

REFERENCES

- Aherne, S.A. and O'Brien, N.M. 2002. Dietary flavonols: chemistry, food content, and metabolism. *Nutrition*, 18 (1):75– 81.
- Anwar-Mohamed, A. and El-Kadi, A.O. 2009. Down-regulation of the detoxifying enzyme NAD(P)H:quinone oxidoreductase 1 by vanadium in Hepa 1c1c7 cells. *Toxicol Appl. Pharmacol.*, 236(3): 261-269.
- Asano, N., Katsuma, Y., Tamura, H., Higashikuni, N. and Hayashi, M. 1998. An automated new technique for scoring the rodent micronucleus assay: computerized image analysis of acridine orange supravitaly stained peripheral blood cells. *Mutat. Res.*, 404 (1-2): 149-154.
- Attasara, P., Buasom, R. Hospital-based cancer registry. National Cancer Institute, Bangkok 2008.
- Bannasch, P. 1986. Preneoplastic lesions as end points in carcinogenicity testing. I. Hepatic preneoplasia. *Carcinogenesis*, 7(5): 689-695.
- Benson, A.M., Hunkeler, M.J. and Talalay, P. 1980. Increase of NAD(P)H:quinone reductase by dietary antioxidants: Possible role in protection against carcinogenesis and toxicity. *Proc. Nat. Acad. Sci.*, 77(9): 5216–5220.
- Bernhardt, R. 2006. Cytochromes P450 as versatile biocatalysts. *J. biotechnol.*, 124: 128–145.
- Bianco, N.R., Chaplin, L.J. and Montano, M.M. 2005. Differential induction of quinone reductase by phytoestrogens and protection against oestrogen-induced DNA damage. *Biochem. J.*, 385(Pt 1): 279-287.
- Bock, K.W., Josting, D., Lilienblum, W. and Pfeil, H. 1979. Purification of rat-liver microsomal UDP-glucuronyltransferase. Separation of two enzyme forms inducible by 3-methylcholanthrene or phenobarbital. *Eur. J. Biochem.*, 98(1): 19-26.

- Bonassi, S., Znaor, A., Ceppi, M., Lando, C., Chang, W.P., Holland, N., Kirch-Volders, M., Zeiger, E., Ban, S., Barale, R., Bigatti, M.P., Bolognesi, C., Cebulska-Wasilewska, A., Fabianiva, E., Fucic, A., Hagmar, L., Jokesic, G., Martelli, A., Migliore, L., Mirkova, E., Scarfi, M.R., Zijno, A., Norppa, H. and Fenech, M. 2007. An increased micronucleus frequency in peripheral blood lymphocytes predicts the risk of cancer in humans. *Carcinogenesis*, 28(3): 625-631.
- Brambilla, G. and Martelli, A. 2004. Failure of the standard batter of short-term tests in detecting some rodent and human genotoxic carcinogens. *Toxicology*, 196: 1-19.
- Brankova, L., Ivanov, S., and Alexieva, V. 2007. The induction of microsomal NADPH: cytochrome P450 and NADH:cytochrome b_5 reductases by long-term salt treatment of cotton (*Gossypium hirsutum* L.) and bean (*Phaseolus vulgaris* L.) plants. *Plant Physiol. Bioch.*, 45 (9): 691-695.
- Charoensin, S., Punvittayagul, C., Pompimon, W. Mevatee, U. and Wongpoomchai, R. Toxicological and clastogenic evaluation of some flavanones isolated from *Boesenbergia pandurata* (Roxb.) in Wistar rats. *Thai. J. Toxicol.* (inpress).
- Charoensin, S. Inhibitory mechanism of pinostrobin isolated from *Boesenbergia pandurata* on diethylnitrosamine-induced initiation stage of rat hepatocarcinogenesis. Master thesis, Department of Biochemistry, Graduate School, Chiang Mai University, 2008.
- Chen, C. and Kong, A.N. 2004. Dietary chemopreventive compounds and ARE/EpRE signaling. *Free Radic. Biol. Med.*, 36(12): 1505-1516.
- Chen, C. and Kong, A.N. 2005. Dietary cancer-chemopreventive compounds: from signaling and gene expression to pharmacological effects. *Trends Pharmacol. Sci.*, 26(6): 318-326.
- Chen, P.N., Hsieh, Y.S., Chiou, H.L. and Chu, S.C. 2005. Silibinin inhibits cell invasion through inactivation of both PI3K-Akt and MAPK signaling pathways. *Chem. Biol. Interact.*, 156: 141-150.
- Chen, P.N., Hsieh, Y.S., Chiang, C.L., Chiou, H.L., Yang, S.F. and Chu, S.C. 2006. Silibinin inhibits invasion of oral cancer cells by suppressing the MAPK pathway, *J. Den. Res.*, 85: 220-225.

