

## REFERENCE

- Abbas, A. K., A. H. Lichtman, and J. S. Pober. 2000. Cellular and Molecular Immunology. 4<sup>th</sup> ed. W. B. Sanders Company., pp. 30-35.
- Afzal, M., R. P. Tengerdy, R. P. Ellis, C. V. Kimerling, and C. J. Morris. 1984. Protection of rams against Epodiymitis by a Brucella ovis-Vitamin E adjuvant vaccine. *Vet. Immunol. Immunopathol.*, 7: 293-304.
- Alexander, M., H. Newmark, and R. G. Miller. 1985. Oral beta-carotene can increase cells in human blood. *Immunol. Lett.*, 9: 221.
- Anderson, R., and P. T. Lukey. 1987. A biological role for ascorbate in the selective neutralization of extracellular phagocyte-derived oxidants. *Ann. NY Acad. Sci.*, 498: 229-233.
- Aziz, E., and P. H. Klesius. 1986. Effect of selenium deficiency on caprine polymorphonuclear leukocyte production of leukotriene B<sub>4</sub> and its neutrophil chemotactic activity. *Am. J. Vet. Res.*, 47: 426-428.
- Bains, B. S. 1994. Vitamin E and immune in poultry in medicine. *World poultry.*, 7: 51
- Baker, K. R., and M. Meydani. 1994. Beta-carotene in immunity and cancer. *J. Optim. Nutr.*, 3:39.
- Bang, B. G., M. A. Ford, and F. B. Bang. 1973. The effect of vitamin A deficiency and Newcastle disease on lymphoid cell systems in chickens. *Proc. Soc. Exp. Biol. Med.*, 143: 114-1146.
- Barnett, J. B. 1983. Immunomodulating effects of 13-cis-retinoic acid on the IgG and IgM response of BALB/c mice. *Int. Arch. Allergy Appl. Immunol.*, 72: 227-233.
- Basu, T. K., and C. J. Schorah. 1982. The role of vitamin C. In: Vitamin C in Health and Disease. USA : Avi. Publishing Co., Westport, CT, Inc., pp. 54-60.
- Belyakov, I. M., Z. Hel, and B. Kelsall. 1998. Mucosal immunisation with HIV-1 peptide vaccine induces mucosal and systemic cytotoxic T-lymphocytes and protective immunity in mice against intrarectal recombinant HIV-vaccine challenge. *Proc. Natl. Acad. Sci.*, 95: 1709-1714.

- Bendich, A., and S. S. Shapiro. 1986. Effect of  $\beta$ -carotene and canthaxanthin on the immune responses of the rat. *J. Nutr.*, 116: 2254-22262.
- Bendich, A., E. Gabriel, and L. J. Machlin. 1986. Dietary vitamin E requirement for optimum immune responses in the rat. *J. Nutr.*, 116: 675-681.
- Bendich, A., P. Dapolito, E. Gabriel, and L. J. Machlin. 1984. Interaction of dietary vitamin C and vitamin E on guinea pig immune responses to mitogens. *J. Nutr.*, 144: 1588-1593.
- Blair, L., and K. A. Cummins. 1984. Effect of dietary ascorbic acid on blood immunoglobulin concentration in dairy calves. *J. Dairy Sci.*, 67: 138.
- Boveris, A., and B. Chance. 1973. The mitochondrial generation of hydrogen peroxide. General properties and effect of hyperbaric oxygen. *Biochem. J.*, 134:707-716.
- Brandtzaeg P. 1996. History of oral tolerance and mucosal immunity. *Ann N Y Acad Sci*; 778: 1-27.
- Brandtzaeg P. 1998. Development and basic mechanisms of human gut immunity. *Nutr Rev*; 56: S5-S18.
- Brandtzaeg, P. 2003. Mucosal immunity: integration between mother and the breast-fed infant. *J. Vaccine.*, 21: 3382-3388.
- Brandtzaeg, P., I. N. Farstad, F. E. Johansen, H. C. Morton, I. N. Norderhaug, and T. Yamanaka. 1999. The B-cell system of human mucosae and exocrine glands. *Immunol Rev.*, 171: 45-87.
