REFERENCES

Adebiyi AP, Adebiyi AO, Yamashita J, Ogawa T, Muramoto K. Purification and characterization of antioxidative peptides derived from rice bran protein hydrolysates. **European Food Research and Technology** 2009; 228: 553-563.

Adibi SA. Intestinal transport of dipeptides in man: relative importance of hydrolysis and intact absorption. **J Clin Invest** 1971; 50: 2266-75.

Aekplakorn W, Abbott-Klafter J, Khonputsa P, Tatsanavivat P, Chongsuvivatwong V, Chariyalertsak S, et al. Prevalence and management of prehypertension and hypertension by geographic regions of Thailand: the Third National Health Examination Survey, 2004. **J Hypertens** 2008; 26: 191-8.

Aggarwal BB, Sundaram C, Malani N, Ichikawa H. Curcumin: the Indian solid gold. **Adv Exp Med Biol** 2007; 595: 1-75.

Aggarwal BB, Sung B. Pharmacological basis for the role of curcumin in chronic diseases: an age-old spice with modern targets. **Trends Pharmacol Sci** 2009; 30: 85-94.

Ammon HP, Wahl MA. Pharmacology of Curcuma longa. Planta Med 1991; 57: 1-7.

Anand P, Thomas SG, Kunnumakkara AB, Sundaram C, Harikumar KB, Sung B, et al. Biological activities of curcumin and its analogues (Congeners) made by man and Mother Nature. **Biochem Pharmacol** 2008; 76: 1590-611.

Anderson WP, Kett MM, Stevenson KM, Edgley AJ, Denton KM, Fitzgerald SM. Renovascular hypertension: structural changes in the renal vasculature. **Hypertension** 2000; 36: 648-52.

Andrew PJ, Mayer B. Enzymatic function of nitric oxide synthases. **Cardiovasc Res** 1999; 43: 521-31.

Andriantsitohaina R, Auger C, Chataigneau T, Etienne-Selloum N, Li H, Martinez MC, et al. Molecular mechanisms of the cardiovascular protective effects of polyphenols. **Br J Nutr** 2012; 108: 1532-49.

Anselm E, Socorro VF, Dal-Ros S, Schott C, Bronner C, Schini-Kerth VB. Crataegus special extract WS 1442 causes endothelium-dependent relaxation via a redox-sensitive Src- and Akt-dependent activation of endothelial NO synthase but not via activation of estrogen receptors. **J Cardiovasc Pharmacol** 2009; 53: 253-60.

Araujo CC, Leon LL. Biological activities of Curcuma longa L. **Mem Inst Oswaldo Cruz** 2001; 96: 723-8.

Ardiansyah, Shirakawa H, Koseki T, Hashizume K, Komai M. The Driselase-treated fraction of rice bran is a more effective dietary factor to improve hypertension, glucose and lipid metabolism in stroke-prone spontaneously hypertensive rats compared to ferulic acid. **Br J Nutr** 2007; 97: 67-76.

Arribas SM, Hinek A, Gonzalez MC. Elastic fibres and vascular structure in hypertension. **Pharmacol Ther** 2006; 111: 771-91.

Arts IC, Hollman PC. Polyphenols and disease risk in epidemiologic studies. **Am J Clin Nutr** 2005; 81: 317S-325S.

Bar-Sela G, Epelbaum R, Schaffer M. Curcumin as an anti-cancer agent: review of the gap between basic and clinical applications. **Curr Med Chem** 2010; 17: 190-7.

Behrendt D, Ganz P. Endothelial function. From vascular biology to clinical applications. **Am J Cardiol** 2002; 90: 40L-48L.

Bernatova I, Pechanova O, Babal P, Kysela S, Stvrtina S, Andriantsitohaina R. Wine polyphenols improve cardiovascular remodeling and vascular function in NO-deficient hypertension. **Am J Physiol Heart Circ Physiol** 2002; 282: H942-8.

Beswick RA, Dorrance AM, Leite R, Webb RC. NADH/NADPH oxidase and enhanced superoxide production in the mineralocorticoid hypertensive rat. **Hypertension** 2001; 38: 1107-11.

Bolz SS, de Wit C, Pohl U. Endothelium-derived hyperpolarizing factor but not NO reduces smooth muscle Ca2+ during acetylcholine-induced dilation of microvessels. **Br J Pharmacol** 1999; 128: 124-34.

Boonla O, Kukongviriyapan U, Pakdeechote P, Kukongviriyapan V, Pannangpetch P, Prachaney P, et al. Curcumin improves endothelial dysfunction and vascular remodeling in 2K-1C hypertensive rats by raising nitric oxide availability and reducing oxidative stress. **Nitric Oxide** 2014; 42: 44-53.

Boonloh K, Kukongviriyapan U, Pannangpetch P, Kongyingyoes B, Senggunprai L, Prawan A, et al. Rice bran protein hydrolysates prevented interleukin-6- and high glucose-induced insulin resistance in HepG2 cells. **Food Funct** 2015; 6: 556-73.

Bouvet C, Gilbert LA, Girardot D, deBlois D, Moreau P. Different involvement of extracellular matrix components in small and large arteries during chronic NO synthase inhibition. **Hypertension** 2005; 45: 432-7.

Braam B, Navar LG, Mitchell KD. Modulation of tubuloglomerular feedback by angiotensin II type 1 receptors during the development of Goldblatt hypertension. **Hypertension** 1995; 25: 1232-7.

Bradford MM. A rapid and sensitive method for the quantitation of microgram quantities of protein utilizing the principle of protein-dye binding. **Anal Biochem** 1976; 72: 248-54.

Bundhamcharoen K, Odton P, Phulkerd S, Tangcharoensathien V. Burden of disease in Thailand: changes in health gap between 1999 and 2004. **BMC Public Health** 2011; 11: 53.

Cai H, Griendling KK, Harrison DG. The vascular NAD(P)H oxidases as therapeutic targets in cardiovascular diseases. **Trends Pharmacol Sci** 2003; 24: 471-8.

Cai H, Harrison DG. Endothelial dysfunction in cardiovascular diseases: the role of oxidant stress. **Circ Res** 2000; 87: 840-4.

