

REFERENCES

- Aarsland D, Tandberg E, Larsen JP, Cummings JL. Frequency of dementia in Parkinson disease. **Arch Neurol** 1996; 53(6): 538-42.
- Abrahamse SL, Kloots WJ, van Amslevoort JMM. Absorption, distribution, and secretion of epicatechin and quercetin in the rat, **Nutr Res** 2005; 25(3): 305-17.
- Abou-Sleiman PM, Muqit MM, Wood NW. Expanding insights of mitochondrial dysfunction in Parkinson's disease. **Nat Rev Neurosci** 2006; 7(3): 207-19.
- Ader P, Wessmann A, Wolfram S. Bioavailability and metabolism of the flavonol quercetin in the pig. **Free Radic Biol Med** 2000; 28(7): 1056-67.
- Aeschbacher HU, Meier H, Ruch E. Nonmutagenicity in vivo of the food flavonol quercetin. **Nutr Cancer** 1982; 4(2): 90-8.
- Agid Y, Blin J. Nerve cell death in degenerative diseases of the central nervous system: clinical aspects. **Ciba Found Symp** 1987; 126: 3-29.
- Ahern GP, Klyachko VA, Jackson MB. cGMP and S-nitrosylation: two routes for modulation of neuronal excitability by NO. **Trends Neurosci** 2002; 25(10): 510-7.
- Ahmad M, Saleem S, Ahmad AS, Yousuf S, Ansari MA, Khan MB, et al. Ginkgo biloba affords dose-dependent protection against 6-hydroxydopamine-induced parkinsonism in rats: neurobehavioural, neurochemical and immunohistochemical evidences. **J Neurochem** 2005; 93(1): 94-104.
- Alarcon de la Lastra C, Martin MJ, Motilva V. Antiulcer and gastroprotective effects of quercetin: a gross and histologic study. **Pharmacology** 1994; 48(1): 56-62.
- Albin RL, Young AB, Penney JB. The functional anatomy of basal ganglia disorders. **Trends Neurosci** 1989; 12(10): 366-75.
- Alvarez-Roman R, Naik A, Kalia YN, Guy RH, Fessi H. Enhancement of topical delivery from biodegradable nanoparticles. **Pharm Res** 2004; 21(10): 1818-25.
- Ambrose AM, Robbins DJ, Deeds F. Comparative toxicities of quercetin and quercitrin. **J Am Pharm Assoc Am Pharm Assoc** 1952; 41(3): 119-22.

- Aravindakshan M, Chauhan PS, Sundaram K. Studies on germinal effects of quercetin, a naturally occurring flavonoid. **Mutat Res** 1985; 144(2): 99-106.
- Ascherio A, Chen H, Weisskopf MG, O'Reilly E, McCullough ML, Calle EE, et al. Pesticide exposure and risk for Parkinson's disease. **Ann Neurol** 2006; 60(2): 197-203.
- Ashour R, Tintner R, Jankovic J. Striatal deformities of the hand and foot in Parkinson's disease. **Lancet Neurol** 2005; 4(7): 423-31.
- Askmark H, Eeg-Olofsson K, Johansson A, Nilsson P, Olsson Y, Aquilonius S. Parkinsonism and neck extensor myopathy: a new syndrome or coincidental findings? **Arch Neurol** 2001; 58(2): 232-7.
- Baba M, Nakajo S, Tu PH, Tomita T, Nakaya K, Lee VM, et al. Aggregation of alpha-synuclein in Lewy bodies of sporadic Parkinson's disease and dementia with Lewy bodies. **Am J Pathol** 1998; 152(4): 879-84.
- Baba S, Furuta T, Horie M, Nakagawa H. Studies on drug metabolism by use of isotopes XXVI: Determination of urinary metabolites of rutin in humans. **J Pharm Sci** 1981; 70(7): 780-2.
- Badkar AV, Smith AM, Eppstein JA, Banga AK. Transdermal delivery of interferon alpha-2B using microporation and iontophoresis in hairless rats. **Pharm Res** 2007; 24(7): 1389-95.
- Bagheri H, Damase-Michel C, Lapeyre-Mestre M, Cismondo S, O'Connell D, Senard JM, et al. A study of salivary secretion in Parkinson's disease. **Clin Neuropharmacol** 1999; 22(4): 213-5.
- Balazs L, Leon M. Evidence of an oxidative challenge in the Alzheimer's brain. **Neurochem Res** 1994; 19(9): 1131-7.
- Banati RB, Daniel SE, Blunt SB. Glial pathology but absence of apoptotic nigral neurons in long-standing Parkinson's disease. **Mov Disord** 1998; 13(2): 221-7.
- Barrenetxe J, Aranguren P, Grijalba A, Martinez-Penuela JM, Marzo F, Urdaneta E. Effect of dietary quercetin and sphingomyelin on intestinal nutrient absorption and animal growth. **Br J Nutr** 2006; 95(3): 455-61.
- Benabid AL, Deuschl G, Lang AE, Lyons KE, Rezaei AR. Deep brain stimulation for Parkinson's disease. **Mov Disord** 2006; 21(Suppl 14): S168-70.