- Bryant, R. W., and J. M. Bailey. 1980. Altered lipoygenase metabolism and decreased glutathine peroxidase activity in platelets from selenium-deficient rats. *Biochem. Biophys. Res. Commun.*, 92: 268-276.
- Burton, G. W. 1989. Antioxidant action of carotenoids. *J. Nutr.*, 119: 109-111.
- Burton, G. W., and M. G. Traber. 1990. Vitamin E: Antioxidant activity, biokinetics, and bioavailability. *Annu. Rev. Nutr.*, 10: 357-382.
- Butera, S. T., and S. Krakowka. 1986. Assessment of lymphocyte function during vitamin A deficiency. *Am. J. Vet. Res.*, 47: 850-855.
- Butter, N. L., A. T. Hattersley, and P. M. Clark. 2001. Development of bloodspot assay for insulin. *Clinical Chimica Acta.*, 310: 141-150.

- Chance, B., H. Sies, and A. Boveris. 1979. Hydroperoxide metabolism in mammalian organs. *Physiol. Rev.*, 59: 527-605.
- Chew, B. P. 1987. Vitamin A and B-carotene on host defense. *J. Dairy Sci.*, 70: 2732-2743.
- Chew, B. P. 1993(a). Role of carotenoids in the immune response. Symposium on "Antioxidants, Immune Response and Animal Function". *J. Dairy Sci.*, 76: 2804-2811.
- Chew, B. P. 1993(b). Effects of supplemental B-carotene and vitamin A on reproduction in swine. Symposium on High supplemental vitamin levels and reproductive function in swine. *J. Anim. Sci.*, 71: 247-252.
- Chew, B. P. 1996. Importance of Antioxidant vitamins in immunity and health in animals. *J. Anim. Feed. Sci. Tech.*, 59: 103-114.
- Cicero, A. F., and Gaddi. A. 2001. Rice bran oil and gamma-oryzanol in the treatment of hyperlipoproteinaemias and other conditions. *PTR: Phytotherapy Research.*, 15: 277-289.
- Cohen, B. E., and I. K. Cohen. 1973. Vitamin A: adjuvant and steroid antagonist in the immune response. *J. Immunol.*, 111: 1376-1380.
- Corwin, L. M., and J. Xhloss. 1980. Influence of vitamin E on the mitogenic response of murine lymphoid cells. *J. Nutr.*, 110: 916-923.
- Cross, C. E., B. Halliwell, and E. T. Borish. 1987. Oxygen radicals and human disease. *Annals. Intern. Med.*, 107: 526-545.
- Crowther, J. R. 1995. Methods in molecular biology ELISA theory and practice, USA: Humana Press Inc., pp. 131-149.
- Cummins, K. A., and C. J. Brunner. 1989. Dietary ascorbic acid and immune response in dairy calves. *J. Dairy Sci.*, 72: 129-134.
- Daniel, L. S., B. P. Chew, T. S Tanaka, and L. W. Tjoelker. 1986. In vitro vitamin A and  $\beta$ -carotene influence on blood lymphocyte transformation. *J. Dairy Sci.*, 69: 118.
- Daniel, L. S., B. P. Chew, T. S Tanaka, and L. W. Tjoelker. 1990(a).  $\beta$ -Carotene and vitamin A effects on Bovine phagocyte function in vitro during the peripartum period. *J. Dairy Sci.*, 74: 124-131.
- Daniel, L. S., B. P. Chew, T. S Tanaka, and L. W. Tjoelker. 1990(b). In vitro effects of B-carotene and vitamin A on peripheral blood mononuclear cell proliferation. *J. Dairy Sci.*, 74: 911-915.

- Davis, C. T., and J. L. Sell. 1983. Effect of all-trans retinol and retinoic acid nutrition on the immune system of chickens. *J. Nutr.*, 113: 1914-1919.
- Deckere, E. A. M., and O. Korver. 1996. Minor constituents of rice bran oil as functional foods. Copyright International Life Sciences Institute and Nutrition Foundation. Washington: Nutrition Reviews., 54: S120-136.
- Dennert, G., and R. Lotan. 1978. Effect of retinoic acid on the immune system: stimulation of T-killer cell induction. *Eur. J. Immunol.*, 8: 23-29.
