

## REFERENCES



### Thai

ประสาน มานิตพิสิฐกุล. 2530(ก.). บทบาทของวิตามินอี. สารสัณยา. 3(3): 97-105.

ประสาน มานิตพิสิฐกุล. 2530(ข.). บทบาทของวิตามินอี. สารสัณยา. 3(4): 125-129.

วิญญูรัตน์ ต้นศิริ. 2540. วิตามินอี. ใกล้หมอ. 21(9): 38-40.

### English

Ab Gapor, M.T. 1990. Effect of refining and fractionation on vitamin E in palm oil. Proceedings of 1989 International Palm Oil Development Conference-Chemistry, Technology & Marketing, published by PORIM pp. 261-265.

Association of Official Chemistry Standard. 1993. Sampling and analysis of commercial fats and oils. Determination of tocopherols and tocotrienols in vegetable oils and fats by HPLC. pp. 1-5.

Andrews, J.W., Wagstaff, R.K., and Edwards, H.M. 1968. Cholesterol metabolism in the laying fowl. Am. J. Physiol. 214: 1078-1083.

Arad, Y., Ramakrishnan, R., and Ginsberg, H.N. 1990. Lovastatin therapy reduces low density lipoprotein apo-B levels in subjects with combined hyperlipidemia by reducing the production of apo-B containing lipoproteins: implications for the pathophysiology of apo-B production. J. Lipid. Res. 31: 567-582.

Arita, M., Sato, Y., Miyata, A., Tanabe, T., Takahashi, E., Kayden, H.J., Arai, H., and Inoue, K. 1995. Human alpha-tocopherol transfer protein: cDNA cloning, expression and chromosomal localization. Biochem. J. 306: 437-443.

- Azzi, A., Boscoboinik, D., Chatelain, E., Ozer, N.Y., and Stauble, B. 1993. d- $\alpha$ -Tocopherol control of cell proliferation. Mol. Asp. Med. 14: 265-271.
- Bacon, W.L., Brown, K.I., and Musser, M.A. 1973. Low density lipoproteins of chicken, turkey and quail egg yolk. Poult. Sci. 52: 1741-1744.
- Bacon, W.L., Leclercq, B., and Blum, J.C. 1978. Differences in metabolism of very low density lipoprotein from laying hens in comparison to immature chicken hens. Poult. Sci. 57: 1675-1686.
- Behren, W.A., and Madere, R. 1982. Transfer of  $\alpha$ -tocopherol to microsomes mediated by a partially purified liver  $\alpha$ -tocopherol binding protein. Nutr. Res. 2: 611-618.
- Behrens, W.A., Thompson, J.N., and Madere, R. 1982. Distribution of alpha tocopherol in human plasma lipoproteins. Am. J. Clin. Nutr. 35: 691-696.
- Bendich, A., and Shapiro, S.S. 1986. Effect of  $\beta$ -carotene and canthaxanthin on the immune response of the rat. J. Nutr. 116: 2254-2262.
- Berger, K.G., Ab Gapor, M.T., Hashimoto, T., Kato, A., Tanabe, K., Manuro, H., and Yamaoka, M. 1980. Studies on tocopherols and tocotrienols in Malaysian Palm Oil (11), Proceedings of International Symposium on the Tropical Plants 1-4 September 1980, Tsukuba, Japan, published by ITIT, Ministry of International Trade and Industry of Japan, pp. 294-305.
- Beyer, R.S., and Jensen, L.S. 1989. Cholesterol content in commercially produced eggs in Georgia. Poult. Sci. 68: 1703-1706.
- Bitman, J., and Wood, D.I. 1980. Cholesterol and cholesteryl esters of eggs from various avian species. Poult. Sci. 59: 2014-2023.