- Berardelli A, Sabra AF, Hallett M. Physiological mechanisms of rigidity in Parkinson's disease. **J Neurol Neurosurg Psychiatry** 1983; 46(1): 45-53.
- Berner B, John VA. Pharmacokinetic characterisation of transdermal delivery systems. **Clin Pharmacokinet** 1994; 26(2): 121-34.
- Bernheimer H, Birkmayer W, Hornykiewicz O, Jellinger K, Seitelberger F. Brain dopamine and the syndromes of Parkinson and Huntington. Clinical, morphological and neurochemical correlations. **J Neurol Sci** 1973; 20(4): 415-55.
- Betarbet R, Sherer TB, Greenamyre JT. Animal models of Parkinson's disease. **Bioessays** 2002; 24(4): 308-18.
- Bilyk A, Cooper P, Sapers G. Varietal differences in distribution of quercetin and kaempferol in onion tissue. **J Agric Food Chem** 1984; 32(2): 274-6.
- Bjeldanes LF, Chang GW. Mutagenic activity of quercetin and related compounds. **Science** 1977; 197(4303): 577-8.
- Blanc A, Pandey NR, Srivastava AK. Synchronous activation of ERK 1/2, p38mapk and PKB/Akt signaling by H₂O₂ in vascular smooth muscle cells: potential involvement in vascular disease (review). **Int J Mol Med** 2003; 11(2): 229-34.
- Blandini F, Levandis G, Bazzini E, Nappi G, Armentero MT. Time-course of nigrostriatal damage, basal ganglia metabolic changes and behavioural alterations following intrastriatal injection of 6-hydroxydopamine in the rat: new clues from an old model. **Eur J Neurosci** 2007; 25(2): 397-405.
- Blandini F, Nappi G, Tassorelli C, Martignoni E. Functional changes of the basal ganglia circuitry in Parkinson's disease. **Prog Neurobiol** 2000; 62(1): 63-88.
- Blum D, Torch S, Lambeng N, Nissou M, Benabid AL, Sadoul R, et al. Molecular pathways involved in the neurotoxicity of 6-OHDA, dopamine and MPTP: contribution to the apoptotic theory in Parkinson's disease. **Prog Neurobiol** 2001; 65(2): 135-72.
- Blunt S, Jenner P, Marsden CD. The effect of chronic L-dopa treatment on the recovery of motor function in 6-hydroxydopamine-lesioned rats receiving ventral mesencephalic grafts. **Neuroscience** 1991; 40(2): 453-64.

- Boersma MG, van der Woude H, Bogaards J, Boeren S, Vervoort J, Cnubben NH, et al. Regioselectivity of phase II metabolism of luteolin and quercetin by UDP-glucuronosyl transferases. **Chem Res Toxicol** 2002; 15(5): 662-70.
- Boka G, Anglade P, Wallach D, Javoy-Agid F, Agid Y, Hirsch EC. Immunocytochemical analysis of tumor necrosis factor and its receptors in Parkinson's disease. **Neurosci Lett** 1994; 172(1-2): 151-4.
- Booth AN, Deeds F, Jones FT, Murray CW. The metabolic fate of rutin and quercetin in the animal body. **J Biol Chem** 1956; 223(1): 251-7.
- Boots AW, Kubben N, Haenen GR, Bast A. Oxidized quercetin reacts with thiols rather than with ascorbate: implication for quercetin supplementation. **Biochem Biophys Res Commun** 2003; 308(3): 560-5.
- Borlongan CV, Sanberg PR. Elevated body swing test: a new behavioral parameter for rats with 6-hydroxydopamine-induced hemiparkinsonism. **J Neurosci** 1995; 15(7 Pt 2): 5372-8.
- Bors W, Heller W, Michel C, Saran M. Radical chemistry of flavonoid antioxidants. In: Emerit I, Packer L, Auclair C, editors. **Antioxidant in Therapy and Preventive Medicine (Advances in Experimental Medicine and Biology)**. New York: Plenum Press; 1990. p. 165-70.
- Boulton DW, Walle UK, Walle T. Extensive binding of the bioflavonoid quercetin to human plasma proteins. **J Pharm Pharmacol** 1998; 50(2): 243-9.
- Boyle SP, Dobson VL, Duthie SJ, Kyle JA, Collins AR. Absorption and DNA protective effects of flavonoid glycosides from an onion meal. **Eur J Nutr** 2000; 39(5): 213-23.
- Braune A, Gutschow M, Engst W, Blaut M. Degradation of quercetin and luteolin by *Eubacterium ramulus*. **Appl Environ Microbiol** 2001; 67(12): 5558-67.
- Brightman MW, Reese TS. Junctions between intimately apposed cell membranes in the vertebrate brain. **J Cell Biol** 1969; 40(3): 648-77.
- Brown JP. A review of the genetic effects of naturally occurring flavonoids, anthraquinones and related compounds. **Mutat Res** 1980; 75(3): 243-77.
- _____, Dietrich PS. Mutagenicity of plant flavonols in the Salmonella/mammalian microsome test: activation of flavonol glycosides by mixed glycosidases from rat cecal bacteria and other sources. **Mutat Res** 1979; 66(3): 223-40.