- Derubertis, F. R., T. V Zenser, W. H. Adler, and T. Hudson. 1974. Role of cyclic adenosin 3, 5-monophosphate in lymphocyte mitogenesis. *J. Immunol.*, 113: 151-161.
- Diack, M., and M. Saska. 1994 . Separation of vitamin E and  $\gamma$ -oryzanol from rice bran oil by normal-phase chromatography. *J. Am. Oil Chem. Soc.*, 71: 1211-1217.
- Droke, E. A., and S. C. Loerch. 1989. Effects of parenteral selenium and vitamin E on performance, health and humoral immune response of steers new to the feedlot environment. *J. Anim. Sci.*, 67: 1350-1359.
- Duve, J. K., and P. J. White. 1991. Extraction and identification of antioxidants in oats. *J. Am. Oil Chem. Soc.*, 68: 365-370.
- Eriksson, K., M. Quiding-Jarbrink, J. and Osek. 1999. Specific-antibodysecreting cells in the rectums and genital tracts of non-human primates following vaccination. *Infect. Immunol.*, 66: 5889-5896.
- Eskew, M. L., R. W. Scholz, C.C. Reddy, D. A. Todhunter, and A. Zarkower. 1985. Effects of vitamin E and selenium deficiencies on rat immune function. *Immunol.*, 54: 173-180.
- Evershed, R. P., N. Spooner, M. C. Prescott, and L. J. Goad. 1988. Isolation and characterization of intact sterol ferulates from seeds. *J. Chromatogr.*, 440: 23-35.
- Fraker, L. D., S. A. Halter, and J. T. Forbes. 1986. Effects of orally administered retinol on natural killer cell activity in wild type BALB/c and congenitally athymic BALB/c mice. *Cancer. Immunol. Immunother.*, 21: 114-118.
- Fraser, R. C., S. Paclovic, C. G. Kurahara, C. G. Murata, A. Murata, N. S. Peterons, K. B. Taylor, and G. A. Feigen. 1978. The effects of variations in vitamin C intake on the cellular immune response of tuinea pigs. *Am. J. Clin. Nutr.*, 33: 839-847.

- Freeman B, A., and J. D. Crapo. 1982. Biology of disease: Free radicals and tissue injury. *Lab. Invest.*, 47: 412-426.
- Fujiwara, S., S. Sakurai, I. Sugimoto, and N. Awata. 1983. Absorption and metabolism of  $\gamma$ -oryzanol in rats. *Chem. Pharm. Bull.*, 31: 645-652
- Gebremichael, A., E. M. Levy, and L.M. Corwin. 1984. Adherent cel requirement for the effect of vitamine E on in vitro antibody synthesis. *J. Nutr.*, 114: 1297-1305.
- Girotti, A. W. 1998. Lipid hydroperoxide generation, turnover, and effector action in biological systems. *J. Lipid. Res.*, 39:1529-1542.
- GL Sciences. Inc. 1998. "Analysis of gamma oryzanol" [Online]. Available <http://www.inertsil.com/Chromatograms/Biochem/F27.htm>, [2004, May 24].
- General Nutrition Centers. Inc. 1997. "gamma oryzanol supplementation in human" [Online]. Available <http://gnc.mondosoft.com/cgi-bin/MsmFind.exe?QUERY=oryzanol> [2003, May 24].
- Goeptar, A. R., H. Sheerens and N. P. Vermeulen. 1995. Oxygen and xenobiotic reductase activities of cytochrome P450. *Crit. Rev. Toxicol.*, 25: 25-65.
- Gowans, J. L., and E. J. Knight. 1964. The route of recirculation of lymphocytes in the rat. *Proc. R. Soc. Lond.*, 159: 257-282.
- Graf, E. 1992. Antioxidant potential of ferulic acid. *Free. Radic. Biol. Med.*, 13: 435-448
- Gross, W. B., D. Jones, and J. Cherry. 1988. Effect of ascorbic acid on the disease caused by *Escherichia coli* challenge infections. *Avian Dis.*, 32: 407-409.
- Gruner, S., H. D. Volk, P. Falck, and R. V. Baehr. 1986. The influence of phagocytic stimuli on the expression of HLA-DR antigens; role of reactive oxygen intermediates. *Eur. J. Immunol.*, 16: 212.