- Combes, R.D. 2000. The use of structure-activity relationships and markers of cell toxicity to detect non-genotoxic carcinogens. *Toxicol. In Vitro*, 14(4): 387-99.
- Cook, N.C., Samman, S. 1996. Flavonoids-Chemistry, metabolism, cardioprotective effects, and dietary sources. *Nutr. Biochem.*, 7: 66-76.
- Cullen, J.J., Hinkhouse, M.M., Grady, M., Gaut, A.W., Liu, J., Zhang, Y.P., Barby Weydert, C.J., Domann, F.E. and Oberley, L.W. 2003. Dicumarol inhibition of NADPH:quinone oxidoreductase induces growth inhibition of pancreatic cancer via a superoxide-mediated mechanism. *Cancer Res.*, 63(17): 5513-5520.
- Dasgupta T, Rao RA, Yadava KP. Chemomodulatory action of curry leaf (*Murraya koenigii*) extract on hepatic and extrahepatic xenobiotic metabolising enzymes, antioxidant levels, lipid peroxidation, skin and forestomach papillomagenesis. *Nutr Res* 2003; 23: 1427–1446.
- Debersac, P., Vernevault, M.F., Amiot, M.J., Suschetet, M., Siess, M.H. 2001. Effects of a water-soluble extract of rosemary and its purified component rosmarinic acid on xenobiotic-metabolizing enzymes in rat liver. *Food Chem. Toxicol.*, 39(2): 109-117.
- Del Rayo Camacho, M., Sanchez, B., Quiroz, H., Contreras, J.L. and Mata, R. 1991. Pinocembrin: a bioactive flavanone from *Teloxys graveolens*. *J. Ethnopharmacol.*, 31: 383–389.
- Doi, K., Wei, M., Kitano, M., Uematsu, N., Inoue, M. and Wanibuchi, H. 2009. Enhancement of preneoplastic lesion yield by Chios Mastic Gum in a rat liver medium-term carcinogenesis bioassay. *Toxicol. Appl. Pharmacol.*, 234(1): 135-142.
- Doostdar, H., Burke, M.D. and Mayer, R.T. 2000. Bioflavonoids: selective substrates and inhibitors for cytochrome P450 CYP1A and CYP1B1. *Toxicology*, 144(1-3): 31-38.
- Edwards, D.J. and Bernier, S.M. 1996. Inhibitory effect of grapefruit juice and its bitter principal, naringenin, on CYP1A2 dependent metabolism of caffeine in man. *Life Sciences*, 59 (13): 1025–1030.

- Ellinger-Ziegelbauer, H., Stuart, B., Wahle, B., Bomann, W., Ahr, H.J. 2005. Comparison of the expression profiles induced by genotoxic and nongenotoxic carcinogens in rat liver. *Mutat. Res.*, 575(1-2): 61-84.
- Erlund, I. 2004. Review of the flavonoids quercetin, hesperetin, and naringenin. Dietary sources, bioactivities, bioavailability, and epidemiology. *Nutr. Res.*, 24: 851–874.
- Farombi, E.O. 2004. Diet-related cancer and prevention using anticarcinogens. *Afr. J. Biotechnol.*, 3 (12): 651-661.
- Fatemi, F., Allameh, A., Dadkhah, A., Forouzandeh, M., Kazemnejad, S. and Sharifi, R. 2006. Changes in hepatic cytosolic glutathione -S-transferase activity and expression of its class-P during prenatal and postnatal period in rats treated with aflatoxin B1. *Arch. Toxicol.*, 80(9): 572-579.
- Fukushima, S., Morimura, K., Wanibuchi, H., Kinoshita, A. and Salim, E.I. 2005. Current and emerging challenges in toxicopathology: carcinogenic threshold of phenobarbital and proof of arsenic carcinogenicity using rat medium-term bioassays for carcinogens. *Toxicol. Appl. Pharmacol.*, 207(2 Suppl): 225-229.
- Galati, G. and O'Brien, P.J. 2004. Potential toxicity of flavonoids and other dietary phenolics: significance for their chemopreventive and anticancer properties. *Free Radic. Biol. Med.*, 37 (3): 287 – 303.
- Ghia, M., Mattioli, F. and Mereto, E. 1996. A possible medium-term assay for detecting the effects of liver and colon carcinogens in rats. *Cancer Lett.* 105(1): 71-5.
- Gish, R.G. 2006. Hepatocellular Carcinoma: Overcoming Challenges in Disease Management. *Clin. Gastroenterol. H.*, 4: 252–261.
- Gordon, G.G.; Skett, P. *Introduction to drug metabolism*, 2nd ed.; Stanley Thornes Publishers, Ltd: English, 1994, pp. 236-237.
- Grancharov, K., Naydenova, Z., Lozeva, S. and Golovinsky, E. 2001. Natural and synthetic inhibitors of UDP-glucuronosyltransferase. *Pharmacol. Ther.*, 89(2): 171-186.