- Burn DJ, McKeith IG. Current treatment of dementia with Lewy bodies and dementia associated with Parkinson's disease. **Mov Disord** 2003; 18(Suppl 6): S72-9.
- Cadenas E, Davies KJ. Mitochondrial free radical generation, oxidative stress, and aging. **Free Radic Biol Med** 2000; 29(3-4): 222-30.
- Calabrese V, Mancuso C, Calvani M, Rizzarelli E, Butterfield DA, Stella AM. Nitric oxide in the central nervous system: neuroprotection versus neurotoxicity. **Nat Rev Neurosci** 2007; 8(10): 766-75.
- Carbonaro M, Grant G. Absorption of quercetin and rutin in rat small intestine. **Ann Nutr Metab** 2005; 49(3): 178-82.
- Caria H, Chaveca T, Laires A, Rueff J. Genotoxicity of quercetin in the micronucleus assay in mouse bone marrow erythrocytes, human lymphocytes, V79 cell line and identification of kinetochore-containing (CREST staining) micronuclei in human lymphocytes. **Mutat Res** 1995; 343(2-3): 85-94.
- Carlsson A, Winblad B. Influence of age and time interval between death and autopsy on dopamine and 3-methoxytyramine levels in human basal ganglia. **J Neural Transm** 1976; 38(3-4): 271-6.
- Cenci MA, Whishaw IQ, Schallert T. Animal models of neurological deficits: how relevant is the rat? **Nat Rev Neurosci** 2002; 3(7): 574-9.
- Cevc G. Lipid vesicles and other colloids as drug carriers on the skin. **Adv Drug Deliv Rev** 2004; 56(5): 675-711.
- Chandra SV, Shukla GS, Srivastava RS, Singh H, Gupta VP. An exploratory study of manganese exposure to welders. **Clin Toxicol** 1981; 18(4): 407-16.
- Chaturvedi RK, Shukla S, Seth K, Chauhan S, Sinha C, Shukla Y, et al. Neuroprotective and neurorescue effect of black tea extract in 6-hydroxydopamine-lesioned rat model of Parkinson's disease. **Neurobiol Dis** 2006; 22(2): 421-34.
- Chen X, Yin OQ, Zuo Z, Chow MS. Pharmacokinetics and modeling of quercetin and metabolites. **Pharm Res** 2005; 22(6): 892-901.
- Cheng K, Ip NY. Cdk5: a new player at synapses. **Neurosignals** 2003; 12(4-5): 180-90.
- Cheung ZH, Fu AK, Ip NY. Synaptic roles of Cdk5: implications in higher cognitive functions and neurodegenerative diseases. **Neuron** 2006; 50(1): 13-8.

- Cheung ZH, Ip NY. Cdk5: mediator of neuronal death and survival. **Neurosci Lett** 2004; 361(1-3): 47-51.
- Chinta SJ, Andersen JK. Redox imbalance in Parkinson's disease. **Biochim Biophys Acta** 2008; 1780(11): 1362-7.
- Chopra M, Fitzsimons PE, Strain JJ, Thurnham DI, Howard AN. Nonalcoholic red wine extract and quercetin inhibit LDL oxidation without affecting plasma antioxidant vitamin and carotenoid concentrations. **Clin Chem** 2000; 46 (8 Pt 1): 1162-70.
- Christophers E. Cellular architecture of the stratum corneum. **J Invest Dermatol** 1971; 56(3): 165-9.
- Chulalongkorn Comprehensive Movement Disorder Centre. **Parkinson's disease** [online] 2007 [cited 2009 Aug 20]. Available from: <http://www.chula-parkinsons.org/parkinson1.html>
- Chung KK. Say NO to neurodegeneration: role of S-nitrosylation in neurodegenerative disorders, **Neurosignals** 2007; 15(6): 307–13.
- Cierniak A, Papiez M, Kapiszewska M. Modulatory effect of quercetin on DNA damage, induced by etoposide in bone marrow cells and on changes in the activity of antioxidant enzymes in rats. **Rocz Akad Med Bialymst** 2004; 49(Suppl 1): 167-9.
- Cleeter MW, Cooper JM, Schapira AH. Irreversible inhibition of mitochondrial complex I by 1-methyl-4-phenylpyridinium: evidence for free radical involvement. **J Neurochem** 1992; 58(2): 786-9.
- Conway KA, Rochet JC, Bieganski RM, Lansbury PT, Jr. Kinetic stabilization of the alpha-synuclein protofibril by a dopamine-alpha-synuclein adduct. **Science** 2001; 294(5545): 1346-9.
- Cook DG, Fahn S, Brait KA. Chronic manganese intoxication. **Arch Neurol** 1974; 30(1): 59-64.
- Correia AS, Anisimov SV, Li JY, Brundin P. Stem cell-based therapy for Parkinson's disease. **Ann Med** 2005; 37(7): 487-98.
- Cotzias GC, Papavasiliou PS, Gellene R. Modification of Parkinsonism--chronic treatment with L-dopa. **N Engl J Med** 1969; 280(7): 337-45.