- Gyang, E. O., J. B. Stevens, W. G. Olson, S. D. Tsitsamis, and E. A. Usenik. 1984. Effects of selenium-vitamin E in jection on bovine polymorphonucleated leukocytes phagocytosis and killing of *Staphylococcus aureus*. *Am. J. Vet. Res.*, 45: 175-177.
- Halliwell, B., and J. M. C. Gutteridge. 1984. Oxygen toxicity, oxygen radicals, transition metals and disease. *Biochem. J.*, 219: 1014-1023.
- Halliwell, B., and J. M. C. Gutteridge. 1999. Free radical in biology and medicinal 3<sup>rd</sup> ed. India: Thomson press Ltd., pp. 22-30

- Harris, R. E., L. A. Boxer, and R. L. Baehner. 1980. Consequences of vitamin E deficiency on the phagocyte and oxidative function of the rat polymorphonuclear leukocyte. *Blood.*, 55: 338-343.
- Hayek, M. B., G. E. Mitchell, R. J. Harmon, T. S. Stahly, G. L. Cromwell, R. E. Tucker, and K. B. Baker. 1989. Porcine immunoglobulin transfer after prepartum treatment with selenium or vitamin E. *J. Anim. Sci.*, 67: 1299-1306.
- Heinzerling, R. H., C. F. Nockels, C. L. Quarles, and R. P. Tengerdy. 1974. Protection of chicks against E. coli infection by dietary supplementation of vitamin E. *Proc. Soc. Exp. Biol. Med.*, 146: 279-283.
- Heirman, L. R., B. P. Chew, T. S. Wong, J. J. Michal, and F. E. Standaert. 1990. Effects of dietary B-carotene on lymphocyte function in peripartum dairy cows. *J. Dairy Sci.*, 73: 166.
- Hoskinson, C. D., B. P. Chew, and T. S. Wong. 1989. Effects of  $\beta$ -carotene and vitamin A on mitogen-induced lymphocyte proliferation in the pig in vivo. *Fed. Am. Soc. Exp. Biol. J.*, 3: A663.
- Hoskinson, C. D., B. P. Chew, and T. S. Wong. 1992. Effects of injectable  $\beta$ -carotene and vitamin A on lymphocyte proliferation and polymorphonuclear neutrophil function in piglets. *Biol. Neonate.*, 62: 325-336.
- Hughes, D. A. 2001. Dietary carotenoids and human immune function. *J. Nutr.*, 17: 823 – 827.
- Hughes, D. A. 2002. Antioxidant vitamins and immune function. Nutrition and Consumer Science Division, Institute of Food Research, Norwich Research Park, Norwich NR4 7UA., pp. 171-191.
- Humphrey, B. D., and K. C. Klasing. 2004. Modulation of nutrient metabolism and homeostasis by the immune system. *J. world's poultry Science.*, 60: 90-95.
- Ikeda, I., and M. Nakashima-Yoshida Sugano. 1985. Effects of cycloartenol on absorption and serum levels of cholesterol in rats. *J. Nutr. Sci. Vitaminol.*, 31: 375-384.
- Itoh, T., T. Tamura and T. Matsumoto. 1973(b). Methylsterol composition of 19 components and simultaneous assessment of tocopherols in rice bran oil. *J. Am. Oil. Chem. Soc.*, 50: 300-303.
- Itoh, T., T. Tamura, and T. Matsumoto. 1973(a). Sterol composition of 19 vegetable oils. *J. Am. Oil. Chem. Soc.*, 50: 122-125.

- Jackman, J. B. W., and H. C. Gibbs. 1968. Studies on the interrelationships between vitamin A intake and *Dictyocaulus viviparus* infection in calves. *Can. Vet. J.*, 9: 199-209.
- Jackson, P. W., G. R. J. Law, and C. F. Nockels. 1978. Maternal vitamin E alters passively acquired immunity of chicks. *Poultry Sci.*, 70-73.
- Jurin, M., and I. F. Tannock. 1972. Influence of vitamin A on immunological response. *Immunol.*, 23: 283-287.