- Guyton, K.Z., Kyle, A.D., Aubrecht, J., Cogliano, V.J., Eastmond, D.A., Jackson, M., Keshava, N., Sandy, M.S., Sonawane, B., Zhang, L., Waters, M.D. and Smith, M.T. 2009. Improving prediction of chemical carcinogenicity by considering multiple mechanisms and applying toxicogenomic approaches. *Mutat. Res.*, 681(2-3): 230-240.
- Habig, W. H. and Jakoby, W. B., 1981. Assays for differentiation of glutathione-S-Transferases. *Methods Enzymol.*, 77: 398-405.
- Hail, N.Jr., Cortes, M., Drake, E.N., Spallholz, J.E. 2008. Cancer chemoprevention: a radical perspective. *Free Radic. Biol. Med.*, 45(2): 97-110.
- Hakura, A., Kadoi, M., Suzuki, T. and Saeki, K. 2007. Clastogenicity of quinoline derivatives in the liver micronucleus assay using rats and mice. *J. Health. Sci.*, 53(4): 470-474.
- Hannemann, F., Bichet, A., Ewen, K.M., Bernhardt, R. 2007. Cytochrome P450 systems—biological variations of electron transport chains. *Biochim. Biophys. Acta.*, 1770: 330–344.
- Havsteen, B.H. 2002. The biochemistry and medical significance of the flavonoids. *Pharmacol. Ther.*, 96(2-3): 67-202.
- Hawighorst, T., Velasco, P., Streit, M., Hong, Y.K., Kyriakides, T.R., Brown, L.F., Bornstein, P. and Detmar, M. 2001. Thrombospondin-2 plays a protective role in multistep carcinogenesis: a novel host anti-tumor defense mechanism. *EMBO J.*, 20(11): 2631-2640.
- Henderson, C.J., Sahraoui, A. and Wolf, C.R. 2000. Cytochrome P450s and chemoprevention. *Biochem. Soc. Trans.*, 28(2): 42-46.
- Hernandez, L.G., Steeg, H., Luijten, M. and Benthem, J. 2009. Mechanisms of non-genotoxic carcinogens and importance of a weight of evidence approach. *Mutat. Res.*, 682(2-3): 94-109.
- Higashi, K., Hiai, H., Higashi, T. and Muramatsu, M. 2004. Regulatory mechanism of glutathione S-transferase P-form during chemical hepatocarcinogenesis: old wine in a new bottle. *Cancer Lett.*, 209: 155–163.

- Higgin, G.M. and Anderson, R.M., 1931. Experimental pathology of the liver, Restoration of the liver of white rat following partial surgical removal. *Arch. Pathol.*, 12: 186-202.
- Hill, M., Pereira, V., Chauveau, C., Zagani, R., Remy, S., Tesson, L., Mazal, D., Ubillos, L., Brion, R., Ashgar, K., Mashreghi, M.F., Kotsch, K., Moffett, J., Doeblis, C., Seifert, M., Boczkowski, J., Osinaga, E. and Anegón, I. 2005. Heme oxygenase-1 inhibits rat and human breast cancer cell proliferation: mutual cross inhibition with indoleamine 2, 3-dioxygenase. *FASEB J.*, 19(14): 1957-1968.
- Hodek, P., Trefil, P. and Stiborova, M. 2002. Flavonoids-potent and versatile biologically active compounds interacting with cytochromes P450. *Chem-Biol. Interact.*, 139: 1-21.
- Hudson, C.E., Kelly, M.M., Schwartz, D.A., Schofield, D.A., Dehaven, J.E., Schulte, B. A. and Norris, J.S. 1998. Glutathione S-transferase in hormonal carcinogenesis. *Chem-Biol. Interact.*, 111-112: 343-50.
- Hwang, E.I., Kaneko, M., Ohnishi, Y. and Horinouchi, S. 2003. Production of plant-specific flavanones by *Escherichia coli* containing an artificial gene cluster. *Appl. Environ. Microbiol.*, 69: 2699-2706.
- Iarmarcovai, G., Bonassi, S. and Botta, A., Baan, R.A. and Orsiere, T. 2008. Genetic polymorphisms and micronucleus formation: a review of the literature. *Mutat. Res.*, 658(3): 215-233.
- Ichihara, T., Wanibuchi, H., Lee, C.C., Nakajima, K., Yano, Y., Taniyama, T., Otani, S., Shimizu, Y. and Fukushima, S. 1999. Lack of inhibitory effects of the Ju-myo protein on development of glutathione-S-transferase placental form-positive foci in the male F344 rat liver. *J Toxicol. Sci.*, 24: 27-31.
- Igarashi, M. and Shimada, H. 1997. An improved method for the mouse liver micronucleus test. *Mutat. Res.*, 391(1-2): 49-55.
- Imaida, K. and Fukushima, S. 1996. Initiation-promotion model for assessment of carcinogenicity: medium-term liver bioassay in rats for rapid detection of carcinogenic agents. *J. Toxicol. Sci.*, 21: 483-487.