- Coyle JT, Puttfarcken P. Oxidative stress, glutamate, and neurodegenerative disorders. **Science** 1993; 262(5134): 689-95.
- Crebelli R, Aquilina G, Falcone E, Carere A. Urinary and faecal mutagenicity in Sprague-Dawley rats dosed with the food mutagens quercetin and rutin. **Food Chem Toxicol** 1987; 25(1): 9-15.
- Creese I, Burt DR, Snyder SH. Dopamine receptor binding enhancement accompanies lesion-induced behavioral supersensitivity. **Science** 1977; 197(4303): 596-8.
- Crespy V, Morand C, Manach C, Besson C, Demigne C, Remesy C. Part of quercetin absorbed in the small intestine is conjugated and further secreted in the intestinal lumen. **Am J Physiol** 1999; 277(1 Pt 1): G120-6.
- Cross HJ, Tilby M, Chipman JK, Ferry DR, Gescher A. Effect of quercetin on the genotoxic potential of cisplatin. **Int J Cancer** 1996; 66(3): 404-8.
- Cummings JL, Masterman DL. Depression in patients with Parkinson's disease. **Int J Geriatr Psychiatry** 1999; 14(9): 711-8.
- Czczot H. Mutagenic activity of quercetin in derivatives of Escherichia coli WP2 uvrA with increased permeability. **Acta Biochim Pol** 1994; 41(2): 144-7.
- Czczot H, Tudek B, Kusztelak J, Szymczyk T, Dobrowolska B, Glinkowska G, et al. Isolation and studies of the mutagenic activity in the Ames test of flavonoids naturally occurring in medical herbs. **Mutat Res** 1990; 240(3): 209-16.
- Danielson SR, Andersen JK. Oxidative and nitrative protein modifications in Parkinson's disease. **Free Radic Biol Med** 2008; 44(10): 1787-94.
- Davis GC, Williams AC, Markey SP, Ebert MH, Caine ED, Reichert CM, et al. Chronic Parkinsonism secondary to intravenous injection of meperidine analogues. **Psychiatry Res** 1979; 1(3): 249-54.
- Dawson TM. New animal models for Parkinson's disease. **Cell** 2000; 101(2): 115-8.
- Dawson VL, Dawson TM, London ED, Bredt DS, Snyder SH. Nitric oxide mediates glutamate neurotoxicity in primary cortical cultures. **Proc Natl Acad Sci U S A** 1991; 88(14): 6368-71.
- Day AJ, Canada FJ, Diaz JC, Kroon PA, McLauchlan R, Faulds CB, et al. Dietary flavonoid and isoflavone glycosides are hydrolysed by the lactase site of lactase phlorizin hydrolase. **FEBS Lett** 2000; 468(2-3): 166-70.

- de Boer VC, Dihal AA, van der Woude H, Arts IC, Wolfram S, Alink GM, et al. Tissue distribution of quercetin in rats and pigs. **J Nutr** 2005; 135(7): 1718-25.
- De Leonibus E, Pascucci T, Lopez S, Oliverio A, Amalric M, Mele A. Spatial deficits in a mouse model of Parkinson disease. **Psychopharmacology (Berl)** 2007; 194(4): 517-25.
- De Santi C, Pietrabissa A, Mosca F, Pacifici GM. Methylation of quercetin and fisetin, flavonoids widely distributed in edible vegetables, fruits and wine, by human liver. **Int J Clin Pharmacol Ther** 2002; 40(5): 207-12.
- de Vries JH, Hollman PC, Meyboom S, Buysman MN, Zock PL, van Staveren WA, et al. Plasma concentrations and urinary excretion of the antioxidant flavonols quercetin and kaempferol as biomarkers for dietary intake. **Am J Clin Nutr** 1998; 68(1): 60-5.
- DeLong MR. Primate models of movement disorders of basal ganglia origin. **Trends Neurosci** 1990; 13(7): 281-5.
- Deschner EE, Ruperto J, Wong G, Newmark HL. Quercetin and rutin as inhibitors of azoxymethanol-induced colonic neoplasia. **Carcinogenesis** 1991; 12(7): 1193-6.
- Dexter DT, Carayon A, Javoy-Agid F, Agid Y, Wells FR, Daniel SE, et al. Alterations in the levels of iron, ferritin and other trace metals in Parkinson's disease and other neurodegenerative diseases affecting the basal ganglia. **Brain** 1991; 114(Pt 4): 1953-75.
- _____, Carayon A, Vidailhet M, Ruberg M, Agid F, Agid Y, et al. Decreased ferritin levels in brain in Parkinson's disease. **J Neurochem** 1990; 55(1): 16-20.
- _____, Carter CJ, Wells FR, Javoy-Agid F, Agid Y, Lees A, et al. Basal lipid peroxidation in substantia nigra is increased in Parkinson's disease. **J Neurochem** 1989; 52(2): 381-9.
- _____, Holley AE, Flitter WD, Slater TF, Wells FR, Daniel SE, et al. Increased levels of lipid hydroperoxides in the parkinsonian substantia nigra: an HPLC and ESR study. **Mov Disord** 1994; 9(1): 92-7.