- Bjorneboe, A., Bjorneboe, G.A., and Drevon, C.A. 1990. Absorption, transport and distribution of vitamin E. J. Nutr. 120: 233-242.
- Bjorneboe, A., Bjorneboe, G.-E.A., Hagen, F.B., Nossen, J.O., and Drevon, C.A. 1987. Secretion of  $\alpha$ -tocopherol from cultured rat hepatocytes. Biochem. Biophys. Acta. 922: 199-205.
- Bjornson, L.K., Gniewkowski, C., and Kayden, H.J. 1975. A comparison of the exchange of  $\alpha$ -tocopherol and of free cholesterol between rat plasma lipoproteins and erythrocytes. J. Lipid. Res. 16: 35-53.
- Bjornson, L.K., Kayden, H.J., Miller, E., and Moshell, A.N. 1976. The transport of alpha-tocopherol and beta-carotene in human blood. J. Lipid Res. 17: 343-351.
- Blomhoff, R., Green, M., Berg, T., and Norum, K. 1990. Transport and storage of vitamin A. Science 250: 399-404.
- Bohnsack, C.R., Harm, R.H., Merkel, W.D., and Russell, D.B. 2002. Performance of commercial layer when fed diets with four levels of corn oil on poultry fat. J. Appl. Poult. Res. 11(1): 68-76.
- Brigelius-Flohe, R., and Traber, M.G. 1999. Vitamin E: function and metabolism. F.A.S.E.B. J. 13: 1145-1155.
- Brin, M.F., Pedley, T.A., Emerson, R.G., Lovelace, R.E., Gouras, P., Mackay, C., Kayden, H.J., Levy, J., and Baker, H. 1986. Electrophysiological features of abetalipoproteinemia: functional consequences of vitamin E deficiency. Neurology 36: 669-673.
- Brockman, H., and Volker, O. 1934. The yellow pigment of the canary and the occurrence of carotenoids in birds. Hoppe-Seyler's. Physiol. Chem. 224: 193-215.

- Brown, M.S., and Goldstein, J.L. 1983. Lipoprotein metabolism in the macrophage: implications for cholesterol deposition in atherosclerosis. Annu. Rev. Biochem. 52: 223-261.
- Brown, W.L. 1938. The influence of pimento pigments in the color of egg yolk of fowls. J. Biol. Chem. 122: 655-659.
- Brown, W.V. 1990. Dietary recommendations to prevent coronary heart disease. Annals. N. Y. Acad. Sci. 598: 376-388.
- Buckley, D.J., Morrissey, P.A., and Gray, J.I. 1995. Influence of dietary vitamin E on the oxidative stability and quality of pig meat. J. Anim. Sci. 73: 3122-3130.
- Bunyan, J., McHale, D., Green, L., and Marcinkiewicz, S. 1961. Biological potencies of  $\epsilon$ - and  $\xi_1$ -tocopherol and 5-methyltolcol. Br. J. Nutr. 15: 253-257.
- Burgess, T.L., Burgess, C., and Wilson, J.D. 1962. Effect of MER-29 on egg production in chickens. Proc. Soc. Exp. Biol. Med. 109: 218-221.
- Burton, G.W., Joyce, A., and Ingold, K. 1983. Is vitamin E the only lipid-soluble, chain-breaking antioxidant in human blood plasma and erythrocyte membranes? Arch. Biochem. Biophys. 221: 281-290.
- Burton, G.W., and Traber, M.G. 1990. Vitamin E: antioxidant activity, biokinetics and bioavailability. Annu. Rev. Nutr. 10: 357-382.
- Cannon, G. 1990. Healthy Eating: The Experts Agree. HMSO, London.
- Catignani, G.L., and Bieri, L.G. 1977. Rat liver  $\alpha$ -tocopherol binding protein. Biochem. Biophys. 497: 349-357.

- Cherian, G., Wolfe, F.H., and Sim, J.S. 1996a. Feeding dietary oils with tocopherols. Effects on internal qualities of eggs during storage. J. Food. Sci. 61: 15-81.
- Cherian, G., Wolfe, F.H., and Sim, J.S. 1996b. Dietary oils with added tocopherols: effects on egg or tissue tocopherols, fatty acids, and oxidative stability. Poult. Sci. 75: 423-431.
- Cherian, G., Kang, K.R., and Sim, J.S. 2000. Tocopherols, retinal and carotenes in eggs and hatched chick tissues as influenced by dietary palm oil. Egg Nutrition and Biotechnology pp. 163-171.
- Chipault, J.R. 1962. Autoxidation and Antioxidants vol. 2. (Ed., Lundberg, W.O.), New York: Interscience, 12: 477-542.
- Cohn, W., Loechleiter, F., and Weber, F. 1988.  $\alpha$ -Tocopherol is secreted from rat liver in very low density lipoproteins. J. Lipid. Res. 29: 1359-1366.
- Cook, W.H. 1986. Macromolecular components of egg yolk. A Study of Hen's Egg Oliver and Boyd. Egg Quality (Ed., Carter, T.C.), Edinburgh, pp. 109-132.
- Dugan, R.E. 1981. Regulation of HMG-CoA reductase. Biosynthesis of polyisoprenoids vol.1 (Eds., Poter, J.W., and Spurgeon, S.L.), New York: John Wiley and sons, pp. 95-159.
- Elkin, R.G., and Rogler, J.C. 1989. Effect of lovastation on laying hen performance and egg cholesterol content. Poult. Sci. 68(Suppl.1): 49.
- Elson, C.E. 1995. Suppression of mevalonate pathway activities by dietary iosoprenoid: Pretective roles in cancer and cardiovascular disease. J. Nutr. 125(6 Suppl): 1666S-1672S.