- Kaneko, R., and T. Tsuchiya. 1954. New compound in rice bran and germ oils [Abstract; in Japanese]. *J. Chem. Soc. Jpn.*, 57: 526
- Karladee, D., P. Pongpiachan, T. Teltathum, and A. Gavilo. 2003. Accumulation of gamma-oryzanol in purple rice grain. In: Poster presentation, The 2<sup>nd</sup> International conference on Medicinal Mushroom and the International conference on Biodiversity and Bioactive Compound. 17-19 July. PEACH, Pattaya, Thailand.
- Kinnula, V. L. and J. D. Crapo. 2003. Superoxide dismutase in malign and cells and human tumors. *J. Free. Rad. Biol. Med.*, in press.
- Kuenzig, W., J. Chau, and E. Norkus. 1984. Caffeic and ferulic acid as blockers of nitrosamine formation. *Carcinogenesis.*, 5: 309-313.
- Kumar, M., and A. E. Axelrod. 1969. Circulating antibody formation in scorbutic guinea-pigs. *J. Nutr.*, 98: 41-44.
- Lawrence, L. M., M. M. Mathias, C. F. Nockels, and R. P. Tengerdy. 1985. The effect of vitamin E on prostaglandin levels in the immune organs of chicks during the course of an *E. coli* infection. *Nutr. Res.*, 5: 497-509.
- Lehner, T., L. A. Bergmeier, and C. Panagiotidi. 1992. Induction of mucosal and systemic immunity to a recombinant simian immunodeficiency viral protein. *Science.*, 258: 1365-1369.
- Lehner, T., R. Brookes, and C. Panagiotidi. 1993. T and B cell functions and epitope expression in non-human primates immunized with SIV by the rectal as compared with the systemic route. *Proc Natl. Acad. Sci.*, 90: 8638-8642.
- Lessard, M., W. C. Yang, G. S. Elliott, A. H. Rebar, J. F. Van Vleet, N. Deslauriers, G. J. Brisson. and R. D. Schultz. 1991. Cellular immune responses in pigs fed a vitamin E-and selenium-deficient diet. *J. Anim. Sci.*, 69: 1575-1582.

- Li, Y., and T. Lovel. 1985. Elevated levels of dietary ascorbic acid increase immune responses in channel catfish. *J. Nutr.*, 115: 123-131.
- Likoff, R. O., D. R. Guptill, L. M. Lawrence, C. C. McKay, M. M. Mathias, C. F. Nockels, and R. P. Tengerdy. 1981. Vitamin E and aspirin depress prostaglandins in protection of chickens against *Escherichia coli* infection. *Am J. Clin. Nutr.*, 34: 245-251.
- Macrae, R., R. R. Robinson, and M. J. Sadler. 1993. Tocopherols. *Encyclopaedia of Food science food technology and Nutrition.*, 7: 4569-4579.
- Mark, D. A., B. S. Baliga, and R. M. Suskind. 1983. All-trans retinoic acid reversed immune-related hematological changes in the vitamin A deficient rat. *Nutr. Rep. Int.*, 28: 1245-1252.
- Marshall, W. E., and J. I. Wadsworth. 1994. *Rice science and technology, USA*: Marcel Dekker, Inc., pp. 421-473.
- Mbawuike, I. N., W. E. Rizzoni, M. R. Rose, J. Shloss, M. P. Kurek, and L. M. Corwin. 1982. Effects of K3T3 sarcomas on tissue concentrations of vitamin E. *Nutr. Cancer.*, 2: 140-145.
- McCall, M. R., and B. Frei. 1999. Can antioxidant vitamins materially reduce oxidative damage in humans. *Free. Rad. Biol. Med.*, 26: 1034-1053.
- McCord, J. M., and I. Fridovich. 1969. Superoxide dismutase. an enzymic function for erythrocyte hemocuprein (hemocuprein). *J. Biol. Chem.*, 244: 6049-6055.
- McCorkle, F., R. Taylor, R. Stinson, E. J. Day and B. Glick. 1980. The effects of a megalevel of vitamin C on the immune response of the chicken. *Poultry Sci.*, 59: 1324-1327.
- McDermott, M. R., and J. Bienenstock. 1979. Evidence for a common mucosal system I Migration of B immunoblasts into intestinal respiratory and genital tissues. *J. Immunol.*, 122: 1892-1898.