- Dexter DT, Wells FR, Lees AJ, Agid F, Agid Y, Jenner P, et al. Increased nigral iron content and alterations in other metal ions occurring in brain in Parkinson's disease. **J Neurochem** 1989; 52(6): 1830-6.
- Dietz MA, Goetz CG, Stebbins GT. Evaluation of a modified inverted walking stick as a treatment for parkinsonian freezing episodes. **Mov Disord** 1990; 5(3): 243-7.
- Djaldetti R, Mosberg-Galili R, Sroka H, Merims D, Melamed E. Camptocormia (bent spine) in patients with Parkinson's disease--characterization and possible pathogenesis of an unusual phenomenon. **Mov Disord** 1999; 14(3): 443-7.
- Dooneief G, Mirabello E, Bell K, Marder K, Stern Y, Mayeux R. An estimate of the incidence of depression in idiopathic Parkinson's disease. **Arch Neurol** 1992; 49(3): 305-7.
- Dostrovsky JO, Hutchison WD, Lozano AM. The globus pallidus, deep brain stimulation, and Parkinson's disease. **Neuroscientist** 2002; 8(3): 284-90.
- Drachman DA, Leavitt J. Human memory and the cholinergic system. A relationship to aging? **Arch Neurol** 1974; 30(2): 113-21.
- Duffy PE, Menefee M. Electron microscopic observations of neurosecretory granules, nerve and glial fibers, and blood vessels in the median eminence of the rabbit. **Am J Anat** 1965; 117(2): 251-86.
- Dunnick JK, Hailey JR. Toxicity and carcinogenicity studies of quercetin, a natural component of foods. **Fundam Appl Toxicol** 1992; 19(3): 423-31.
- Elias PM. Epidermal lipids, barrier function, and desquamation. **J Invest Dermatol** 1983; 80(1 suppl): 44s-9s.
- Elias PM. Lipids and the epidermal permeability barrier. **Arch Dermatol Res** 1981; 270(1): 95-117.
- Ellman GL, Courtney KD, Andres Jr. V, Feather-Stone RM. A new and rapid colorimetric determination of acetylcholinesterase activity. **Biochem Pharmacol** 1961; 7: 88-95.
- Erlund I, Kosonen T, Alfthan G, Maenpaa J, Perttunen K, Kenraali J, et al. Pharmacokinetics of quercetin from quercetin aglycone and rutin in healthy volunteers. **Eur J Clin Pharmacol** 2000; 56(8): 545-53.

- Factor SA. Literature review: intermittent subcutaneous apomorphine therapy in Parkinson's disease. **Neurology** 2004; 62(6 Supply 4): S12-7.
- Fahn S, Cohen G. The oxidant stress hypothesis in Parkinson's disease: evidence supporting it. **Ann Neurol** 1992; 32(6): 804-12.
- Fakher SH, Djalali M, Tabei SMB, Zараati H, Jadadi E, Sadeghi MR et al. Effect of vitamin A, E, C and omega-3 fatty acids on lipid peroxidation in streptozotocin induced diabetic rats. **Iranian J Publ Health** 2007; 36(2): 58-63.
- Faull RL, Lavery R. Changes in dopamine levels in the corpus striatum following lesions in the substantia nigra. **Exp Neurol** 1969; 23(3): 332-40.
- Feany MB. New genetic insights into Parkinson's disease. **N Engl J Med** 2004; 351(19): 1937-40.
- Fearnley JM, Lees AJ. Ageing and Parkinson's disease: substantia nigra regional selectivity. **Brain** 1991; 114(Pt 5): 2283-301.
- Fergusson J, Landon M, Lowe J, Dawson SP, Layfield R, Hanger DP, et al. Pathological lesions of Alzheimer's disease and dementia with Lewy bodies brains exhibit immunoreactivity to an ATPase that is a regulatory subunit of the 26S proteasome. **Neurosci Lett** 1996; 219(3): 167-70.
- Ferro MM, Bellissimo MI, Anselmo-Franci JA, Angellucci ME, Canteras NS, Da Cunha C. Comparison of bilaterally 6-OHDA- and MPTP-lesioned rats as models of the early phase of Parkinson's disease: histological, neurochemical, motor and memory alterations. **J Neurosci Methods** 2005; 148(1): 78-87.
- Ferry DR, Smith A, Malkhandi J, Fyfe DW, deTakats PG, Anderson D, et al. Phase I clinical trial of the flavonoid quercetin: pharmacokinetics and evidence for in vivo tyrosine kinase inhibition. **Clin Cancer Res** 1996; 2(4): 659-68.
- Findley L, Aujla M, Bain PG, Baker M, Beech C, Bowman C, et al. Direct economic impact of Parkinson's disease: a research survey in the United Kingdom. **Mov Disord** 2003; 18(10): 1139-45.
- Findley LJ, Gresty MA. Tremor and rhythmical involuntary movements in Parkinson's disease. In: Findley LJ, Capildeo R, editors. **Movement Disorders: Tremors**. New York: Oxford University Press; 1984. p. 295-304.