- Esterbauer, H., Jurgens, G., Quehenberger, O., and Koller, E. 1987. Autoxidation of human low density lipoprotein: loss of poly unsaturated fatty acids and vitamin E and generation of aldehydes. J. Lipid. Res. 28: 495-509.
- Esterbauer, H., Dieber-Rotheneder, M., Striegl, G., and Waeg, G. 1991. Role of vitamin E in preventing the oxidation of low density lipoprotein. Am. J. Clin. Nutr. 53: 314S-321S.
- Evans, H.M., and Bishop, K.S. 1992. On the existence of a hitherto unrecognized dietary factor essential for reproduction. Science 56: 650-651.
- Farrell, P. 1980. Deficiency states. Pharmacological effects, and nutrient requirements. Vitamin E: a comprehensive treatise (Ed., Machlin), New York: Marcel Dekker, pp. 520-620.
- Farrell, P.M. 1988. Vitamin E. Modern nutrition in health and disease (Eds., Shils, M.E., and Young, V.R.), Philadelphia: Lea & Febiger, pp. 340-354.
- Gallo-Torres, H.E. 1980. Transport and metabolism. Vitamin E: a comprehensive treatise (Ed., Machlin, L.J.), New York: Marcel Dekker, pp. 193-267.
- Ganguly J., Mehl, J.W., and Devel, H.J. 1953. Studies on carotenoid metabolism, XII. The effect of dietary carotenoid on the carotenoid distribution in the tissue of chickens. J. Nutr. 50: 59-72.
- Gapor, A., Berger, K.G., and Hashimoto, T. 1983. Palm oil product technology in the eighties. Incorporated Society of Planter (Eds., Pushparajah, E., and Rajadurai, M.), p. 145.
- Geden, M.J.H., Gibson, D.M., and Rodwell, V.W. 1986. Hydroxymethylglutaryl-CoA reductase—the rate limiting enzyme of cholesterol biosynthesis. F.A.S.E.B. J. 201: 183-186.

- Gilbert, A.B. 1971. The female reproductive effort. Physiology and Biochemistry of the Domestic Fowl vol. 3 (Eds., Bell, D.J., and Freeman, B.M.), Academic Press, London, UK, pp. 1153-1162.
- Goh, S.H., Choo, Y.M., and Ons, S.H. 1985. Minor constituents of palm oil. J.A.O.C.S. 62: 237-240.
- Goldstein, J.L., and Brown, M.S. 1983. Familial hypercholesterolemia. The metabolic basis of inherited disease 5<sup>th</sup>ed (Eds., Stanbury et al.), New York: McGraw-Hill, pp. 672-713.
- Goldstein, J.L., and Brown, M.S. 1990. Regulation of mevalonate pathway. Nature. 343: 425-430.
- Gornall, D.A., and Kuksis, A. 1973. Alterations in lipid composition of plasma lipoproteins during deposition of egg yolk. J. Lipid. Res. 14: 197-205.
- Gottenbos, J.J., and Vles, R.O. 1983. The nutritive value of palm oil. PORIM 8: 5-13.
- Grandhi, R.R., Smith, M.W., Frigg, M., and Thacker, P.A. 1993. Effect of supplemental vitamin E during prepuberal development and early gestation on reproductive performance and nutrient metabolism in gilts. Can. J. Anim. Sci. 73: 593-603.
- Granot, E., Tramir, I., and Deckelbaum, R.J. 1988. Neutral lipid transfer protein does not regulate  $\alpha$ -tocopherol transfer between human plasma lipoproteins. Lipids 23: 17-21.
- Griffin, H.D. 1992. Manipulation of egg yolk cholesterol: a physiologist's review. Poult. Sci. 48: 101-112.
- Griffin, H.D., and Perry, M.M. 1985. Exclusion of plasma lipoproteins of intestinal origin from avian egg yolk because of their size. Comp. Biochem. Physiol. 82B: 321-325.