- McGhee, J. R., C. Czerkinsky, and J. Mestecky. 1999. Mucosal vaccines: overview. *In: Mucosal immunology*. 2<sup>nd</sup> edition. New York: Academic Press., pp. 741-757.
- Meeker, H. C., M. L. Eskew, W. Scheuchenzuber, R. W. Scholz, and A. Zarkower. 1985. Antioxidant effects on cell-mediated immunity. *J. Leukocyte Biol.*, 38: 451-458.



- Mestecky, J., W. H. Kutteh, and S. Jackson. 1994. Mucosal immunity in the female genital tract: relevance to vaccination efforts against the human immunodeficiency virus. *AIDS. Res. Hum. Retroviruses.*, 10: S11-20.
- Michal, J. J., B. P. Chew, T. S. Wong, L. R. Heirman, and F. E. Standaert. 1994. Modulatory effects of dietary B-carotene on blood and mammary leukocyte function in peripartum dairy cows. *J. Dairy Sci.*, 77: 1408-1422.
- Moriguchi, S., L. Werner, and R. R. Watson. 1985. High dietary vitamin A (retinyl palmitate) and cellular immune functions in mice. *Immunol*, 56: 169-176.
- Moser, V. 1987. Uptake of ascorbic acid by leukocytes. *Ann. NY Acad. Sci.*, 498: 200-205.
- Nakamura, H. 1966. Effect of gamma-oryzanol on hepatic cholesterol biosynthesis and fecal excretion of cholesterol metabolites [in Japanese]. *Radioisotopes.*, 25: 371-374.
- Nauss, K. M., D. A. Mark, and R. M. Suskind. 1979. The effects of vitamin A deficiency on the in vitro cellular immune response of rat. *J. Nutr.*, 109: 1815-1823.
- Nelson, W. A., J. Weintraub, and R. Hironaka. 1968. Effects of vitamin A deficiency and ked resistance on the feeding of *Dermacentor andersoni* on sheep. *Exp. Parasitol.*, 22: 240-244.
- Niki, E. 1987. Uptake of ascorbic acid by leukocytes. *Ann. NY Acad. Sci.*, 498:186-199.
- Nockels, C. F. 1979. Protective effects of supplemental vitamin E against infection. *Fed. Proc.*, 38: 2134-2138.
- Nockels, C. F., G. A. Lopez, and R. W. Phillips. 1973. Influence of vitamins A and C on corticosterone and carbohydrate metabolism in chickens. *Poultry Sci.*, 52: 1261-1269.
- Norton, R. A., 1995. Quantitation of steryl ferulate and pcoumarate esters from corn and rice. *Lipids.*, 30: 269-274.
- NRC. 1978. Nutrient requirements of Laboratory Animals. 3<sup>rd</sup> edition. The National Research Council., pp. 38-53.
- Packer, L., M. Hiramatsu, and T. Yoshikawa. 1999. Antioxidant food supplements in human health. England: Academic press, pp 482.
- Peplowski, M. A., D.C. Mohan, F. A. Murray, A. L. Moxon, A. H. Cantor, and K. E. Ekstrom. 1980. Effect of dietary and injectable vitamin E and selenium in weanling swine, antigenically challenged with sheep red blood cells. *J. Anim. Sci.*, 51: 344-351.

- Plummer, D. T. 1989. The organization of living cells. *Biochemistry : The chemistry of life*. UR: McGraw – Hill Book Company., 66-69 and 225-281.
- Pongpichan, P., T. Teltathum, and D. Karladee. 2004.  $\gamma$ -oryzanol quantity in plant products, *J. Agriculture*. Chiang Mai University, in press.
- Reffett, J. K., J. W. Spears, and T. T. Jr. Brown. 1988. Effects of dietary selenium and vitamin E on the primary and secondary immune response in lambs challenged with parainfluenza<sub>3</sub> virus. *J. Anim. Sci.*, 66: 1520-1528.
- Rogers, E. J., S. M. Rice, R. J. Nicolosi, D. R. Carpenter, C. A. McClelland and L. J. Romanczyk. 1993. Identification and quantitation of  $\gamma$ -oryzanol components and simultaneous assessment of tocopherols in rice bran oil. *J. Am. Oil Chem. Soc.*, 70: 301-307.