- Iqbal, M. and Okada, S. 2003. Induction of NAD(P)H:quinone reductase by probucol: A possible mechanism for protection against chemical carcinogenesis and toxicity. *Pharmacol. Toxicol.*, 93: 259–263.
- Ito, N., Hasegawa, R., Imaida, K., Hirose, M., Asamoto, M. and Shirai, T. 1995. Concepts in multistage carcinogenesis. *Crit. Rev. Oncol. Hematol.*, 21(1-3): 105-133.
- Ito, N., Hasegawa, R., Imaida, K., Hirose, M. and Shirai, T. 1996. Medium-term liver and multi-organ carcinogenesis and chemopreventive agents. *Exp. Toxicol. Pathol.*, 48: 113–119.
- Ito, N., Tamano, S. and Shirai, T. 2003. A medium-term rat liver bioassay for rapid in vivo detection of carcinogenic potential of chemicals. *Cancer Sci.*, 94(1): 3-8.
- Iyanagi, T. 2005. Structure and function of NADPH-cytochrome P450 reductase and nitric oxide synthase reductase domain. *Biochem. Biophys. Res. Commun.*, 338(1): 520-528.
- Jagan, S., Ramakrishnan, G., Anandakumar, P., Kamaraj, S. and Devaki, T. 2008. Antiproliferative potential of gallic acid against diethylnitrosamine-induced rat hepatocellular carcinoma. *Mol. Cell Biochem.*, 319(1-2): 51-59.
- Jaipetch, T., Kanghae, S., Pancharoen, O., Patrick, V.A., Reutrakul, V., Tuntiwachwuttikul, P., and White, A.H. 1982. Constituents of *Boesenbergia pandurata* (syn. *Kaempferia pandurata*): Isolation, crystal structure and synthesis of ($\pm$)-Boesenbergin A. *Aust. J. Chem.*, 35: 351-361.
- Jena, B.G., Kaul, L.C., and Ramarao, P. 2005. Regulatory requirements and ICH guidelines on carcinogenicity testing of pharmaceuticals: A review on current status. *Indian J. Pharmacol.*, 37(4): 209-222.
- Kaefenstein, H. 2009. Forensic relevance of glucuronidation in phase-II-metabolism of alcohols and drugs. *Leg. Med. (Tokyo)*, 11 Suppl 1: S22-6.
- Kikuchi, G., Yoshida, T. and Noguchi, M. 2005. Heme oxygenase and heme degradation. *Biochem. Biophys. Res. Commun.*, 338(1): 558-567.

- Kirkland, D., Aardema, M., Muller, L. and Hayashi, M. 2006. Evaluation of the ability of a battery of three in vitro genotoxicity tests to discriminate rodent carcinogens and non-carcinogens II. Further analysis of mammalian cell results, relative predictivity and tumour profiles. *Mutat. Res.*, 608(1): 29-42.
- Klaassen, C. D., *Casarett and Doull's: Toxicology - The Basic Science of Poisons*, 7th ed; The McGraw-Hill Companies, Inc.: USA, 2008, pp. 131-159.
- Klaunig, J.E. and Kamendulis, L.M. 2004. The role of oxidative stress in carcinogenesis. *Annu. Rev. Pharmacol. Toxicol.*, 44: 239-267.
- Klaunig, J.E., Xu, Y., Isenberg J.S., Bachowski, S., Kolaja, K.L., Jiang, J., Stevenson, D. E. and Walborg Jr, E.F. 1998. The role of oxidative stress in chemical carcinogenesis. *Environ. Health Perspect.*, 106 Suppl 1: 289-295.
- Klein, C.B. and Costa, M. 1997. DNA methylation, heterochromatin and epigenetic carcinogens. *Mutat. Res.*, 386(2): 163-180.
- Ko, C.H., Shen, S.C., Lin, H.Y., Hou, W.C., Lee, W.R., Yang, L.L. and Chen, Y.C. 2002. Flavanones structure-related inhibition on TPA-induced tumor promotion through suppression of extracellular signal-regulated protein kinases: involvement of prostaglandin E2 in anti-promotive process, *J. Cell Physiol.*, 193: 93-102.
- Kohno, H., Taima, M., Sumida, T., Azuma, Y., Ogawa, H. and Tanaka, T. 2001. Inhibitory effect of mandarin juice rich in beta-cryptoxanthin and hesperidin on 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone-induced pulmonary tumorigenesis in mice. *Cancer Lett.*, 174: 141-150.
- Kushida, M., Sukata, T., Uwagawa, S., Ozaki, K., Kinoshita, A., Wanibuchi, H., Morimura, K., Okuno, Y. and Fukushima, S. 2005. Low dose DDT inhibition of hepatocarcinogenesis initiated by diethylnitrosamine in male rats: possible mechanisms. *Toxicol. Appl. Pharmacol.*, 208(3): 285-294.
- Kwon, K.H., Barve, A., Yu, S., Huang, M. and Kong, A.N. 2007. Cancer chemoprevention by phytochemicals: potential molecular targets, biomarkers and animal models. *Acta Pharmacol. Sin.*, 28(9): 1409-1421.
- Lee, B.M. and Park, K.K. 2003. Beneficial and adverse effects of chemopreventive agents. *Mutat. Res.*, 523-524: 265-278.