Castro MM, Rizzi E, Ceron CS, Guimaraes DA, Rodrigues GJ, Bendhack LM, et al. Doxycycline ameliorates 2K-1C hypertension-induced vascular dysfunction in rats by attenuating oxidative stress and improving nitric oxide bioavailability. **Nitric Oxide** 2012; 26: 162-8.

Castro MM, Rizzi E, Figueiredo-Lopes L, Fernandes K, Bendhack LM, Pitol DL, et al. Metalloproteinase inhibition ameliorates hypertension and prevents vascular dysfunction and remodeling in renovascular hypertensive rats. **Atherosclerosis** 2008; 198: 320-31.

Castro MM, Rizzi E, Rodrigues GJ, Ceron CS, Bendhack LM, Gerlach RF, et al. Antioxidant treatment reduces matrix metalloproteinase-2-induced vascular changes in renovascular hypertension. **Free Radic Biol Med** 2009; 46: 1298-307.

Chang BW, Chen RL, Huang IJ, Chang HC. Assays for angiotensin converting enzyme inhibitory activity. **Anal Biochem** 2001; 291: 84-8.

Chang HR, Lee RP, Wu CY, Chen HI. Nitric oxide in mesenteric vascular reactivity: a comparison between rats with normotension and hypertension. **Clin Exp Pharmacol Physiol** 2002; 29: 275-80.

Chen Q, Xuan G, Fu M, He G, Wang W, Zhang H, et al. Effect of angiotensin I-converting enzyme inhibitory peptide from rice dregs protein on antihypertensive activity in spontaneously hypertensive rats. **Asia Pac J Clin Nutr** 2007; 16 Suppl 1: 281-5.

Chiong JR, Aronow WS, Khan IA, Nair CK, Vijayaraghavan K, Dart RA, et al. Secondary hypertension: current diagnosis and treatment. **Int J Cardiol** 2008; 124: 6-21.

Clare DA, Swaisgood HE. Bioactive milk peptides: a prospectus. **J Dairy Sci** 2000; 83: 1187-95.

Costa CA, Amaral TA, Carvalho LC, Ognibene DT, da Silva AF, Moss MB, et al. Antioxidant treatment with tempol and apocynin prevents endothelial dysfunction and development of renovascular hypertension. **Am J Hypertens** 2009; 22: 1242-9.

Cross JM, Donald AE, Nuttall SL, Deanfield JE, Woolfson RG, Macallister RJ. Vitamin C improves resistance but not conduit artery endothelial function in patients with chronic renal failure. **Kidney Int** 2003; 63: 1433-42.

Curin Y, Andriantsitohaina R. Polyphenols as potential therapeutical agents against cardiovascular diseases. **Pharmacol Rep** 2005; 57 Suppl: 97-107.

da Costa CA, de Oliveira PR, de Bem GF, de Cavalho LC, Ognibene DT, da Silva AF, et al. Euterpe oleracea Mart.-derived polyphenols prevent endothelial dysfunction and vascular structural changes in renovascular hypertensive rats: role of oxidative stress. **Naunyn Schmiedebergs Arch Pharmacol** 2012; 385: 1199-209.

Davis GE, Senger DR. Extracellular matrix mediates a molecular balance between vascular morphogenesis and regression. **Curr Opin Hematol** 2008; 15: 197-203.

De Hert S. Physiology of hemodynamic homeostasis. **Best Pract Res Clin Anaesthesiol** 2012; 26: 409-19.

Di Castelnuovo A, Rotondo S, Iacoviello L, Donati MB, De Gaetano G. Meta-analysis of wine and beer consumption in relation to vascular risk. **Circulation** 2002; 105: 2836-44.

Dinkova-Kostova AT, Talalay P. Direct and indirect antioxidant properties of inducers of cytoprotective proteins. **Mol Nutr Food Res** 2008; 52 Suppl 1: S128-38.

Dollery CM, McEwan JR, Henney AM. Matrix metalloproteinases and cardiovascular disease. **Circ Res** 1995; 77: 863-8.

Endemann DH, Schiffrin EL. Endothelial dysfunction. **J Am Soc Nephrol** 2004; 15: 1983-92.

Epstein J, Sanderson IR, Macdonald TT. Curcumin as a therapeutic agent: the evidence from in vitro, animal and human studies. **Br J Nutr** 2010; 103: 1545-57.

Fabian C, Ju YH. A review on rice bran protein: its properties and extraction methods. **Crit Rev Food Sci Nutr** 2011; 51: 816-27.

Feihl F, Liaudet L, Levy BI, Waeber B. Hypertension and microvascular remodelling. **Cardiovasc Res** 2008; 78: 274-85.

Feron O, Saldana F, Michel JB, Michel T. The endothelial nitric-oxide synthase-caveolin regulatory cycle. **J Biol Chem** 1998; 273: 3125-8.

Forstermann U. Nitric oxide and oxidative stress in vascular disease. **Pflugers Arch** 2010; 459: 923-39.

Forstermann U. Oxidative stress in vascular disease: causes, defense mechanisms and potential therapies. **Nat Clin Pract Cardiovasc Med** 2008; 5: 338-49.

Forstermann U, Munzel T. Endothelial nitric oxide synthase in vascular disease: from marvel to menace. **Circulation** 2006; 113: 1708-14.

Fridovich I. Superoxide anion radical (O2-.), superoxide dismutases, and related matters. **J Biol Chem** 1997; 272: 18515-7.

Fuglsang A, Nilsson D, Nyborg NC. Characterization of new milk-derived inhibitors of angiotensin converting enzyme in vitro and in vivo. **J Enzyme Inhib Med Chem** 2003; 18: 407-12.

Furchgott RF. Role of endothelium in responses of vascular smooth muscle. **Circ Res** 1983; 53: 557-73.

Furchgott RF, Zawadzki JV. The obligatory role of endothelial cells in the relaxation of arterial smooth muscle by acetylcholine. **Nature** 1980; 288: 373-6.

Galis ZS, Khatri JJ. Matrix metalloproteinases in vascular remodeling and atherogenesis: the good, the bad, and the ugly. **Circ Res** 2002; 90: 251-62.

