supplements decrease plasma gamma-tocopherol levels in humans. *J Nutr* 1985;115:807–13.
5. Handelman GJ, Epstein WL, Peerson J, Spiegelman D, Machlin LJ, Dratz EA. Human adipose alpha-tocopherol and gamma-tocopherol kinetics during and after 1 y of alpha-tocopherol supplementation. *Am J Clin Nutr* 1994;59:1025–32.
6. McLaughlin PJ, Weihrauch JL. Vitamin E content of foods. *J Am Diet Assoc* 1979;75:647–65.
7. Yamashita K, Nohara Y, Katayama K, Namiki M. Sesame seed lignans and gamma-tocopherol act synergistically to produce vitamin E activity in rats. *J Nutr* 1992;122:2440–6.

Alpha Lipoic Acid

A. Antioxidation, detoxification

1. Anuradha B, Varalakshmi P. Protective role of DL-alpha-lipoic acid against mercury-induced neural lipid peroxidation. *Pharmacol Res.* Jan1999;39(1):67-80.
2. Arivazhagan P, Panneerselvam C. Effect of DL - alpha -lipoic acid on neural antioxidants in aged rats. *Pharmacol Res.* 2000 Sep;42(3):219-22.
3. Berkson BM. Thiocetic acid in treatment of hepatotoxic mushroom (Phalloides) poisoning. *N Engl J Med.* Feb1979;300(7):371.
4. Biewenga GP, Haenen GR, Bast A. The pharmacology of the antioxidant lipoic acid. *Gen Pharmacol.* 1997 Sep;29(3):315-31.
5. Busse E, Zimmer G, Schorpohl B, et al. Influence of alpha-lipoic acid on intracellular glutathione in vitro and in vivo. *Arzneimittel-Forschung*1992;42:829–31.
6. Dovinova I. alpha-Lipoic acid--a natural disulfide cofactor and antioxidant with anticarcinogenic effects. *Ceska Slov Farm.* 1996 Sep;45(5):237-41.
7. Gurer H, Ozgunes H, Oztezcan S, Ercal N. Antioxidant role of alpha-lipoic acid in lead toxicity. *Free Radic Biol Med.* Jul1999;27(1-2):75-81.
8. Hagen TM, Ingersoll RT, Lykkesfeldt J, Liu J, Wehr CM, Vinarsky V, Bartholomew JC, Ames AB. (R)-alpha-lipoic acid-supplemented old rats have improved mitochondrial function, decreased oxidative damage, and increased metabolic rate. *FASEB J.* 1999 Feb;13(2):411-8.

9. Kagan V, Khan S, Swanson C, et al. Antioxidant action of thioctic acid and dihydrolipoic acid. *Free Radic Biol Med* 1990;9S:15.
10. Kagan V, Serbinova E, Packer L. Antioxidant effects of ubiquinones in microsomes and mitochondria are mediated by tocopherol recycling. *Biochem Biophys Res Commun* 1990;169:851–7.
11. Kagan VE, Shvedova A, Serbinova E, et al. Dihydrolipoic acid--a universal antioxidant both in the membrane and in the aqueous phase. Reduction of peroxy, ascorbyl and chromanoxyl radicals. *Biochem Pharmacol*. Oct1992;44(8):1637-49.
12. Lykkesfeldt J, Hagen TM, Vinarsky V, Ames BN. Age-associated decline in ascorbic acid concentration, recycling, and biosynthesis in rat hepatocytes—reversal with (R)-alpha-lipoic acid supplementation. *FASEB J* 1998;12:1183–9.
13. Monograph:Alpha-Lipoic Acid. *Altern Med Rev*. Aug1998;3(4):308-11.
14. Nichols TW Jr. Alpha-lipoic acid: biological effects and clinical implications. *Altern Med Rev* 1997;2:177–83 [review].
15. Nickander KK, McPhee BR, Low PA, Tritschler H. Alpha-lipoic acid: antioxidant potency against lipid peroxidation of neural tissues in vitro and implications for diabetic neuropathy. *Free Radic Biol Med*. 1996;21(5):631-9.
16. Packer L. alpha-Lipoic acid: a metabolic antioxidant which regulates NF-kappa B signal transduction and protects against oxidative injury. *Drug Metab Rev*. 1998 May;30(2):245-75.
17. Packer L, Tritschler HJ, Wessel K. Neuroprotection by the metabolic antioxidant alpha-lipoic acid. *Free Radic Biol Med*. 1997;22(1-2):359-78.
18. Packer L, Witt EH, Tritschler HJ. Alpha-lipoic acid as a biological antioxidant. *Free Radic Biol Med* 1995 Aug;19(2):227–50 [review].
19. Panigrahi M, Sadguna Y, Shivakumar BR, Kolluri SV, Roy S, Packer L, Ravindranath V. alpha-Lipoic acid protects against reperfusion injury following cerebral ischemia in rats. *Brain Res*. 1996 Apr 22;717(1-2):184-8.
20. Parish RC, Doering PL. Treatment of Amanita mushroom poisoning: a review. *Vet Hum Toxicol*. Aug1986;28(4):318-22.
21. Podda M, Tritschler HJ, Ulrich H, Packer L. Alpha-lipoic acid supplementation prevents symptoms of vitamin E deficiency. *Biochem Biophys Res Commun*. 1994 Oct 14;204(1):98-104.