- Letelier, M.E., Pimentel, A., Pino, P., Lepe, A.M., Faundez, M., Aracena, P. and Speisky, H. 2005. Microsomal UDP-glucuronyltransferase in rat liver: oxidative activation. *Basic Clin. Pharmacol. Toxicol.*, 96(6): 480-486.
- Li Ching, A. Y., Sook Wah, T. , Sukari, M. A., Cheng Lian G. E., Rahmani M., and Khalid, K., 2007. Characterization of flavonoid derivatives from *Boesenbergia rotunda* (L.). *The Malaysian Journal of Analytical Sciences*, 11(1): 154-159.
- Liska, D.J. 1998. The detoxification enzyme systems. *Altern. Med. Rev.*, 3(3): 187-98.
- Liu, R., Gao, M., Yang, Z.H., Du, G-H. 2008. Pinocembrin protects rat brain against oxidation and apoptosis induced by ischemia-reperfusion both in vivo and in vitro. *Brain Res.*, 1216: 104-115.
- Liu, C., Shang, Y.F., Zhang, X.F., Zhang, X.G., Wang, B., Wu, Z., Liu, X.M., Yu, L., Ma, F. and Lv, Y. 2009. Co-administration of grapefruit juice increases bioavailability of tacrolimus in liver transplant patients: a prospective study. *Eur. J. Clin. Pharmacol.*, 65(9):881-885.
- Lowry, O. H., Rosebrough, N. J., Farr, A.L. and Randall, R. J., 1951. Protein measurement with the Folin-Phenol reagents. *J. Biol. Chem.*, 193: 265-275.
- Luch, A. 2005. Nature and nurture - lessons from chemical carcinogenesis. *Nat. Rev. Cancer*, 5(2): 113-125.
- Maines, M.D. and Gibbs, P.E. 2005. 30 some years of heme oxygenase: from a "molecular wrecking ball" to a "mesmerizing" trigger of cellular events. *Biochem. Biophys. Res. Commun.*, 338(1): 568-577.
- Majewska, M., Zajac, K., Dulak, J. and Szczepanik, M. 2008. Heme oxygenase (HO-1) is involved in the negative regulation of contact sensitivity reaction. *Pharmacol. Rep.*, 60(6): 933-940.
- Mally, A. and Chipman, J.K. 2002. Non-genotoxic carcinogens: early effects on gap junctions, cell proliferation and apoptosis in the rat. *Toxicology*, 180(3): 233-248.
- Manson, M.M., Gescher, A., Hudson E.A., Plummer, S.M., Squires, M.S. and Prigent, S. A. 2000. Blocking and suppressing mechanisms of chemoprevention by dietary constituents. *Toxicol. Lett.*, 112-113: 499-505.