Garcea G, Berry DP, Jones DJ, Singh R, Dennison AR, Farmer PB, et al. Consumption of the putative chemopreventive agent curcumin by cancer patients: assessment of curcumin levels in the colorectum and their pharmacodynamic consequences. **Cancer Epidemiol Biomarkers Prev** 2005; 14: 120-5.

Garcia-Saura MF, Galisteo M, Villar IC, Bermejo A, Zarzuelo A, Vargas F, et al. Effects of chronic quercetin treatment in experimental renovascular hypertension. **Mol Cell Biochem** 2005; 270: 147-55.

Goldblatt H, Lynch J, Hanzal RF, Summerville WW. Studies on Experimental Hypertension : I. The Production of Persistent Elevation of Systolic Blood Pressure by Means of Renal Ischemia. **J Exp Med** 1934; 59: 347-79.

Gonzalez W, Fontaine V, Pueyo ME, Laquay N, Messika-Zeitoun D, Philippe M, et al. Molecular plasticity of vascular wall during N(G)-nitro-L-arginine methyl ester-induced hypertension: modulation of proinflammatory signals. **Hypertension** 2000; 36: 103-9.

Goufo P, Trindade H. Rice antioxidants: phenolic acids, flavonoids, anthocyanins, proanthocyanidins, tocopherols, tocotrienols, gamma-oryzanol, and phytic acid. **Food Sci Nutr** 2014; 2: 75-104.

Griffith OW, Stuehr DJ. Nitric oxide synthases: properties and catalytic mechanism. **Annu Rev Physiol** 1995; 57: 707-36.

Gryglewski RJ, Palmer RM, Moncada S. Superoxide anion is involved in the breakdown of endothelium-derived vascular relaxing factor. **Nature** 1986; 320: 454-6.

Guimaraes DA, Rizzi E, Ceron CS, Oliveira AM, Oliveira DM, Castro MM, et al. Doxycycline dose-dependently inhibits MMP-2-mediated vascular changes in 2K1C hypertension. **Basic Clin Pharmacol Toxicol** 2011; 108: 318-25.

Hamilton CA, Brosnan MJ, Al-Benna S, Berg G, Dominiczak AF. NAD(P)H oxidase inhibition improves endothelial function in rat and human blood vessels. **Hypertension** 2002; 40: 755-62.

Hara H, Funabiki R, Iwata M, Yamazaki K. Portal absorption of small peptides in rats under unrestrained conditions. **J Nutr** 1984; 114: 1122-9.

Heiss EH, Schachner D, Werner ER, Dirsch VM. Active NF-E2-related factor (Nrf2) contributes to keep endothelial NO synthase (eNOS) in the coupled state: role of reactive oxygen species (ROS), eNOS, and heme oxygenase (HO-1) levels. **J Biol Chem** 2009; 284: 31579-86.

Heitzer T, Schlinzig T, Krohn K, Meinertz T, Munzel T. Endothelial dysfunction, oxidative stress, and risk of cardiovascular events in patients with coronary artery disease. **Circulation** 2001; 104: 2673-8.

Hernandez-Ledesma B, del Mar Contreras M, Recio I. Antihypertensive peptides: production, bioavailability and incorporation into foods. **Adv Colloid Interface Sci** 2011; 165: 23-35.

Hink U, Li H, Mollnau H, Oelze M, Matheis E, Hartmann M, et al. Mechanisms underlying endothelial dysfunction in diabetes mellitus. **Circ Res** 2001; 88: E14-22.

Hlavackova L, Janegova A, Ulicna O, Janega P, Cerna A, Babal P. Spice up the hypertension diet - curcumin and piperine prevent remodeling of aorta in experimental L-NAME induced hypertension. **Nutr Metab (Lond)** 2011; 8: 72.

Holecyova A, Torok J, Bernatova I, Pechanova O. Restriction of nitric oxide rather than elevated blood pressure is responsible for alterations of vascular responses in nitric oxide-deficient hypertension. **Physiol Res** 1996; 45: 317-21.

Hsieh NK, Wang JY, Liu JC, Wang SD, Chen HI. Nitric oxide inhibition accelerates hypertension and induces perivascular inflammation in rats. **Clin Exp Pharmacol Physiol** 2004; 31: 212-8.

Hu FB, Willett WC. Optimal diets for prevention of coronary heart disease. **JAMA** 2002; 288: 2569-78.

Humphrey JD. Mechanisms of arterial remodeling in hypertension: coupled roles of wall shear and intramural stress. **Hypertension** 2008; 52: 195-200.

Ignarro LJ, Kadowitz PJ. The pharmacological and physiological role of cyclic GMP in vascular smooth muscle relaxation. **Annu Rev Pharmacol Toxicol** 1985; 25: 171-91.

Jacob MP. Extracellular matrix remodeling and matrix metalloproteinases in the vascular wall during aging and in pathological conditions. **Biomed Pharmacother** 2003; 57: 195-202.

Jacob MP, Badier-Commander C, Fontaine V, Benazzoug Y, Feldman L, Michel JB. Extracellular matrix remodeling in the vascular wall. **Pathol Biol (Paris)** 2001; 49: 326-32.

Jariwalla RJ. Rice-bran products: phytonutrients with potential applications in preventive and clinical medicine. **Drugs Exp Clin Res** 2001; 27: 17-26.

Jarvelainen H, Sainio A, Koulu M, Wight TN, Penttinen R. Extracellular matrix molecules: potential targets in pharmacotherapy. **Pharmacol Rev** 2009; 61: 198-223.

Jendekova L, Kojsova S, Andriantsitohaina R, Pechanova O. The time-dependent effect of Provinols on brain NO synthase activity in L-NAME-induced hypertension. **Physiol Res** 2006; 55 Suppl 1: S31-7.

Jimenez R, Lopez-Sepulveda R, Kadmiri M, Romero M, Vera R, Sanchez M, et al. Polyphenols restore endothelial function in DOCA-salt hypertension: role of endothelin-1 and NADPH oxidase. **Free Radic Biol Med** 2007; 43: 462-73.