- Roth, E. 1997. Oxygen free radicals and their clinical implications. *Acta. Chirurg. Hung.*, 36: 302-305.
- Roth, J. A. and M. L. Kaerberle. 1985. In vivo effect of ascorbic acid on neutrophil function in healthy and dexamethasone-treated cattle. *Am. J. Vet. Res.*, 46: 2434-2436.
- Russell, M. W., J. Reinholdt, and M. Kilian. 1989. Anti-inflammatory activity of human IgA antibodies and their Fab-fragments: inhibition of IgG-mediated complement activation. *Eur. J. Immunol.*, 19: 2243-2249.
- Saalmüller, A., and J. Bryant. 1994. Characteristics of porcine T lymphocytes and T-cell. *Veterinary immunology and immunopathology.*, 43: 45-52.
- Sayre, B., and R. Saunders. 1990. Rice bran and rice bran oil. *Lipid Technol.*, 2: 72-76.
- Schwartz, J. L., E. Flynn, and G. Shklar. 1990. The effect of carotenoids on the antitumor immune response in vivo and in vitro with hamster and mouse effectors. *Micronutr. Immunol. Function.*, 587: 92-109.
- Scrimshaw, N. S., C. E. Taylor, and J. E. Gordon. 1968. Interactions of nutrition and infection. *WHO Monogr.*, 57: 87-94.
- Seetharamaiah, G. S., and N. Chandrasekhara. 1989. Studies on hypocholesterolemic activity of rice bran oil. *Atherosclerosis.*, 78: 219-223.
- Seetharamaiah, G. S., and N. Chandrasekhara. 1993. Comparative hypocholesterolemic activities of oryzanol, curcumin and ferulic acid in rats. *J. Food. Sci. Technol.*, 30: 249-252.

- Seifter, E., G. Rettura, and S. M. Levenson. 1981. Carotenoids and cell-mediated immune responses. In: G. Charalambois, G. Inglett (Editors), *The quality of Foods and Beverages. Chemistry and Technology*, New York: Academic Press., pp. 2: 335-347.
- Sharma, R. D. 1980. Effects of hydroxy acids on hypercholesterolaemia in rats. *Atherosclerosis.*, 37: 463-468.
- Sirisinha, S., M. D. Darip, P. Moonkarndi, M. Ongsakul, and A. J. Lamb. 1980. Impaired local immune response in vitamin A-deficient rats. *Clin. Exp. Immunol.*, 40: 127-135.
- Srinivasan, M. R., and M. N. Satyanarayana. 1988. Influence of capsaicin, eugenol, curcumin and ferulic acid on sucroseinduced hypertriglyceridemia in rats. *Nutr. Rep. Int.*, 38: 571-581.
- Stephens, L. C., A. E. McChesney, and C. F. Nockels. 1979. Improved recovery of vitamin E treated lambs that have been experimentally infected with intratracheal chlamydia. *Br. Vet. J.*, 135: 291-296.
- Swell, L., H. Fiel, and C. R. Treadwell. 1954. Sterol specificity of pancreatic cholesterol esterase. *Proc. Soc. Exp. Biol. Med.*, 87: 216-218.
- Tengerdy, R. P., R. H. Heinzerling, G. L. Brown, and M. M. Mathias. 1973. Enhancement of the humoral immune response by vitamin E. *Int. Arch. Allergy.*, 44: 221-232
- Tengerdy, R. P., L. H. MyerLauerman, D. C. Leuker, and C. F. Nockels. 1983. Vitamin E enhanced humoral antibody response to *Clostridium perfringens* type D in sheep. *Br. Vet. J.*, 139: 147-152.
- Terao, J., and M. K. Piskula. 1999. Flavonoids and membrane lipid peroxidation inhibition. *J. Nutr.*, 15: 790-791.
- Tjoelker, L. W., B. P. Chew, T. S. Tanaka, and L. R. Daniel. 1986. Effects of vitamin A and B-carotene on phagocytosis and killing by bovine mammary neutrophils in vitro. *J. Dairy Sci.*, 69: 103.
- Tjoelker, L. W., B. P. Chew, T. S. Tanaka, and L. R. Daniel. 1988(a). Bovine vitamin A and B-carotene intake and lactational status. 1. Responsiveness of peripheral blood polymorphonuclear leukocytes to vitamin A and B-carotene challenge in vitro. *J. Dairy Sci.*, 71: 3112-3119.