- Manthey, J.A., Grohmann, K. and Guthrie, N. 2001. Biological properties of citrus flavonoids pertaining to cancer and inflammation. *Curr. Med. Chem.*, 8: 135–153.
- Matsuda, M., Nakamoto, Y., Suzuki, S., Kurata, T. and Kaneko, S. 2005. Interferon-gamma-mediated hepatocarcinogenesis in mice treated with diethylnitrosamine. *Lab Invest.*, 85(5): 655-663.
- Mazzanti, R., Gramantieri, L. and Bolondi, L. 2008. Hepatocellular carcinoma: epidemiology and clinical aspects. *Mol. Aspects. Med.*, 29(1-2): 130-143.
- McKinney, M. A., Arukwe, A., Guise, S., Martineau, D., Beland, P., Dallaire, A., Lebeuf, M. and Letcher, R.J. 2004. Characterization and profiling of hepatic cytochromes P450 and phase II xenobiotic-metabolizing enzymes in beluga whales (*Delphinapterus leucas*) from the St. Lawrence River Estuary and the Canadian Arctic. *Aquat. Toxicol.*, 69(1): 35-49.
- McNally, S. J., Ross, J. A., Garden, O. J., and Wigmore, S. J., 2004. Optimization of the paired enzyme assay for heme oxygenase activity. *Anal. Biochem.*, 332, 398–400.
- Misra, V., Grondin, A., Klamut, H.J. and Rauth, A.M. 2000. Assessment of the relationship between genotypic status of a DT-diaphorase point mutation and enzymatic activity. *Br. J. Cancer*, 83(8): 998-1002.
- Moon, Y.J., Wang, X., Morris, M.E., 2006. Dietary flavonoids: effects on xenobiotic and carcinogen metabolism. *Toxicol. In Vitro*, 20(2): 187-210.
- Morse, M.A. and Stoner, G.D. 1993. Cancer chemoprevention: principles and prospects. *Carcinogenesis*, 14(9): 1737-1746.
- Moulari, B., Pellequer, Y., Lboutounne, H., Girard, C., Chaumont, J.P., Millet, J. and Muyard, F. 2006. Isolation and in vitro antibacterial activity of astilbin, the bioactive flavanone from the leaves of *Harungana madagascariensis* Lam. ex Poir. (Hypericaceae). *J. Ethnopharmacol.*, 106: 272–278.
- Muller-Tegethoff, K. Kasper, P. and Muller, L. 1995. Evaluation studies on the in vitro rat hepatocyte micronucleus assay. *Mutat. Res.*, 335: 293-307.

- Nair, S., Li, W., Kong, A.N. 2007. Natural dietary anti-cancer chemopreventive compounds: redox-mediated differential signaling mechanisms in cytoprotection of normal cells versus cytotoxicity in tumor cells. *Acta Pharmacol. Sin.*, 28(4): 459-472.
- Nebbia, C. 2001. Biotransformation enzymes as determinants of xenobiotic toxicity in domestic animals. *Vet. J.*, 161(3): 238-252.
- Nikolic, D. and Breemen, R.B. 2003. New metabolic pathways for flavanones catalyzed by rat liver microsomes. *Drug. Metab. Dispos.*, 32(4): 387-397.
- Nioi, P. and Hayes, J.D. 2004. Contribution of NAD(P)H:quinone oxidoreductase 1 to protection against carcinogenesis, and regulation of its gene by the Nrf2 basic-region leucine zipper and the arylhydrocarbon receptor basic helix-loop-helix transcription factors. *Mutat. Res.*, 555(1-2): 149-171.
- Ogiso, T., Tatematsu, M., Tamano, S., Hasegawa, R. and Ito, N. 1990. Correlation between medium-term liver bioassay system data and results of long-term testing in rats. *Carcinogenesis*, 11(4): 561-566.
- Ohkawa, H., Ohishi, N. and Yagi, K., 1979. Assay for lipid peroxides in animal tissues by thiobarbituric acid reaction. *Anal. Biochem.*, 95(2): 351-358.
- Oliveira, P.A., Colaco, A., Chaves, R., Guedes-Pinto, H., De-La-Cruz, Luis F. and Lopes, C. 2007. Chemical carcinogenesis. *An. Acad. Bras. Cienc.*, 79(4): 593-616.
- Ortiz de Montellano, P.R., 2000. The mechanism of heme oxygenase. *Curr. Opin. Chem. Biol.*, 4: 221-227
- Pepeljnjak, S., Jalsenjak, I. and Maysinger, D. 1985. Flavonoid content in propolis extracts and growth inhibition of *Bacillus subtilis*. *Pharmazie*, 40: 122-123.
- Prawan, A., Kundu, J.K. and Surh, Y.J., 2005. Molecular basis of heme oxygenase-1 induction: implications for chemoprevention and chemoprotection. *Antioxid. Redox. Signal.*, 7: 1688-1703.
- Puatanachokchai, R., Noguchi, T., Vinitketkumnien, U. and Matsushima, T. Rat liver micronucleus assay. Proceeding of the 4th Sountheast Asian Workshop on Short-term assays for detection of environmental mutagens, carcinogens and teratogens. Naresuan University, Phitsanulok, Thailand, December 16th - 20th, 1996: 14-23.