Jung O, Schreiber JG, Geiger H, Pedrazzini T, Busse R, Brandes RP. gp91phox-containing NADPH oxidase mediates endothelial dysfunction in renovascular hypertension. **Circulation** 2004; 109: 1795-801.

Justo ML, Candiracci M, Dantas AP, de Sotomayor MA, Parrado J, Vila E, et al. Rice bran enzymatic extract restores endothelial function and vascular contractility in obese rats by reducing vascular inflammation and oxidative stress. **J Nutr Biochem** 2013; 24: 1453-61.

Justo ML, Rodriguez-Rodriguez R, Claro CM, Alvarez de Sotomayor M, Parrado J, Herrera MD. Water-soluble rice bran enzymatic extract attenuates dyslipidemia, hypertension and insulin resistance in obese Zucker rats. **Eur J Nutr** 2013; 52: 789-97.

Karim M, McCormick K, Kappagoda CT. Effects of cocoa extracts on endothelium-dependent relaxation. **J Nutr** 2000; 130: 2105S-8S.

Katusic ZS, d'Uscio LV, Nath KA. Vascular protection by tetrahydrobiopterin: progress and therapeutic prospects. **Trends Pharmacol Sci** 2009; 30: 48-54.

Kaup RM, Khayyal MT, Verspohl EJ. Antidiabetic effects of a standardized Egyptian rice bran extract. **Phytother Res** 2013; 27: 264-71.

Kennedy G, Burlingame B. Analysis of food composition data on rice from a plant genetic resources perspective. **Food Chemistry** 2003; 80: 589-596.

Ketonen J, Pilvi T, Mervaala E. Caloric restriction reverses high-fat diet-induced endothelial dysfunction and vascular superoxide production in C57Bl/6 mice. **Heart Vessels** 2010; 25: 254-62.

Kim KM, Pae HO, Zhung M, Ha HY, Ha YA, Chai KY, et al. Involvement of anti-inflammatory heme oxygenase-1 in the inhibitory effect of curcumin on the expression of pro-inflammatory inducible nitric oxide synthase in RAW264.7 macrophages. **Biomed Pharmacother** 2008; 62: 630-6.

Kitamoto S, Egashira K, Kataoka C, Usui M, Koyanagi M, Takemoto M, et al. Chronic inhibition of nitric oxide synthesis in rats increases aortic superoxide anion production via the action of angiotensin II. **J Hypertens** 2000; 18: 1795-800.

Kojsova S, Jendekova L, Zicha J, Kunes J, Andriantsitohaina R, Pechanova O. The effect of different antioxidants on nitric oxide production in hypertensive rats. **Physiol Res** 2006; 55 Suppl 1: S3-16.

Kokkaew H, Thawornchinsombut S. Effect of stimulated gastrointestinal digestion on the ACE inhibitory activity of peptides derived from Thai Hom-Mali rice bran. **Journal of Physiological and Biomedical Sciences** 2011; 24: 171.

Kong X, Yang JR, Guo LQ, Xiong Y, Wu XQ, Huang K, et al. Sesamin improves endothelial dysfunction in renovascular hypertensive rats fed with a high-fat, high-sucrose diet. **Eur J Pharmacol** 2009; 620: 84-9.

Korhonen H, Pihlanto A. Food-derived bioactive peptides--opportunities for designing future foods. **Curr Pharm Des** 2003; 9: 1297-308.

Kouno K, Hirano S, Kuboki H, Kasai M, Hatae K. Effects of dried bonito (katsuobushi) and captopril, an angiotensin I-converting enzyme inhibitor, on rat isolated aorta: a possible mechanism of antihypertensive action. **Biosci Biotechnol Biochem** 2005; 69: 911-5.

Koyanagi M, Egashira K, Kubo-Inoue M, Usui M, Kitamoto S, Tomita H, et al. Role of transforming growth factor-beta1 in cardiovascular inflammatory changes induced by chronic inhibition of nitric oxide synthesis. **Hypertension** 2000; 35: 86-90.

Laakso J, Mervaala E, Himberg JJ, Teravainen TL, Karppanen H, Vapaatalo H, et al. Increased kidney xanthine oxidoreductase activity in salt-induced experimental hypertension. **Hypertension** 1998; 32: 902-6.

Lai MH, Chen YT, Chen YY, Chang JH, Cheng HH. Effects of rice bran oil on the blood lipids profiles and insulin resistance in type 2 diabetes patients. **J Clin Biochem Nutr** 2012; 51: 15-8.

Landmesser U, Spiekermann S, Dikalov S, Tatge H, Wilke R, Kohler C, et al. Vascular oxidative stress and endothelial dysfunction in patients with chronic heart failure: role of xanthine-oxidase and extracellular superoxide dismutase. **Circulation** 2002; 106: 3073-8.

Lao CD, Demierre MF, Sondak VK. Targeting events in melanoma carcinogenesis for the prevention of melanoma. **Expert Rev Anticancer Ther** 2006; 6: 1559-68.

Lee MY, Griendling KK. Redox signaling, vascular function, and hypertension. **Antioxid Redox Signal** 2008; 10: 1045-59.

Lehoux S, Lemarie CA, Esposito B, Lijnen HR, Tedgui A. Pressure-induced matrix metalloproteinase-9 contributes to early hypertensive remodeling. **Circulation** 2004; 109: 1041-7.

Lemarie CA, Tharaux PL, Lehoux S. Extracellular matrix alterations in hypertensive vascular remodeling. **J Mol Cell Cardiol** 2010; 48: 433-9.

Leung DY, Glagov S, Mathews MB. A new in vitro system for studying cell response to mechanical stimulation. Different effects of cyclic stretching and agitation on smooth muscle cell biosynthesis. **Exp Cell Res** 1977; 109: 285-98.

Li GH, Qu MR, Wan JZ, You JM. Antihypertensive effect of rice protein hydrolysate with in vitro angiotensin I-converting enzyme inhibitory activity in spontaneously hypertensive rats. **Asia Pac J Clin Nutr** 2007; 16 Suppl 1: 275-80.