22. Scholich H, Murphy ME, Sies H. Antioxidant activity of dihydrolipoate against microsomal lipid peroxidation and its dependence on alpha-tocopherol. *Biochem Biophys Acta* 1989;1001:256–61.
23. Scholz RW, Reddy PV, Wynn MK, Graham KS, Liken AD, Gumprich E, Reddy CC. Glutathione-dependent factors and inhibition of rat liver microsomal lipid peroxidation. *Free Radic Biol Med*. 1997;23(5):815-28.
24. Serbinova E, Khwaja S, Reznick AZ, Packer L. Thiocctic acid protects against ischemia-reperfusion injury in the isolated perfused Langendorff heart. *Free Radic Res Commun*. 1992;17(1):49-58.
25. Sigel H, Prijs B, McCormick DB, Shih JCH. Stability and structure of binary and ternary complexes of a-lipoate and lipoate derivatives with Mn²⁺, Cu²⁺, and Zn²⁺ in solution. *Arch Biochem Biophys*. 1978;187:208-214.
26. Sumathi R, Baskaran G, Varalakshmi P. Relationship between glutathione and DL alpha-lipoic acid against cadmium-induced hepatotoxicity. *Jpn J Med Sci Biol*. Apr1996;49(2):39-48.

B. Glucose uptake and metabolism

1. Estrada DE, Ewart HS, Tsakiridis T, et al. Stimulation of glucose uptake by the natural coenzyme alpha-lipoic acid/thioctic acid: participation of elements of the insulin signaling pathway. *Diabetes*. 1996;45:1798-1804.
2. Evans JL, Goldfine ID. Alpha-lipoic acid: a multifunctional antioxidant that improves insulin sensitivity in patients with type 2 diabetes. *Diabetes Technol Ther*. Sep 2000;2(3):401-13.
3. Konrad D. The antihyperglycemic drug alpha-lipoic acid stimulates glucose uptake via both GLUT4 translocation and GLUT4 activation: potential role of p38 mitogen-activated protein kinase in GLUT4 activation. *Diabetes*. Jun 2000;50(6):1464-71.
4. Konrad T, Vicini P, Kusterer K, Hoflich A, Assadkhani A, Bohles HJ, Sewell A, Tritschler HJ, Cobelli C, Usadel KH. alpha-Lipoic acid treatment decreases serum lactate and pyruvate concentrations and improves glucose effectiveness in lean and obese patients with type 2 diabetes. *Diabetes Care*. 1999 Feb;22(2):280.

C. Visual function

1. Filina AA, Davydova NG, Endrikhovskii SN, et al. Lipoic acid as a means of metabolic therapy of open-angle glaucoma. *Vestn Oftalmol* Dec 1995;111(4):6–8.

2. Kilic F, et al. Modelling Cortical Cataractogenesis XX. In Vitro Effect of Alpha-lipoic Acid on Glutathione Concentrations in Lens in Model Diabetic Cataractogenesis. *Biochem Mol Biol Int.* Oct1998;46(3):585-95.
3. Stoyanovsky DA, Goldman R, Darrow RM, et al. Endogenous ascorbate regenerates vitamin E in the retina directly and in combination with exogenous dihydrolipoic acid. *Curr Eye Res.* Mar1995;14(3):181-9.
4. Ziegler D, Gries FA. Alpha-lipoic acid in the treatment of diabetic peripheral and cardiac autonomic neuropathy. *Diabetes.* 1997 Sep;46 Suppl 2:S62-6.

D. Cellular energy production

1. Khanna S, Atalay M, Lodge JK, Laaksonen DE, Roy S, Hanninen O, Packer L, Sen CK. Skeletal muscle and liver lipoyllysine content in response to exercise, training and dietary alpha-lipoic acid supplementation. *Biochem Mol Biol Int.* 1998 Oct;46(2):297-30.