- Puatanachokchai, R., Morimura, K., Wanibuchi, H., Oka, M., Kinoshita, A., Mitsuru, F., Yamaguchi, S., Funae, Y., and Fukushima, S., 2006. Alpha-benzene hexachloride exerts hormesis in preneoplastic lesion formation of rat hepatocarcinogenesis with the possible role for hepatic detoxifying enzymes. *Cancer Lett.*, 18(240;1): 102-113.
- Rundle, A. 2006. Carcinogen-DNA adducts as a biomarker for cancer risk. *Mutat. Res.*, 600(1-2): 23-36.
- Sadik, N., El-Maraghy, S.A. and Ismail, M.F. 2008. Diethylnitrosamine-induced hepatocarcinogenesis in rats: possible chemoprevention by blueberries. *Afr. J. Biochem. Res.*, 2(3): 81-87.
- Sakai, M. and Muramatsu, M. 2007. Regulation of glutathione transferase P: A tumor marker of hepatocarcinogenesis. *Biochem. Bioph. Res. Co.*, 357: 575–578.
- Sala, A., Recio, M.C., Schinella, G.R., Máñez, S., Giner, R.M., Cerdá-Nicolás, M. and Rosí, J.L. 2003. Assessment of the anti-inflammatory activity and free radical scavenger activity of tiliroside. *Eur. J. Pharmacol.*, 461: 53–61.
- Saracino, M.R. and Lampe, J.W. 2007. Phytochemical regulation of UDP-glucuronosyltransferases: implications for cancer prevention. *Nutr. Cancer*, 59(2): 121-41.
- Sasagawa, T., Kosai, K., Ota, Y., Mori, M. and Okita, M. 2002. Influences of a dietary fatty acid composition on the emergence of glutathione S-transferase-P (GST-P) positive foci in the liver of carcinogen-treated rats. *Prostag. Leukotr. Ess.*, 67(5): 327-332.
- Santos, A.C., Uyemura, S.A., Lopes, J.L., Bazon, J.N., Mingatto, F.E. and Curti, C. 1998. Effect of naturally occurring flavonoids on lipid peroxidation and membrane permeability transition in mitochondria. *Free Radic. Biol. Med.*, 24: 1455–1461.
- Schafer, D.F. and Sorrell, M.F. 1999. Hepatocellular carcinoma. *Lancet*, 353: 1253-57.
- Shindo, K., Kato, M., Kinoshita, A., Kobayashi, A. and Koike, Y. 2006. Analysis of antioxidant activities contained in the *Boesenbergia pandurata* Schult. rhizome. *Biosci. Biotechnol. and Biochem.*, 70: 2281-2284.

- Shirai, T. 1997. A medium-term rat liver bioassay as a rapid in vivo test for carcinogenic potential: A historical review of model development and summary of results from 291 tests. *Toxicol. Pathol.*, 25(5): 453-460.
- Siess, H.M., Leclerc, J., Canivenc-Lavire, M., Rat, P. and Suschetet, M. 1995. Heterogenous effect of natural flavonoids on monooxygenase activities in human and rat liver microsomes. *Toxicol. Appl. Pharmacol.*, 130: 73-78.
- Silva, R.N., Ribeiro, D.A., Salvadori, D.M. and Marques, M.E. 2007. Placental glutathione S-transferase correlates with cellular proliferation during rat tongue carcinogenesis induced by 4-nitroquinoline 1-oxide. *Exp. Toxicol. Pathol.*, 59(1): 61-68.
- Srivatanakul, P. 2001. Epidemiology of liver cancer in Thailand. *Asian Pac. J. Cancer. Prev.*, 2(2): 117-121.
- Surh, Y-J., Kundu, J. K. and Na, H-K. 2008. Nrf2 as a master redox switch in turning on the cellular signaling involved in the induction of cytoprotective genes by some chemopreventive phytochemicals. *Planta Med.*, 74: 1526–1539.
- Suzuki, H., Shirotori, T. and Hayashi, M. 2004. A liver micronucleus assay using young rats exposed to diethylnitrosamine: methodological establishment and evaluation. *Cytogenet. Genome Res.*, 104(1-4): 299-303.
- Tan, X.L. and Spivack, S.D. 2009. Dietary chemoprevention strategies for induction of phase II xenobiotic-metabolizing enzymes in lung carcinogenesis: A review. *Lung Cancer*, 65(2): 129-137.
- Tanaka, T., Makita, H., Kawabata, K., Mori, H., Kakumoto, M., Satoh, K., Hara, A., Sumida, T., Fukutani, K. and Ogawa, H. 1997. Modulation of *N*-methyl-*N*-amyl nitrosamine-induced rat oesophageal tumourigenesis by dietary feeding of diosmin and hesperidin, both alone and in combination. *Carcinogenesis*, 18: 761–769.
- Townsend, D.M. and Tew, K.D. 2003. The role of glutathione-S-transferase in anti-cancer drug resistance. *Oncogene*, 22(47): 7369-7375.