Li H, Witte K, August M, Brausch I, Godtel-Armbrust U, Habermeier A, et al. Reversal of endothelial nitric oxide synthase uncoupling and up-regulation of endothelial nitric oxide synthase expression lowers blood pressure in hypertensive rats. **J Am Coll Cardiol** 2006; 47: 2536-44.

Li J, Xie ZZ, Tang YB. Genistein prevents myocardial hypertrophy in 2-kidney 1-clip renal hypertensive rats by restoring eNOS pathway. **Pharmacology** 2010; 86: 240-8.

Lincoln TM, Komalavilas P, Cornwell TL. Pleiotropic regulation of vascular smooth muscle tone by cyclic GMP-dependent protein kinase. **Hypertension** 1994; 23: 1141-7.

Litterio MC, Jaggers G, Sagdicoglu Celep G, Adamo AM, Costa MA, Oteiza PI, et al. Blood pressure-lowering effect of dietary (-)-epicatechin administration in L-NAME-treated rats is associated with restored nitric oxide levels. **Free Radic Biol Med** 2012; 53: 1894-902.

Liu Y, Dolence J, Ren J, Rao M, Sreejayan N. Inhibitory effect of dehydrozingerone on vascular smooth muscle cell function. **J Cardiovasc Pharmacol** 2008; 52: 422-9.

Lorenz M, Wessler S, Follmann E, Michaelis W, Dusterhoft T, Baumann G, et al. A constituent of green tea, epigallocatechin-3-gallate, activates endothelial nitric oxide synthase by a phosphatidylinositol-3-OH-kinase-, cAMP-dependent protein kinase-, and Akt-dependent pathway and leads to endothelial-dependent vasorelaxation. **J Biol Chem** 2004; 279: 6190-5.

Luchtefeld M, Grote K, Grothusen C, Bley S, Bandlow N, Selle T, et al. Angiotensin II induces MMP-2 in a p47phox-dependent manner. **Biochem Biophys Res Commun** 2005; 328: 183-8.

Maes W, Van Camp J, Vermeirssen V, Hemeryck M, Ketelslegers JM, Schrezenmeir J, et al. Influence of the lactokinin Ala-Leu-Pro-Met-His-Ile-Arg (ALPMHIR) on the release of endothelin-1 by endothelial cells. **Regul Pept** 2004; 118: 105-9.

Manikandan P, Sumitra M, Aishwarya S, Manohar BM, Lokanadam B, Puvanakrishnan R. Curcumin modulates free radical quenching in myocardial ischaemia in rats. **Int J Biochem Cell Biol** 2004; 36: 1967-80.

Mansour SM, Bahgat AK, El-Khatib AS, Khayyal MT. Ginkgo biloba extract (EGb 761) normalizes hypertension in 2K, 1C hypertensive rats: role of antioxidant mechanisms, ACE inhibiting activity and improvement of endothelial dysfunction. **Phytomedicine** 2011; 18: 641-7.

Marin J, Ferrer M, Balfagon G. Role of protein kinase C in electrical-stimulation-induced neuronal nitric oxide release in mesenteric arteries from hypertensive rats. **Clin Sci (Lond)** 2000; 99: 277-83.

Martin S, Andriambeloson E, Takeda K, Andriantsitohaina R. Red wine polyphenols increase calcium in bovine aortic endothelial cells: a basis to elucidate signalling pathways leading to nitric oxide production. **Br J Pharmacol** 2002; 135: 1579-87.

Martinez ML, Castro MM, Rizzi E, Fernandes K, Demacq C, Bendhack LM, et al. Lercanidipine reduces matrix metalloproteinase-2 activity and reverses vascular dysfunction in renovascular hypertensive rats. **Eur J Pharmacol** 2008; 591: 224-30.

Martinez ML, Lopes LF, Coelho EB, Nobre F, Rocha JB, Gerlach RF, et al. Lercanidipine reduces matrix metalloproteinase-9 activity in patients with hypertension. **J Cardiovasc Pharmacol** 2006; 47: 117-22.

Martyn CN, Greenwald SE. Impaired synthesis of elastin in walls of aorta and large conduit arteries during early development as an initiating event in pathogenesis of systemic hypertension. **Lancet** 1997; 350: 953-5.

Matsui T, Matsumoto K. Antihypertensive peptides from natural resources. Advances in **Phytomedicine** 2006; 2: 255-71.

Mayet J, Hughes A. Cardiac and vascular pathophysiology in hypertension. **Heart** 2003; 89: 1104-9.

Mervaala EM, Cheng ZJ, Tikkanen I, Lapatto R, Nurminen K, Vapaatalo H, et al. Endothelial dysfunction and xanthine oxidoreductase activity in rats with human renin and angiotensinogen genes. **Hypertension** 2001; 37: 414-8.

Michel T, Feron O. Nitric oxide synthases: which, where, how, and why? **J Clin Invest** 1997; 100: 2146-52.

Michel T, Vanhoutte PM. Cellular signaling and NO production. **Pflugers Arch** 2010; 459: 807-16.

Min B, McClung AM, Chen MH. Phytochemicals and antioxidant capacities in rice brans of different color. **J Food Sci** 2011; 76: C117-26.

Moller NP, Scholz-Ahrens KE, Roos N, Schrezenmeir J. Bioactive peptides and proteins from foods: indication for health effects. **Eur J Nutr** 2008; 47: 171-82.

Moncada S, Palmer RM, Higgs EA. Nitric oxide: physiology, pathophysiology, and pharmacology. **Pharmacol Rev** 1991; 43: 109-42.

Montenegro MF, Neto-Neves EM, Dias-Junior CA, Ceron CS, Castro MM, Gomes VA, et al. Quercetin restores plasma nitrite and nitroso species levels in renovascular hypertension. **Naunyn Schmiedebergs Arch Pharmacol** 2010; 382: 293-301.

MOPH. Statistical Thailand. **Bureau of Policy and Strategy Ministry of Public Health**. Bankok, Thailand: [n.p.]; 2013.

Motterlini R, Foresti R, Bassi R, Green CJ. Curcumin, an antioxidant and anti-inflammatory agent, induces heme oxygenase-1 and protects endothelial cells against oxidative stress. **Free Radic Biol Med** 2000; 28: 1303-12.