- Griffin, H.D., Perry, M.M., and Gilbert, A.B. 1985. Yolk formation. Physiology and Biochemistry of Domestic Fowl (Ed., Freeman, B.), Academic Press, London, pp. 345-380.
- Grobas, S., Mendez, J., De blas, C. and Mateos, G.G. 1999. Laying hen productivity as affected by energy, supplemental fat, and linoleic acid concentration of the diet. Poult. Sci. 78: 1542-1551.
- Grobas, S., Mendez, J., Lopez Bote, C., De Blas, C., and Mateos, G.G. 2002. Effect of vitamin E and A supplementation on egg yolk  $\alpha$ -tocopherol concentration. Poult. Sci. 81: 376-381.
- Haga, P., Ekand, J., and Kran, S. 1982. Plasma tocopherol levels and vitamin E/beta lipoprotein relationships during pregnancy and in cord blood. Am. J. Clin. Nutr. 36: 1200-1204.
- Hall, L.M., and Mckay, J.C. 1993. The relationship between yolk cholesterol and total lipid concentration throughout the first year of egg production in the domestic fowl. Br. Poult. Sci. 34: 487-495.
- Hamilton, R.A., Moorehouse, A., and Havel, R.J. 1991. Isolation and properties of nascent lipoproteins from highly purified rat hepatocytic Golgi fractions. J. Lipid. Res. 32: 529-543.
- Handelman, G.L., Machlin, L.J., Fitch, K., Weiter, J.J., and Dratz, E.A. 1985. Oral  $\alpha$ -tocopherol supplements decrease plasma  $\gamma$ -tocopherol levels in humans. J. Nutr. 115: 807-813.
- Hargis, P.S. 1988. Modifying egg yolk cholesterol-a review. World's. Poult. Sci. J. 44: 17-29.



- Harris, P.C., and Wilcox, F.H. 1963. Studies on egg yolk cholesterol. 1. Genetic variation and some phenotypic correlations in a random bred population. Poult. Sci. 42: 178-182.
- Haugh, R.R. 1937. The Haugh unit for measuring egg quality, U.S. Egg Poult. Mag. 43: 522-555, 572-573.
- Hayashi, K., Nimpe, J., and Schneider, W.J. 1989. Chicken oocytes and fibroblasts express different apolipoprotein-B-specific receptors. J. Biol. Chem. 264: 3131-3139.
- Hayes, K.C., Pronczuk, A., and Liang, J.S. 1993. Differences in the plasma transport and tissue concentrations of tocopherols and tocotrienols: observations in humans and hamsters. Proc. Soc. Exp. Biol. Med. 202: 353-359.
- Heinonen, M., and Piironen, V. 1991. The tocotrienol, and vitamin-E content of the average finish diet. Int. J. Vitam. Nutr. Res. 61: 27-32.
- Hidaka, H., Nakanura T., and Aoki, T. 1990. Increased plasma plant sterol levels in heterozygotes with sitosterolemia and xanthomatosis. J. Lipid. Res. 31: 881-888.
- Hollander, D., Rim, E., Muralidhara, K. 1975. Mechanism and site of small intestinal absorption of  $\alpha$ -tocopherol in the rat. Gastroenterology 68: 1492-1499.
- Horwitt, M.H., Harvey, C.C., Dahm, D.H., and Searcy, M.T. 1972. Relationship between tocopherol and serum lipid levels for determination of nutritional adequacy. Ann. N. Y. Acad. Sci. 203: 223-236.
- Hosomi, A., Arita, m., Sato, Y., Kiyose, C., Ueda, T., Igarashi, O., Arai, H., and Inoue, K. 1997. Affinity for alpha-tocopherol transfer protein as a determinant of the biological activities of vitamin E analogue. F.A.S.E.B. Lett. 409: 105-108.

- Ikeda, S., Niwa, T., and Yamashita, K. 2000. Selective uptake of dietary tocotrienols into rat skin. J. Nutr. Sci. Vitaminol. 46: 141-143.
- Ikeda, S., Tohyama, T., Yoshimura, H., Hamamura, K., Abe, K., and Yamashita, K. 2003. Dietary  $\alpha$ -tocopherol decreases  $\alpha$ -tocotrienol but not  $\gamma$ -tocotrienol concentration in rat. J. Nutr. 133: 428-434.
- Ikeda, S., Toyoshima, K., and Yamashita, K. 2001. Dietary sesame seeds elevate  $\alpha$ - and  $\gamma$ -tocotrienol concentrations in skin and adipose tissue of rats fed the tocotrienol-rich fraction extracted from palm oil. J. Nutr. 131: 2892-2897.
- Illingworth, D.R. 1987. Lipid-lowering drugs. An overview of indications and optimum therapeutic use. Drugs 33: 259-279.
- IUPAC-IUB Joint Commission on Biochemical Nomenclature. 1982. Nomenclature of tocopherols and related compounds. Recommendations 1981. Eur. J. Biochem. 123: 473-475.
- Jensen, L.S., Allred, J.B., Fry, R.E., and McGinnis, J. 1958. Evidence for an unidentified factor necessary for maximum egg weight in chickens. J. Nutr. 65: 219-233.
- Jialal, I., and Grundy, S.M. 1992. Effect of dietary supplementation with alpha-tocopherol on the oxidative modification of low density lipoprotein. J. Lipid. Res. 33: 899-906.
- Jiang, Z., McGeachin, R.B., and Bailey, C.A. 1994.  $\alpha$ -Tocopherol,  $\beta$ -carotene and retinol enrichment of chicken eggs. Poult. Sci. 73: 1137-1143.
- Jung, D.H., Biggs, B.E., and Moorehead, W.R. 1975. Colorimetric of serum cholesterol with use of ferric acetate uranyl acetate and ferrous sulfate/sulfuric and acid reagents. Clin. Chem. 21: 1526-2530.