- Tjoelker, L. W., B. P. Chew, T. S. Tanaka, and L. R. Daniel. 1988(b). Bovine vitamin A and B-carotene intake and lactational status. 1. Responsiveness of peripheral blood

- polymorphonuclear leukocytes to vitamin A and B-carotene challenge in vitro. *J. Dairy Sci.*, 71: 3120-3127.
- Tjoelker, L. W., B. P. Chew, T. S. Tanaka, and L. R. Daniel. 1990. Effect of dietary vitamin A and B-carotene on polymorphonuclear leukocyte and lymphocyte function in dairy cows during the early dry period. *J. Dairy Sci.*, 73: 1017-1022.
- Tomita, Y., K. Himeno, K. Nomoto, H. Endo, and T. Hirohata. 1985. Vitamin A and tumor immunity. *Experientia.*, 41: 92-93.
- Tomita, Y., K. Himeno, K. Nomoto, H. Endo, and T. Hirohata. 1987. Augmentation of tumor immunity against syngeneic tumors in mice by B-carotene. *J. Natl. Cancer Inst.*, 78: 679-681.
- Turgeon, M. L. 1996. Immunology and serology in laboratory medicine 2<sup>nd</sup> edition. Mosby-year book Inc., pp. 3-7 and 64.
- Turrens J. F., A. Alexandre, and A. L. Lehninger. 1985. Ubisemiquinone is the electron donor for superoxide formation by complex III of heart mitochondria. *Biochem. Biophys.*, 237:408-414.
- Turrens J. F., and A. Boveris. 1980. Generation of superoxide anion by the NADH dehydrogenase of bovine heart mitochondria. *Biochem. J.*, 191: 421-427.
- Voet and Voet. 1995. Biochemistry 2<sup>nd</sup> ed. United States of America : John Wiley & sons, Inc., pp. 298.
- Wada, K., F. Okuda, and H. Miki. 1981. Effect of gammaoryzanol on serum lipids and serum lipid peroxide levels [in Japanese]. *Geriatr. Med.*, 19: 1183-1186.
- Wakikawa, A., M. Utsuyama, A. Wakabayashi, M. Kitagawa, and K. Hirokawa. 1999. Vitamin E enhances the immune functions of young but not old mice under restraint stress. *J. Experimental Gerontology.*, 34: 853-862.
- Watson, R. R., R. H. Prabhala, P. M. Plzia, and D. S. Albetts. 1991. Effects of B-carotene on lymphocyte subpopulations in elderly humans: evidence for a dose-response relationship. *Am. J. Clin. Nutr.*, 53: 90-94.
- Wattenberg L. W., J. B. Coccia, L. K. T. Lam. 1980. Inhibitor effects of phenolic compounds on bezo(a)pyrene-induced neoplasia. *Cancer Res.*, 40: 2820-2823
- Weisz-Carrington, P., Jr. S. R. Grimes, and M. E. Lamm. 1987. Gut-associated lymphoid tissue as a source of an IgA response in respiratory tissues after oral immunization and intrabronchial challenge. *Cell Immunol.*, 106: 132-139.

- Wheeler, K. B., and K. A. Garleb. 1991. Gamma oryzanol-plant sterol supplementation: metabolicendocrine and physiological effects. *Int. J. Sport. Nutr.*, 1: 170-177
- Wuryastuti, H., H. D. Stowe, R. W. Bull, and E. R. Miller. 1993. Effects of vitamin E and selenium on immune response of peripheral blood, colostrum, and milk leukocytes of sows. *J. Anim. Sci.*, 71: 2464-2472.
- Xu, Z., and J. S. Godber. 1999. Purification and identification of components of gamma oryzanol in rice bran oil. *J. Agric. Food. Chem.*, 47: 2724 -2728.
- Xu, Z., N. Hua, and J. S. Godber. 2001. Antioxidant activity of tocopherols, tocotrienols, and gamma oryzanol components from rice bran against cholesterol oxidation accelerated by 2, 2'-azobis (2-methylpropionamide) dihydrochloride. *J. Agric. Food. Chem.*, 49: 2077- 2081.