- Firestone JA, Smith-Weller T, Franklin G, Swanson P, Longstreth WT, Jr., Checkoway H. Pesticides and risk of Parkinson disease: a population-based case-control study. **Arch Neurol** 2005; 62(1): 91-5.
- FitzGerald PM, Jankovic J. Lower body parkinsonism: evidence for vascular etiology. **Mov Disord** 1989; 4(3): 249-60.
- Florio T, Capozzo A, Nisini A, Lupi A, Scarnati E. Dopamine denervation of specific striatal subregions differentially affects preparation and execution of a delayed response task in the rat. **Behav Brain Res** 1999; 104(1-2): 51-62.
- Forno LS, Langston JW, DeLanney LE, Irwin I, Ricaurte GA. Locus ceruleus lesions and eosinophilic inclusions in MPTP-treated monkeys. **Ann Neurol** 1986; 20(4): 449-55.
- Freed CR, Yamamoto BK. Regional brain dopamine metabolism: a marker for the speed, direction, and posture of moving animals. **Science** 1985; 229(4708): 62-5.
- 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(1-2): 147-55.
- Gaspar J, Rodrigues A, Laires A, Silva F, Costa S, Monteiro MJ, et al. On the mechanisms of genotoxicity and metabolism of quercetin. **Mutagenesis** 1994; 9(5): 445-9.
- Gee JM, DuPont MS, Day AJ, Plumb GW, Williamson G, Johnson IT. Intestinal transport of quercetin glycosides in rats involves both deglycosylation and interaction with the hexose transport pathway. **J Nutr** 2000; 130(11): 2765-71.
- Geetha T, Malhotra V, Chopra K, Kaur IP. Antimutagenic and antioxidant/prooxidant activity of quercetin. **Indian J Exp Biol** 2005; 43(1): 61-7.
- Giasson BI, Duda JE, Murray IV, Chen Q, Souza JM, Hurtig HI, et al. Oxidative damage linked to neurodegeneration by selective alpha-synuclein nitration in synucleinopathy lesions. **Science** 2000; 290(5493): 985-9.
- Gibb WR, Scott T, Lees AJ. Neuronal inclusions of Parkinson's disease. **Mov Disord** 1991; 6(1): 2-11.
- Giladi N, Kao R, Fahn S. Freezing phenomenon in patients with parkinsonian syndromes. **Mov Disord** 1997; 12(3): 302-5.

- Giladi N, McDermott MP, Fahn S, Przedborski S, Jankovic J, Stern M, et al. Freezing of gait in PD: prospective assessment in the DATATOP cohort. **Neurology** 2001; 56(12): 1712-21.
- Giovanni A, Sonsalla PK, Heikkila RE. Studies on species sensitivity to the dopaminergic neurotoxin 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine. Part 2: Central administration of 1-methyl-4-phenylpyridinium. **J Pharmacol Exp Ther** 1994; 270(3): 1008-14.
- Glinka Y, Gassen M, Youdim MB. Mechanism of 6-hydroxydopamine neurotoxicity. **J Neural Transm Suppl** 1997; 50: 55-66.
- Goldberg DM, Yan J, Soleas GJ. Absorption of three wine-related polyphenols in three different matrices by healthy subjects. **Clin Biochem** 2003; 36(1): 79-87.
- Goldblith SA, Proctor BE. Photometric determination of catalase activity. **J Biol Chem** 1950; 187(2): 705-9.
- Goldman JE, Yen SH, Chiu FC, Peress NS. Lewy bodies of Parkinson's disease contain neurofilament antigens. **Science** 1983; 221(4615): 1082-4.
- Gorell JM, Johnson CC, Rybicki BA, Peterson EL, Richardson RJ. The risk of Parkinson's disease with exposure to pesticides, farming, well water, and rural living. **Neurology** 1998; 50(5): 1346-50.
- Graefe EU, Wittig J, Mueller S, Riethling AK, Uehleke B, Drewelow B, et al. Pharmacokinetics and bioavailability of quercetin glycosides in humans. **J Clin Pharmacol** 2001; 41(5): 492-9.
- Graf BA, Ameho C, Dolnikowski GG, Milbury PE, Chen CY, Blumberg JB. Rat gastrointestinal tissues metabolize quercetin. **J Nutr** 2006; 136(1): 39-44.
- Gray GM, White RJ, Williams RH, Yardley HJ. Lipid composition of the superficial stratum corneum cells of pig epidermis. **Br J Dermatol** 1982; 106(1): 59-63.
- Gross M, Pfeiffer M, Martini M, Campbell D, Slavin J, Potter J. The quantitation of metabolites of quercetin flavonols in human urine. **Cancer Epidemiol Biomarkers Prev** 1996; 5(9): 711-20.
- Gugler R, Leschik M, Dengler HJ. Disposition of quercetin in man after single oral and intravenous doses. **Eur J Clin Pharmacol** 1975; 9(2-3): 229-34.