- Kagan, V.E., Serbinova, E.A., and Bakalova R.A. 1990. Mechanism of stabilization of biomembranes by alpha-tocopherol: the role of the hydrocarbon chain in the inhibition of lipid peroxidation. Biochem. Phar. 40: 2403-2414.
- Kahn, B., Wilcox, H.B., and Heimber, M. 1989. Cholesterol is required for secretion of very low density lipoprotein by rat liver. Biochem. J. 258: 807-816.
- Kang, K.R., Cherian, G., and Sim, J.S. 1998. Tocopherols, retinal and carotenes in chicken egg and tissue as influenced by dietary palm oil. J. Food. Sci. 63(4): 592-596.
- Kayden, H.J., and Bjornson, L.K. 1972. The dynamics of vitamin E transport in the human erythrocyte. Ann. N. Y. Acad. Sci. 203: 127-140.
- Kohlschutter, A., Hubner, C., Jansen, W., and Lindner, S.G. 1988. A treatable familial neuromyopathy with vitamin E deficiency, normal absorption, and evidence of increased consumption of vitamin E. J. Inher. Metab. Dis. 11: 149-152.
- Kudzma, D.J., ST Clare, F.L., and Friedberg, S.J. 1975. Mechanisms of avian estrogen-induced hypertriglyceridemia: evidence for overproduction of triglyceride. J. Lipid. Res. 16: 123-133.
- Labier, M., and Leclerq, B. 1994. Nutrition and Feeding of Poultry Chapman & Hall New York, pp. 222-225.
- Lambert, D., and Mourot, J. 1984. Vitamin E and lipoproteins in hyperlipoproteinemia. Atherosclerosis 53: 327-330.
- Leveille, G.A., Romsos, D.R., Yeh, Y.Y., and O'hea, E.K. 1975. Lipid biosynthesis in the chick. A consideration of site of synthesis, influence of diet and possible regulatory mechanisms. Poult. Sci. 54: 1075-1093.

- March, B.E., and MacMillian, C. 1990. Linoleic acid as a mediator of egg size. Poult. Sci. 69: 634-639.
- Massey, J.B. 1984. Kinetics of transfer of  $\alpha$ -tocopherol between model and native plasma lipoproteins. Biochem. Biophys. Acta. 793: 387-392.
- Meluzzi, A., Sirri, F., Manfreda, G., Tallarico, N., and Franchini, A. 2000. Effects of dietary vitamin E on the quality of table eggs enriched with n-3 long-chain fatty acids. Poult. Sci. 79: 539-545.
- Merkel, W.D., Harms, R.H., Bohnsack, C.R., and Russell, G.B. 2002. Performance of commercial layers when fed diets with corn oil added from 24 to 36 weeks of age. J. Appl. Poult. Res. 11(4): 418-423.
- Moudgal, R.P. 1999. Unsaturated dietary fat increases egg size – A mechanism. Ind. J. Anim. Sci. 69(4): 252-254.
- Murphy, T.H., Schnar, R.L., and Coyle, J.T. 1990. Immature cortical neurons are uniquely sensitive to glutamate toxicity by inhibition of cystine uptake. F.A.S.E.B. J. 4: 1624-1633.
- Naber, E.C. 1991. Cholesterol content of eggs: Can and should it be changed?. In fat and cholesterol reduced foods technologies and strategies. Ch. 21. Adv. Appl. Biotech. vol. 12 (Eds., Haberstroh, C., and Morris, C.E.), Portfolio Publishing Company, The Woodlands, TX.
- Nelson, T.S., and Baptist, J.N. 1968. Feed pigments. 2. The influence of feeding single and combined sources of red and yellow pigments on egg yolk color. Poult. Sci. 47: 924-931.