E. Cellular structure and function

1. Hagen TM, Ingersoll RT, Lykkesfeldt J, Liu J, Wehr CM, Vinarsky V, Bartholomew JC, Ames AB. (R)-alpha-lipoic acid-supplemented old rats have improved mitochondrial function, decreased oxidative damage, and increased metabolic rate. *FASEB J.* 1999 Feb;13(2):411-8.

F. Metabolic function

1. Baur A, Harrer T, Peukert M, et al. Alpha-lipoic acid is an effective inhibitor of human immuno-deficiency virus (HIV-1) replication. *Klin Wochenschr* 1991;69:722-4.
2. Hagen TM, Ingersoll RT, Lykkesfeldt J, Liu J, Wehr CM, Vinarsky V, Bartholomew JC, Ames AB. (R)-alpha-lipoic acid-supplemented old rats have improved mitochondrial function, decreased oxidative damage, and increased metabolic rate. *FASEB J.* 1999 Feb;13(2):411-8.
3. Khanna S, Atalay M, Lodge JK, Laaksonen DE, Roy S, Hanninen O, Packer L, Sen CK. Skeletal muscle and liver lipoyllysine content in response to exercise, training and dietary alpha-lipoic acid supplementation. *Biochem Mol Biol Int.* 1998 Oct;46(2):297-30.
4. Roy S, Sen CK, Tritschler HJ, Packer L. Modulation of cellular reducing equivalent homeostasis by alpha-lipoic acid. Mechanisms and implications for diabetes and ischemic injury. *Biochem Pharmacol.* 1997 Feb 7;53(3):393-9.

5. Vasdev S, Ford CA, Parai S, Longerich L, Gadag V. Dietary alpha-lipoic acid supplementation lowers blood pressure in spontaneously hypertensive rats. *J Hypertens*. 2000 May;18(5):567-73.

G. Liver function

1. Berkson BM. A conservative triple antioxidant approach to the treatment of hepatitis C. Combination of alpha lipoic acid (thioctic acid), silymarin, and selenium: three case histories. *Med Klin*. Oct1999;94(Suppl 3):84-9.
2. Berkson BM. Thioctic acid in treatment of hepatotoxic mushroom (Phalloides) poisoning. *N Engl J Med*. Feb1979;300(7):371.
3. Plotzker R, Jensen DM, Payne JA. Case report. Amanita virosa acute hepatic necrosis: treatment with thioctic acid. *Am J Med Sci*. Mar1982;283(2):79-82.
4. Scholz RW, Reddy PV, Wynn MK, Graham KS, Liken AD, Gumprich E, Reddy CC. Glutathione-dependent factors and inhibition of rat liver microsomal lipid peroxidation. *Free Radic Biol Med*. 1997;23(5):815-28.
5. Sumathi R, Baskaran G, Varalakshmi P. Relationship between glutathione and DL alpha-lipoic acid against cadmium-induced hepatotoxicity. *Jpn J Med Sci Biol*. Apr1996;49(2):39-48.

H. Nervous system

1. Low PA, et al. The Roles of Oxidative Stress and Antioxidant Treatment in Experimental Diabetic Neuropathy. *Diabetes*. Sep1997;46(Suppl 2):S38-42.
2. Nickander KK, McPhee BR, Low PA, Tritschler H. Alpha-lipoic acid: antioxidant potency against lipid peroxidation of neural tissues in vitro and implications for diabetic neuropathy. *Free Radic Biol Med*. 1996;21(5):631-9.
3. Packer L, Tritschler HJ, Wessel K. Neuroprotection by the metabolic antioxidant alpha-lipoic acid. *Free Radic Biol Med*. 1997;22(1-2):359-78.
4. Roy S, Sen CK, Tritschler HJ, Packer L. Modulation of cellular reducing equivalent homeostasis by alpha-lipoic acid. Mechanisms and implications for diabetes and ischemic injury. *Biochem Pharmacol*. 1997 Feb 7;53(3):393-9.
5. Ziegler D, Gries FA. Alpha-lipoic acid in the treatment of diabetic peripheral and cardiac autonomic neuropathy. *Diabetes*. 1997 Sep;46 Suppl 2:S62-6.
6. Ziegler D, Ulrich H, Schatz H, et al. Effects of treatment with the antioxidant alpha-lipoic acid on cardiac autonomic neuropathy in NIDDM patients. *Diabetes Care* 1997;20:369-73.