- Gupta D, Venugopal J, Prabhakaran MP, Dev VR, Low S, Choon AT, et al. Aligned and random nanofibrous substrate for the in vitro culture of Schwann cells for neural tissue engineering. **Acta Biomater** 2009; 5(7): 2560-9.
- Ha HJ, Kwon YS, Park SM, Shin T, Park JH, Kim HC, et al. Quercetin attenuates oxygen-glucose deprivation- and excitotoxin-induced neurotoxicity in primary cortical cell cultures. **Biol Pharm Bull** 2003; 26(4): 544-6.
- Habgood MD, Begley DJ, Abbott NJ. Determinants of passive drug entry into the central nervous system. **Cell Mol Neurobiol** 2000; 20(2): 231-53.
- Hadgraft J. Skin deep. **Eur J Pharm Biopharm** 2004; 58(2): 291-9.
- Halliwell B. Reactive oxygen species and the central nervous system. **J Neurochem** 1992; 59(5): 1609-23.
- Harnly JM, Doherty RF, Beecher GR, Holden JM, Haytowitz DB, Bhagwat S, et al. Flavonoid content of U.S. fruits, vegetables, and nuts. **J Agric Food Chem** 2006; 54(26): 9966-77.
- Hartmann A, Hunot S, Michel PP, Muriel MP, Vyas S, Faucheux BA, et al. Caspase-3: A vulnerability factor and final effector in apoptotic death of dopaminergic neurons in Parkinson's disease. **Proc Natl Acad Sci U S A** 2000; 97(6): 2875-80.
- Hasegawa E, Takeshige K, Oishi T, Murai Y, Minakami S. 1-Methyl-4-phenylpyridinium (MPP+) induces NADH-dependent superoxide formation and enhances NADH-dependent lipid peroxidation in bovine heart submitochondrial particles. **Biochem Biophys Res Commun** 1990; 170(3): 1049-55.
- Hauser, RA. **Motor circuit in Parkinson's disease** [online] 2010 Oct 11 [cited 2010 Nov 10]. Available from: <http://emedicine.medscape.com/article/1151267-overview>
- Hawksworth G, Drasar BS, Hill MJ. Intestinal bacteria and the hydrolysis of glycosidic bonds. **J Med Microbiol** 1971; 4(4): 451-9.

- Hayek T, Fuhrman B, Vaya J, Rosenblat M, Belinky P, Coleman R, et al. Reduced progression of atherosclerosis in apolipoprotein E-deficient mice following consumption of red wine, or its polyphenols quercetin or catechin, is associated with reduced susceptibility of LDL to oxidation and aggregation. **Arterioscler Thromb Vasc Biol** 1997; 17(11): 2744-52.
- He Y, Lee T, Leong SK. 6-Hydroxydopamine induced apoptosis of dopaminergic cells in the rat substantia nigra. **Brain Res** 2000; 858(1): 163-6.
- Hefco V, Yamada K, Hefco A, Hritcu L, Tiron A, Nabeshima T. Role of the mesotelencephalic dopamine system in learning and memory processes in the rat. **Eur J Pharmacol** 2003; 475(1-3): 55-60.
- Henze C, Earl C, Sautter J, Schmidt N, Themann C, Hartmann A, et al. Reactive oxidative and nitrogen species in the nigrostriatal system following striatal 6-hydroxydopamine lesion in rats. **Brain Res** 2005; 1052(1): 97-104.
- Heo HJ, Lee CY. Protective effects of quercetin and vitamin C against oxidative stress-induced neurodegeneration. **J Agric Food Chem** 2004; 52(25): 7514-7.
- Hernadi I, Karadi Z, Vigh J, Petyko Z, Egyed R, Berta B, et al. Alterations of conditioned taste aversion after microiontophoretically applied neurotoxins in the medial prefrontal cortex of the rat. **Brain Res Bull** 2000; 53(6): 751-8.
- Hertog, MG, Hollman PC, van de Putte B. Content of potential anticarcinogenic flavonoids of tea infusions, wine and fruits juices. **J Agric food chem** 1993; 41; 1242-6.
- _____, Hollman PC, Katan MB. Content of potentially anticarcinogenic flavonoids of 28 vegetables and 9 fruits commonly consumed in the Netherlands. **J Agric Food Chem** 1992; 40: 2379-83.
- _____, Kromhout D, Aravanis C, Blackburn H, Buzina R, Fidanza F, et al. Flavonoid intake and long-term risk of coronary heart disease and cancer in the seven countries study. **Arch Intern Med** 1995; 155(4): 381-6.
- Hertzman C, Wiens M, Bowering D, Snow B, Calne D. Parkinson's disease: a case-control study of occupational and environmental risk factors. **Am J Ind Med** 1990; 17(3): 349-55.
- Hess DT, Matsumoto A, Kim SO, Marshall HE, Stamler JS. Protein S-nitrosylation: purview and parameters. **Nat Rev Mol Cell Biol** 2005; 6(2): 150-66.

- Hill WD, Lee VM, Hurtig HI, Murray JM, Trojanowski JQ. Epitopes located in spatially separate domains of each neurofilament subunit are present in Parkinson's disease Lewy bodies. **J Comp Neurol** 1991; 309(1): 150-60.
- Hirono I, Ueno I, Hosaka S, Takanashi H, Matsushima T, Sugimura T, et al. Carcinogenicity examination of quercetin and rutin in ACI rats. **Cancer Lett** 1981; 13(1): 15-21.
- Hoch, DB. **Substantia nigra and Parkinson's disease** [online] 2009 Jul 4 [cited 2010 Nov 10]. Available from: <http://www.edward.org/17677.cfm>
- Hoehn MM, Yahr MD. Parkinsonism: onset, progression and mortality. **Neurology** 1967; 17(5): 427-42.
- Hollman PC, Buijsman MN, van Gameren Y, Cnossen EP, de Vries JH, Katan MB. The sugar moiety is a major determinant of the absorption of dietary flavonoid glycosides in man. **Free Radic Res** 1999; 31(6): 569-73.
- _____, de Vries JH, van Leeuwen SD, Mengelers MJ, Katan MB. Absorption of dietary quercetin glycosides and quercetin in healthy ileostomy volunteers. **Am J Clin Nutr** 1995; 62(6): 1276-82.
- _____, van Trijp JM, Buysman MN, van der Gaag MS, Mengelers MJ, de Vries JH, et al. Relative bioavailability of the antioxidant flavonoid quercetin from various foods in man. **FEBS Lett** 1997; 418(1-2): 152-6.
- _____, van Trijp JM, Mengelers MJ, de Vries JH, Katan MB. Bioavailability of the dietary antioxidant flavonol quercetin in man. **Cancer Lett** 1997; 114(1-2): 139-40.
- _____, vd Gaag M, Mengelers MJ, van Trijp JM, de Vries JH, Katan MB. Absorption and disposition kinetics of the dietary antioxidant quercetin in man. **Free Radic Biol Med** 1996; 21(5): 703-7.
- Hosaka S, Hirono I. Carcinogenicity test of quercetin by pulmonary-adenoma bioassay in strain A mice. **Gann** 1981; 72(2): 327-8.
- Hunker CJ, Abbs JH, Barlow SM. The relationship between parkinsonian rigidity and hypokinesia in the orofacial system: a quantitative analysis. **Neurology** 1982; 32(7): 749-54.