- Nelsson-Ehle, P., Garfinkel, A.S., and Schotz, M.C. 1980. Lipolytic enzymes and plasma lipoprotein metabolism. Annu. Rev. Biochem. 49: 667-693.
- Nesaretnam, K., Khor, H.T., Ganeson, J., Chong, Y.H., Sundram, K., and Gapor, A. 1992. The effect of vitamin E tocotrienol is from palm oil on chemically-induced mammary carcinogenesis in female rats. Nutr. Res. 12: 63-75.
- Nimpf, J., Radosavljevic, M., and Schneider, W.J. 1989. Specific postendocytic proteolysis of apolipoprotein B in oocyte does not abolish receptor recognition. Proc. Nat. Acad. Sci. USA. 86: 906-910.
- Nobile, S., and Irving, E.A. 1966. Relationship of  $\alpha$ -tocopherol in the feed to total tocopherol in the egg. Vet. Rec. 78: 113-114.
- Noble, R.C. 1987. Egg lipids. Egg Quality-Current Problems and Recent Advances (Eds., Wells, R.G., and Belyavin, C.J.), Butterworths London, pp. 159-177.
- Noble, R.C., and Cocchi, M. 1990. Lipid metabolism in the neonatal chicken. Prog. Lipid. Res. 29: 107-140.
- North, N.O., and Bell, D.D. 1990. Commercial Chicken Production Manual. 4<sup>th</sup> (Ed., Van, N.O.), Strand Reinhold New York, pp. 913.
- Packer, L., Stefan, U.W., and Gerald, R. 2001. Molecule aspects of  $\alpha$ -tocotrienol antioxidant action and cell signaling. J. Nutr. 131: 369-373.
- Parker, R.A., and Clark, R.W. 1991. Squalene transfer and epoxidatio in HepG2 cell membranes is modulated by  $\gamma$ -tocotrienol (abstract). F.A.S.E.B. J. 5: A-710.

- Parks, J.S., Wilson, M.D., Johnson, F.L., and Rudel, L.L. 1989. Fish oil decrease hepatic cholesteryl ester secretion but not apo-B secretion in African green monkeys. J. Lipid. Res. 30: 1535-1544.
- Pellet, L., Andersen, H., Chen, H., and Tappel, A.L. 1993. Interaction between dietary vitamin E and  $\beta$ -carotene in protection against oxidative damage in chicks. Fed. Am. Soc. Exp. Biol. J. 7: 1660-1668.
- Perry, M.M., and Gilbert, A.B. 1979. Yolk transport in the ovarian follicle of the hen (*Gallus domesticus*): lipoprotein like particles at the periphery of the oocyte in the rapid growth phase. J. Cell. Sci 39: 257-272.
- Perry, M.M., Griffin, H.D., and Gilbert, A.B. 1985. The binding of very low density and low density lipoproteins to the plasma membrane of the hen's oocyte. A morphological study. Exp. Cell. Res. 151: 433-446.
- Phillips, M.C., Johnson, W.J., and Rothblat, G.H. 1987. Mechanisms and consequences of cellular cholesterol exchange and transfer. Biochem. Biophys. Acta. 906: 223-276.
- Privett, O.S., Blank, M.L., and Schmit, J.A. 1962. Studies on the composition of egg lipid. J. Food Sci. 27: 463-468.
- Quahchi, K., Arita, M., Kayden, H., Hentati, F., Ben Hamida, M., Sokol, R., Arai, H., Inoue, K., Mandel, J.L., and Koenig, M. 1995. Ataxia with isolated vitamin E deficiency is caused by mutations in the alpha-tocopherol transfer protein. Nat. Genet. 9: 141-145.
- Qureshi, A.A., Ong, A.S.H., Gapor, A., deWITT, G., and Chon, Y.H. 1988. Suppression of cholesterol biosynthesis and hypocholesterolemic effects of tocotrienols from palm oil in the chicken model. The National Oil Palm/Palm Oil. Conference: Current Development, 11-15 October, 1988. Shaugri-La Hotel, Kuala Lumpur.

- Qureshi, A.A., Weber, F.E., and Qureshi, N. 1989. Dietary tocotrienols reduce levels of plasma cholesterol, apolipoprotein B, thromboxane B<sub>2</sub> and platelet factor 4 in pigs with inherited hyperlipidemias. PORIM International Palm Oil Development Conference, September 5-9, Kuala Lumpur, Malaysia.
- Qureshi, A.A., Qureshi, N., Wright, J.J., Shen, Z., Gapor, A., Chong, Y.H., DeWitt, G., Ong, A., Peterson, D.M., and Bradlow, B.A. 1991b. Lowering of serum cholesterol in hypercholesterolemic humans by tocotrienols (palmvitee). Am. J. Clin. Nutr. 53: 1021S-1026S.
- Qureshi, A.A., Burger, W.C., Peterson, D.M., and Elson, C.E. 1986. The structure of an inhibitor of cholesterol biosynthesis isolated from barley. J. Biol. Chem. 261: 1054-1055.
- Qureshi, N., and Qureshi, A.A. 1993. Tocotrienols: novel hypercholesterolemic agents with antioxidant properties. Vitamin E in Health and Disease (Eds., Packer, L., and Funchs, J.), Marcel Dekker, Inc. New York, NY., pp. 247-267.
- Qureshi, N., and Poter, J.W. 1981. Conversion of acetyl coenzyme A to isopentenyl pyrophosphate. Biosynthesis of isoprenoids vol. 1 (Eds., Porter, J.W., and Spurgeon, S.L.), New York: John Wiley and Sons, pp. 47-94.
- Qureshi, N., Dugan, R.E., Cleland, W.W., and Poter, J.W. 1976. Kinetic analysis of the individual reductive steps catalyzed by  $\beta$ -hydroxy- $\beta$ -methylglutaryl-coenzyme A reductase obtained from yeast. Biochemistry 15: 4191-4197.
- Ramachandran, C.K., Gray, S.L., and Melnylkovych, G. 1978. Coordinate repression of cholesterol biosynthesis and cytoplasmic 3-hydroxy-3methylglutaryl coenzyme A synthase by glucocorticoids in Hela cells. Arch. Biochem. Biophys. 189: 205-211.