Mukai Y, Sato S. Polyphenol-containing azuki bean (Vigna angularis) extract attenuates blood pressure elevation and modulates nitric oxide synthase and caveolin-1 expressions in rats with hypertension. **Nutr Metab Cardiovasc Dis** 2009; 19: 491-7.

Mukamal KJ, Maclure M, Muller JE, Sherwood JB, Mittleman MA. Tea consumption and mortality after acute myocardial infarction. Circulation 2002; 105: 2476-81.

Mulvany MJ, Baumbach GL, Aalkjaer C, Heagerty AM, Korsgaard N, Schiffrin EL, et al. Vascular remodeling. **Hypertension** 1996; 28: 505-6.

Nagao T, Illiano S, Vanhoutte PM. Heterogeneous distribution of endothelium-dependent relaxations resistant to NG-nitro-L-arginine in rats. **Am J Physiol** 1992; 263: H1090-4.

Nagao T, Vanhoutte PM. Endothelium-derived hyperpolarizing factor and endothelium-dependent relaxations. **Am J Respir Cell Mol Biol** 1993; 8: 1-6.

Nakamura Y, Yamamoto N, Sakai K, Okubo A, Yamazaki S, Takano T. Purification and characterization of angiotensin I-converting enzyme inhibitors from sour milk. **J Dairy Sci** 1995; 78: 777-83.

Nakmareong S, Kukongviriyapan U, Pakdeechote P, Donpunha W, Kukongviriyapan V, Kongyingyoes B, et al. Antioxidant and vascular protective effects of curcumin and tetrahydrocurcumin in rats with L-NAME-induced hypertension. **Naunyn Schmiedebergs Arch Pharmacol** 2011; 383: 519-29.

Nakmareong S, Kukongviriyapan U, Pakdeechote P, Kukongviriyapan V, Kongyingyoes B, Donpunha W, et al. Tetrahydrocurcumin alleviates hypertension, aortic stiffening and oxidative stress in rats with nitric oxide deficiency. **Hypertens Res** 2012; 35: 418-25.

Newby AC. Matrix metalloproteinases regulate migration, proliferation, and death of vascular smooth muscle cells by degrading matrix and non-matrix substrates. **Cardiovasc Res** 2006; 69: 614-24.

Nijveldt RJ, van Nood E, van Hoorn DE, Boelens PG, van Norren K, van Leeuwen PA. Flavonoids: a review of probable mechanisms of action and potential applications. **Am J Clin Nutr** 2001; 74: 418-25.

Nishida K, Harrison DG, Navas JP, Fisher AA, Dockery SP, Uematsu M, et al. Molecular cloning and characterization of the constitutive bovine aortic endothelial cell nitric oxide synthase. **J Clin Invest** 1992; 90: 2092-6.

Odenbach J, Wang X, Cooper S, Chow FL, Oka T, Lopaschuk G, et al. MMP-2 mediates angiotensin II-induced hypertension under the transcriptional control of MMP-7 and TACE. **Hypertension** 2011; 57: 123-30.

Orallo F, Alvarez E, Camina M, Leiro JM, Gomez E, Fernandez P. The possible implication of trans-Resveratrol in the cardioprotective effects of long-term moderate wine consumption. **Mol Pharmacol** 2002; 61: 294-302.

Otani L, Ninomiya T, Murakami M, Osajima K, Kato H, Murakami T. Sardine peptide with angiotensin I-converting enzyme inhibitory activity improves glucose tolerance in stroke-prone spontaneously hypertensive rats. **Biosci Biotechnol Biochem** 2009; 73: 2203-9.

Panza JA, Garcia CE, Kilcoyne CM, Quyyumi AA, Cannon RO, 3rd. Impaired endothelium-dependent vasodilation in patients with essential hypertension. Evidence that nitric oxide abnormality is not localized to a single signal transduction pathway. **Circulation** 1995; 91: 1732-8.

Paravicini TM, Touyz RM. NADPH oxidases, reactive oxygen species, and hypertension: clinical implications and therapeutic possibilities. **Diabetes Care** 2008; 31 Suppl 2: S170-80.

Paulis L, Zicha J, Kunes J, Hojna S, Behuliak M, Celec P, et al. Regression of L-NAME-induced hypertension: the role of nitric oxide and endothelium-derived constricting factor. **Hypertens Res** 2008; 31: 793-803.

Pechanova O, Bernatova I, Babal P, Martinez MC, Kysela S, Stvrtina S, et al. Red wine polyphenols prevent cardiovascular alterations in L-NAME-induced hypertension. **J Hypertens** 2004; 22: 1551-9.

Perticone F, Sciacqua A, Maio R, Perticone M, Maas R, Boger RH, et al. Asymmetric dimethylarginine, L-arginine, and endothelial dysfunction in essential hypertension. **J Am Coll Cardiol** 2005; 46: 518-23.

Priviero FB, Teixeira CE, Claudino MA, De Nucci G, Zanesco A, Antunes E. Vascular effects of long-term propranolol administration after chronic nitric oxide blockade. **Eur J Pharmacol** 2007; 571: 189-96.

Puddu P, Puddu GM, Cravero E, Rosati M, Muscari A. The molecular sources of reactive oxygen species in hypertension. **Blood Press** 2008; 17: 70-7.

Raffetto JD, Khalil RA. Matrix metalloproteinases and their inhibitors in vascular remodeling and vascular disease. **Biochem Pharmacol** 2008; 75: 346-59.

Rakici O, Kiziltepe U, Coskun B, Aslamaci S, Akar F. Effects of resveratrol on vascular tone and endothelial function of human saphenous vein and internal mammary artery. **Int J Cardiol** 2005; 105: 209-15.

Ramaswami G, Chai H, Yao Q, Lin PH, Lumsden AB, Chen C. Curcumin blocks homocysteine-induced endothelial dysfunction in porcine coronary arteries. **J Vasc Surg** 2004; 40: 1216-22.