- Trakoontivakorn, G., Nakahara, K., Shinmoto, H., Takenaka, M., Onishi-Kameyama, M., Ono, H., Yoshida, M., Nagata, T. and Tsushida, T. 2001. Structural analysis of a novel antimutagenic compound, 4-hydroxypanduratin A, and the antimutagenic activity of flavonoids in a Thai spice, fingerroot (*Boesenbergia pandurata* Schult.) against mutagenic heterocyclic amines. *J. Agric. Food Chem.*, 49: 3046-3050.
- Tripoli, E. La Guardia, M., Giammanco, S., Di Majo, D. and Giammanco M. 2007. Citrus flavonoids: Molecular structure, biological activity and nutritional properties: A review. *Food Chem.*, 104: 466–479.
- Tsuda, H., Fukushima, S., Wanibuchi, H., Morimura, K., Nakae, D., Imaida, K., Tatematsu, M., Hirose, M., Wakabayashi, K. and Moore, M.A. 2003. Value of GST-P positive preneoplastic hepatic foci in dose-response studies of hepatocarcinogenesis: evidence for practical thresholds with both genotoxic and nongenotoxic carcinogens. A review of recent work. *Toxicol. Pathol.*, 31(1): 80-86.
- Tsuda, H., Ohshima, Y., Nomoto, H., Fujita, K., Matsuda, E., Iigo, M., Takasuka, N. and Moore, M.A. 2004. Cancer prevention by natural compounds. *Drug Metab. Pharmacokinet.*, 19(4): 245-263.
- Tuchinda, P., Reutrakul, V., Claesona, P., Pongprayoon, U., Sematong, T., Santisuk, T. and Taylor, W.C. 2002. Anti-inflammatory cyclohexenyl chalcone derivatives in *Boesenbergia pandurata*. *Phytochemistry*, 59: 169–173.
- Verna, L., Whysner, J. and Williams, G. 1996. N-nitrosodiethylamine mechanistic data and risk assessment: bioactivation, DNA-adduct formation, mutagenicity, and tumor initiation. *Pharmacol. Ther.*, 71(1-2): 57-81.
- Walle, T., Ta, N., Kawamori, T., Wen, X., Tsuji, P. A. and Walle U. K., 2007. Cancer chemopreventive properties of orally bioavailable flavonoids—Methylated versus unmethylated flavones. *Biochem. Pharmacol.*, 73: 1288-1296.
- Wen, X. and Walle, T. 2006. Methylated flavonoids have greatly improved intestinal absorption and metabolic stability. *Drug. Metab. Dispos.*, 34(1):1786–1792.
- Wilce, M.C. and Parker, M.W. 1994. Structure and function of glutathione S-transferases. *Biochim. Biophys. Acta.*, 1205(1): 1-18.

- Williams, G.M. 2001. Mechanisms of chemical carcinogenesis and application to human cancer risk assessment. *Toxicology*, 166(1-2): 3-10.
- Wu, L., Tang, Z.Y. and Li, Y. 2009. Experimental models of hepatocellular carcinoma: developments and evolution. *J. Cancer Res. Clin. Oncol.*, 135(8): 969-981.
- Xie, W., Uppal, H., Saini, S.P., Mu, Y., Little, J.M., Radominska-Pandya, A. and Zemaitis, M.A. 2004. Orphan nuclear receptor-mediated xenobiotic regulation in drug metabolism. *Drug Discov. Today*, 9(10): 442-449.
- Yang, M., Tanaka, T., Hirose, Y., Deguchi, T., Mori, H. and Kawada, Y. 1997. Chemopreventive effects of diosmin and hesperidin on *N*-butyl-*N*-(4-hydroxybutyl) nitrosamine-induced urinary-bladder carcinogenesis in male ICR mice. *Int. J. Cancer*, 73: 719-724.
- Yang, Z., Liu, R., Li, X., Tian, S., Liu, Q. and Du, G. 2009. Development and validation of a high-performance liquid chromatographic method for determination of pinocembrin in rat plasma: Application to pharmacokinetic study. *J. Pharmaceut. Biomed.*, 49: 1277-1281.
- Yates, M.S. and Kensler, T.W. 2007. Keap1 eye on the target: chemoprevention of liver cancer. *Acta Pharmacol. Sin.*, 28(9): 1331-1342.
- Yim, S.K., Yun, C.H., Ahn, T., Jung, H.C., and Pan, J.G. 2005. A continuous spectrophotometric assay for NADPH-cytochrome P450 reductase activity using 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide. *J. Biochem. Mol. Biol.*, 38(3): 366-369.