- Reilly, M., Delanty, N., Lawson, J.A., and FitzGerald, G.A. 1996. Modulation of oxidant stress in vivo in chronic cigarette smokers. Circulation 94: 19-25.
- Reinhart, M.R. 1990. Intracellular sterol trafficking. Experientia 46: 599-611.
- Rhodes, D.N., and Lea, C.H. 1957. Phospholipids. 4. On the composition of hen's egg phospholipids. Biochem. J. 65: 526-533.
- Riemersma, R.A., Wood, D.A., MacIntyre, C.C.A., Elton, R.A., Gey, K.F., and Olive, M.F. 1991. Risk of angina pectoralis and plasma concentrations of vitamin A, C and E and carotene. Lancet 337: 1-5.
- Roca, P., Sainz, F., Gonzalez, M., and Alemany, M. 1984. Structure and composition of the eggs from several avian species. Comp. Biochem. Physiol. A 77: 307-310.
- Schuelke, M., Mayatepek, E., Inter, M., Becker, M., Pfeiffer, E., Speer, A., Hubner, C., and Finckh, B. 1999. Treatment of ataxia in isolated vitamin E deficiency caused by  $\alpha$ -tocopherol transfer protein deficiency. J. Pediatr. 134: 240-244.
- Scott, M.L., Ascarelli, I., and Olson, G. 1968. Studies of egg yolk pigmentation. Poult. Sci. 47: 863-872.
- Serbinova, E., Kagan, V., Han, D., and Packer, L. 1991. Free radical recycling and intramembrane mobility in the antioxidant properties of alpha-tocopherol and alpha-tocotrienol. Free. Rad. Biol. Med. 70: 263-275.
- Shenstone, F.S. 1968. The gross composition, chemistry and physio-chemical basis of organization of the yolk and white. Egg Quality: A study of the hen's egg (Ed., Carter, T.C.), Oliver Boyd, Edinburgh, Scotland.



- Sheppard, A.J., Pennington, J.A.T., and Weihrauch, J.L. 1993. Analysis of distribution of vitamin E in vegetable oils and foods. *Vitamin E in Health and Disease* (Eds., Packer, L., and Fuchs, J.), Marcel Dekker, Inc., New York, pp. 9-13
- Siperstein, M.M., and Fagon, V.M. 1966. Feedback control of mevalonate synthesis by dietary cholesterol. *J. Biol. Chem.* 241: 602-609.
- Smith, I.D., and Perdue, H.S. 1966. Isolation and tentative identification of the carotenoids present in chicken skin and egg yolks. *Poult. Sci.* 45: 577-581.
- Sohail, S.S., Bryant, M.M., and Roland, D.A. 2003. Influence of dietary fat on economic returns of commercial leghorns. *J. Appl. Poult. Res.* 12(3): 356-361.
- Stadelman, W.J. 1995a. Egg-production practices. *Egg Science and Technology* 4<sup>th</sup> eds. (Eds., Stadelman, W.J., and Cotterill, O.J.), Haworth Press, Inc. New york, London, pp. 9-38.
- Stadelman, W.J. 1995b. Quality identification of shell eggs. *Egg Science and Technology* 4<sup>th</sup> eds. (Eds., Stadelman, W.J., and Cotterill, O.J.), Haworth Press, Inc. New york, London. pp. 39-66.
- Steel, R.G.D., and Torrie, J.H. 1960. *Prin. Proc. Stat.* N.Y.: McGraw-Hill Book co., Inc.
- Steiner, M. 1983. Effect of alpha-tocopherol administration on platelet function in man. *Thromb. Hemost.* 49: 73-77.
- Stifani, S., Barber, D.L., Nimpf, J., and Schneider, W.J. 1990. A single chicken oocyte plasma membrane protein mediates uptake of very low density lipoprotein and vitellogenin. *Proc. Natl. Acad. Sci. USA.* 87: 1955-1959.