Rinwa P, Kaur B, Jaggi AS, Singh N. Involvement of PPAR-gamma in curcumin-mediated beneficial effects in experimental dementia. **Naunyn Schmiedebergs Arch Pharmacol** 2010; 381: 529-39.

Rodriguez JA, Orbe J, Martinez de Lizarrondo S, Calvayrac O, Rodriguez C, Martinez-Gonzalez J, et al. Metalloproteinases and atherothrombosis: MMP-10 mediates vascular remodeling promoted by inflammatory stimuli. **Front Biosci** 2008; 13: 2916-21.

Safar ME, Levy BI, Laurent S, London GM. Hypertension and the arterial system: clinical and therapeutic aspects. **J Hypertens Suppl** 1990; 8: S113-9.

Safar ME, Levy BI, Struijker-Boudier H. Current perspectives on arterial stiffness and pulse pressure in hypertension and cardiovascular diseases. **Circulation** 2003; 107: 2864-9.

Safar ME, London GM, Asmar R, Frohlich ED. Recent advances on large arteries in hypertension. **Hypertension** 1998; 32: 156-61.

Sanchez M, Galisteo M, Vera R, Villar IC, Zarzuelo A, Tamargo J, et al. Quercetin downregulates NADPH oxidase, increases eNOS activity and prevents endothelial dysfunction in spontaneously hypertensive rats. **J Hypertens** 2006; 24: 75-84.

Sarikonda KV, Watson RE, Opara OC, Dipette DJ. Experimental animal models of hypertension. **J Am Soc Hypertens** 2009; 3: 158-65.

Sarr M, Chataigneau M, Martins S, Schott C, El Bedoui J, Oak MH, et al. Red wine polyphenols prevent angiotensin II-induced hypertension and endothelial dysfunction in rats: role of NADPH oxidase. **Cardiovasc Res** 2006; 71: 794-802.

Sayre B, Saunders R. Rice bran and rice bran oil. **Lipid Techology** 1990; 2: 72-76.

Schmid-Schonbein GW. Matrix metalloproteinases activities in hypertension: emerging opportunities. **Hypertension** 2011; 57: 24-5.

Sereewatthanawut I, Prapintip S, Watchiraruji K, Goto M, Sasaki M, Shotipruk A. Extraction of protein and amino acids from deoiled rice bran by subcritical water hydrolysis. **Bioresour Technol** 2008; 99: 555-61.

Sharifi AM, Akbarloo N, Heshmatian B, Ziai A. Alteration of local ACE activity and vascular responsiveness during development of 2K1C renovascular hypertension. **Pharmacol Res** 2003; 47: 201-9.

Sharma RA, Gescher AJ, Steward WP. Curcumin: the story so far. **Eur J Cancer** 2005; 41: 1955-68.

Shaughnessy KS, Boswall IA, Scanlan AP, Gottschall-Pass KT, Sweeney MI. Diets containing blueberry extract lower blood pressure in spontaneously hypertensive stroke-prone rats. **Nutr Res** 2009; 29: 130-8.

Sipola M, Finckenberg P, Vapaatalo H, Pihlanto-Leppala A, Korhonen H, Korpela R, et al. Alpha-lactorphin and beta-lactorphin improve arterial function in spontaneously hypertensive rats. **Life Sci** 2002; 71: 1245-53.

Sofi F, Cesari F, Abbate R, Gensini GF, Casini A. Adherence to Mediterranean diet and health status: meta-analysis. **BMJ** 2008; 337: a1344.

Sompamit K, Kukongviriyapan U, Nakmareong S, Pannangpetch P, Kukongviriyapan V. Curcumin improves vascular function and alleviates oxidative stress in non-lethal lipopolysaccharide-induced endotoxaemia in mice. **Eur J Pharmacol** 2009; 616: 192-9.

Somparn P, Phisalaphong C, Nakornchai S, Unchern S, Morales NP. Comparative antioxidant activities of curcumin and its demethoxy and hydrogenated derivatives. **Biol Pharm Bull** 2007; 30: 74-8.

Sreepriya M, Bali G. Effects of administration of Embelin and Curcumin on lipid peroxidation, hepatic glutathione antioxidant defense and hematopoietic system during N-nitrosodiethylamine/Phenobarbital-induced hepatocarcinogenesis in Wistar rats. **Mol Cell Biochem** 2006; 284: 49-55.

Stuehr DJ. Structure-function aspects in the nitric oxide synthases. **Annu Rev Pharmacol Toxicol** 1997; 37: 339-59.

Suda O, Tsutsui M, Morishita T, Tanimoto A, Horiuchi M, Tasaki H, et al. Long-term treatment with N(omega)-nitro-L-arginine methyl ester causes arteriosclerotic coronary lesions in endothelial nitric oxide synthase-deficient mice. **Circulation** 2002; 106: 1729-35.

Taddei S, Virdis A, Ghiadoni L, Magagna A, Salvetti A. Vitamin C improves endothelium-dependent vasodilation by restoring nitric oxide activity in essential hypertension. **Circulation** 1998; 97: 2222-9.

Takemoto M, Egashira K, Usui M, Numaguchi K, Tomita H, Tsutsui H, et al. Important role of tissue angiotensin-converting enzyme activity in the pathogenesis of coronary vascular and myocardial structural changes induced by long-term blockade of nitric oxide synthesis in rats. **J Clin Invest** 1997; 99: 278-87.

Taubert D, Berkels R, Klaus W, Roesen R. Nitric oxide formation and corresponding relaxation of porcine coronary arteries induced by plant phenols: essential structural features. **J Cardiovasc Pharmacol** 2002; 40: 701-13.

Tavares T, Sevilla MA, Montero MJ, Carron R, Malcata FX. Acute effect of whey peptides upon blood pressure of hypertensive rats, and relationship with their angiotensin-converting enzyme inhibitory activity. **Mol Nutr Food Res** 2012; 56: 316-24.

Torok J, Gerova M. Vascular responses after long-term inhibition of nitric oxide synthesis in newborn dogs. **Physiol Res** 1996; 45: 323-8.