- Stifani, S., George, R., and Schneider, W.J. 1987. Solubilisation and characterization of the chicken oocyte vitellogenin receptor. Biochem. J. 250: 467-475.
- Taurog, A., Lorenz F.W., Entenman, C., and Chaikoff, I.L. 1944. The effect of diethylstilbestrol on the in vitro formation of the phospholipids in the liver as measured with radioactive phosphorus. Endocrinology 35: 483-487.
- Theriault, A., Chao, J.T., Wang, Q., Gapor, A., and Adeli, K. 1999. Tocotrienol: A review of its therapeutic potential. Clin. Biochem. 32: 309-319.
- Thompson, B.K., and Hamilton, R.M. 1982. Comparison of the precision and accuracy of the flotation and Archimedes methods for measuring the specific gravity of egg. Poult. Sci. 62: 1599-1605.
- Traber, M.G., Burton G.W., Ingold, K.U., and Kayden, H.J. 1990a. *RRR*- and *SRR*- $\alpha$ -tocopherols are secreted without discrimination in human chylomicrons, but *RRR*- $\alpha$ -tocopherol is preferentially secreted in very low density lipoproteins. J. Lipid Res. 31: 675-685.
- Traber, M.G., Ingold, K.U., Burton, G.W., and Kayden, H.J. 1988. Absorption and transport of deuterium-substituted *2R,4'R,8'R*- $\alpha$ -tocopherol in human lipoproteins. Lipids 23: 791-797.
- Traber, M.G., Rallis M., Podda, M., Weber, C., Maibach, H.I., and Packer, L. 1998. Penetration and distribution of  $\alpha$ -tocopherol,  $\alpha$ - or  $\gamma$ -tocotrienols applied individually onto murine skin. Lipids 33: 87-91.
- Traber, M.G., Sokol, R.J., and Burton, G.W. 1990b. Impaired ability of patients with familial isolated vitamin E deficiency to incorporate  $\alpha$ -tocopherol into lipoproteins secreted by the liver. J. Clin. Invest. 85: 397-407.

- Traber, M.G., Cohn, W., and Muller, D.P.R. 1993. Absorption, transport and delivery to tissue. Vitamin E in Health and Disease (Eds., Packer, L., and Funchs, J.), Marcel Dekker, Inc. New York, pp. 35-51.
- Thompson, B.K. and R.M. Hamilton. 1982. Comparison of the precision and accuracy of the flotation and Archimedes methods for measuring the specific gravity of eggs. Poult. Sci. 61: 599-1605.
- Ueda, T., and Igarashi O. 1987. New solvent system for extraction of tocopherols from biological specimens for HPLC determination and the evaluation of 2,2,5,7,8-pentamethyl-6-chromanol as an internal standard. J. Micronutr. Anal. 3: 185-198.
- Ullrey., D.E. 1981. Vitamin E for swine. J. Anim.Sci. 53: 1039-1056.
- Van Elsyk, M.E., Schake, L.S., and Hargis, P.S. 1991. Evaluation of two extraction methods for the determination of egg yolk cholesterol. Poult. Sci. 70: 1258-1260.
- Van Meer, G. 1989. Lipid traffic in animal cells. Ann.I Rev. Cell. Biol. 5: 247-275.
- Vuilleumier, J.P. 1969. The Roche yolk colour fan--An instrument for measuring yolk colour. Poult. Sci. 48: 767-779.
- Weiser, H., Riss, G., and Kormann, A.W. 1996. Biodiscrimination of the eight alpha-tocopherol stereoisomers results in preferential accumulation of the four 2R forms in tissues and plasma of rats. J. Nutr. 126: 2539-2549.
- Weiser, H., Vecchi, M., and Schlachter, M. 1986. Sterioisomers of  $\alpha$ -tocopheryl acetate. IV. USP units and  $\alpha$ -tocopherol equivalents of *all-rac*-, *2-ambo*- and *RRR*- $\alpha$ -tocopherol equivalated by simultaneous determination of resorption-gestation, myopathy and liver storage capacity in rats. Int. J. Vitam. Nutr. Res. 56: 45-56.

Widhalm, K., Holzl, M., and Brubacher, G. 1985. Lipid, lipoproteins and alpha-tocopherol: relationship and changes during adolescence. A longitudinal study. Ann. Nutr. Matab. 29: 12-18.

Yaffee, M., Schutz, H., Stone, J., Bokhari, S., and Zeidler, G. 1991. Consumer perception and utilization of eggs and egg productions. Poult. Sci. 70: 188.



## BIOGRAPHY

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