Tran ED, DeLano FA, Schmid-Schonbein GW. Enhanced matrix metalloproteinase activity in the spontaneously hypertensive rat: VEGFR-2 cleavage, endothelial apoptosis, and capillary rarefaction. **J Vasc Res** 2010; 47: 423-31.

Tuangpolkrung P. The vasorelaxant effect of peptides derived from Thai rice bran in renovascular hypertensive rats: **Khon Kaen**; 2012.

Ulker S, McMaster D, McKeown PP, Bayraktutan U. Impaired activities of antioxidant enzymes elicit endothelial dysfunction in spontaneous hypertensive rats despite enhanced vascular nitric oxide generation. **Cardiovasc Res** 2003; 59: 488-500.

Van Wart HE, Birkedal-Hansen H. The cysteine switch: a principle of regulation of metalloproteinase activity with potential applicability to the entire matrix metalloproteinase gene family. **Proc Natl Acad Sci U S A** 1990; 87: 5578-82.

Vera R, Galisteo M, Villar IC, Sanchez M, Zarzuelo A, Perez-Vizcaino F, et al. Soy isoflavones improve endothelial function in spontaneously hypertensive rats in an estrogen-independent manner: role of nitric-oxide synthase, superoxide, and cyclooxygenase metabolites. **J Pharmacol Exp Ther** 2005; 314: 1300-9.

Vermeirssen V, Van Camp J, Verstraete W. Bioavailability of angiotensin I converting enzyme inhibitory peptides. **Br J Nutr** 2004; 92: 357-66.

Visse R, Nagase H. Matrix metalloproteinases and tissue inhibitors of metalloproteinases: structure, function, and biochemistry. **Circ Res** 2003; 92: 827-39.

Walter A, Etienne-Selloum N, Sarr M, Kane MO, Beretz A, Schini-Kerth VB. Angiotensin II induces the vascular expression of VEGF and MMP-2 in vivo: preventive effect of red wine polyphenols. **J Vasc Res** 2008; 45: 386-94.

Watson RE, Supowit SC, Zhao H, Katki KA, Dipette DJ. Role of sensory nervous system vasoactive peptides in hypertension. **Braz J Med Biol Res** 2002; 35: 1033-45.

Weiner CP, Lizasoain I, Baylis SA, Knowles RG, Charles IG, Moncada S. Induction of calcium-dependent nitric oxide synthases by sex hormones. **Proc Natl Acad Sci U S A** 1994; 91: 5212-6.

Wenzel S, Rohde C, Wingerning S, Roth J, Kojda G, Schluter KD. Lack of endothelial nitric oxide synthase-derived nitric oxide formation favors hypertrophy in adult ventricular cardiomyocytes. **Hypertension** 2007; 49: 193-200.

WHO. A global brief on hypertension Slent killer. In. Geneva; 2013.

Wiboonsirikul J, Kimura Y, Kadota M, Morita H, Tsuno T, Adachi S. Properties of extracts from defatted rice bran by its subcritical water treatment. **J Agric Food Chem** 2007; 55: 8759-65.

Williams B. The changing face of hypertension treatment: treatment strategies from the 2007 ESH/ESC hypertension Guidelines. **J Hypertens Suppl** 2009; 27: S19-26.

Wilson TA, Nicolosi RJ, Woolfrey B, Kritchevsky D. Rice bran oil and oryzanol reduce plasma lipid and lipoprotein cholesterol concentrations and aortic cholesterol ester accumulation to a greater extent than ferulic acid in hypercholesterolemic hamsters. **J Nutr Biochem** 2007; 18: 105-12.

Wu XQ, Kong X, Zhou Y, Huang K, Yang JR, Li XL. Sesamin exerts renoprotective effects by enhancing NO bioactivity in renovascular hypertensive rats fed with high-fat-sucrose diet. **Eur J Pharmacol** 2012; 683: 231-7.

Wuthi-udomlert M, Grisanapan W, Luanratana O, Caichompoo W. Antifungal activity of Curcuma longa grown in Thailand. **Southeast Asian J Trop Med Public Health** 2000; 31 Suppl 1: 178-82.

Xu PH, Long Y, Dai F, Liu ZL. The relaxant effect of curcumin on porcine coronary arterial ring segments. **Vascul Pharmacol** 2007; 47: 25-30.

Yamashita T, Yamamoto E, Kataoka K, Nakamura T, Matsuba S, Tokutomi Y, et al. Apoptosis signal-regulating kinase-1 is involved in vascular endothelial and cardiac remodeling caused by nitric oxide deficiency. **Hypertension** 2007; 50: 519-24.

Yang HY, Yang SC, Chen JR, Tzeng YH, Han BC. Soyabean protein hydrolysate prevents the development of hypertension in spontaneously hypertensive rats. **Br J Nutr** 2004; 92: 507-12.

Yang HY, Yang SC, Chen ST, Chen JR. Soy protein hydrolysate ameliorates cardiovascular remodeling in rats with L-NAME-induced hypertension. **J Nutr Biochem** 2008; 19: 833-9.

Yasmin, McEniery CM, Wallace S, Dakham Z, Pulsalkar P, Maki-Petaja K, et al. Matrix metalloproteinase-9 (MMP-9), MMP-2, and serum elastase activity are associated with systolic hypertension and arterial stiffness. **Arterioscler Thromb Vasc Biol** 2005; 25: 372.

Zalba G, San Jose G, Moreno MU, Fortuno MA, Fortuno A, Beaumont FJ, et al. Oxidative stress in arterial hypertension: role of NAD(P)H oxidase. **Hypertension** 2001; 38: 1395-9.

Zardi EM, Zardi DM, Cacciapaglia F, Dobrina A, Amoroso A, Picardi A, et al. Endothelial dysfunction and activation as an expression of disease: role of prostacyclin analogs. **Int Immunopharmacol** 2005; 5: 437-59.

Zhang MW, Zhang RF, Zhang FX, Liu RH. Phenolic profiles and antioxidant activity of black rice bran of different commercially available varieties. **J Agric Food Chem** 2010; 58: 7580-7.

Zhou MS, Schulman IH, Raij L. Nitric oxide, angiotensin II, and hypertension. **Semin Nephrol** 2004; 24: 366-78.