- Hunot S, Boissiere F, Faucheux B, Brugg B, Mouatt-Prigent A, Agid Y, et al. Nitric oxide synthase and neuronal vulnerability in Parkinson's disease. **Neuroscience** 1996; 72(2): 355-63.
- Hunot S, Dugas N, Faucheux B, Hartmann A, Tardieu M, Debre P, et al. FcepsilonRII/CD23 is expressed in Parkinson's disease and induces, in vitro, production of nitric oxide and tumor necrosis factor-alpha in glial cells. **J Neurosci** 1999; 19(9): 3440-7.
- Ii K, Ito H, Tanaka K, Hirano A. Immunocytochemical co-localization of the proteasome in ubiquitinated structures in neurodegenerative diseases and the elderly. **J Neuropathol Exp Neurol** 1997; 56(2): 125-31.
- Illarioshkin SN, Periquet M, Rawal N, Lucking CB, Zagorovskaya TB, Slominsky PA, et al. Mutation analysis of the parkin gene in Russian families with autosomal recessive juvenile parkinsonism. **Mov Disord** 2003; 18(8): 914-9.
- Ishikawa A, Tsuji S. Clinical analysis of 17 patients in 12 Japanese families with autosomal-recessive type juvenile parkinsonism. **Neurology** 1996; 47(1): 160-6.
- Ishikawa M, Oikawa T, Hosokawa M, Hamada J, Morikawa K, Kobayashi H. Enhancing effect of quercetin on 3-methylcholanthrene carcinogenesis in C57Bl/6 mice. **Neoplasma** 1985; 32(4): 435-41.
- Ishikawa Y, Kitamura M. Anti-apoptotic effect of quercetin: intervention in the JNK- and ERK-mediated apoptotic pathways. **Kidney Int** 2000; 58(3): 1078-87.
- Ito N, Hagiwara A, Tamano S, Kagawa M, Shibata M, Kurata Y, et al. Lack of carcinogenicity of quercetin in F344/DuCrj rats. **Jpn J Cancer Res** 1989; 80(4): 317-25.
- Jankovic J, Ben-Arie L, Schwartz K, Chen K, Khan M, Lai EC, et al. Movement and reaction times and fine coordination tasks following pallidotomy. **Mov Disord** 1999; 14(1): 57-62.
- _____, Nour F. Respiratory dyskinesia in Parkinson's disease. **Neurology** 1986; 36(2): 303-4.
- _____, Nutt JG, Sudarsky L. Classification, diagnosis, and etiology of gait disorders. **Adv Neurol** 2001; 87: 119-33.

- Jankovic J, Tintner R. Dystonia and parkinsonism. **Parkinsonism Relat Disord** 2001; 8(2): 109-21.
- Janssen K, Mensink RP, Cox FJ, Harryvan JL, Hovenier R, Hollman PC, et al. Effects of the flavonoids quercetin and apigenin on hemostasis in healthy volunteers: results from an in vitro and a dietary supplement study. **Am J Clin Nutr** 1998; 67(2): 255-62.
- Javoy F, Sotelo C, Herbet A, Agid Y. Specificity of dopaminergic neuronal degeneration induced by intracerebral injection of 6-hydroxydopamine in the nigrostriatal dopamine system. **Brain Res** 1976; 102(2): 201-15.
- Jenner P. Molecular mechanisms of L-DOPA-induced dyskinesia. **Nat Rev Neurosci** 2008; 9(9): 665-77.
- Jenner P. Oxidative mechanisms in nigral cell death in Parkinson's disease. **Mov Disord** 1998; 13(Suppl 1): 24-34.
- _____, Dexter DT, Sian J, Schapira AH, Marsden CD. Oxidative stress as a cause of nigral cell death in Parkinson's disease and incidental Lewy body disease. The Royal Kings and Queens Parkinson's Disease Research Group. **Ann Neurol** 1992; 32(Suppl): S82-7.
- _____, Olanow CW. Oxidative stress and the pathogenesis of Parkinson's disease. **Neurology** 1996; 47(Suppl 3): S161-70.
- _____, Olanow CW. Understanding cell death in Parkinson's disease. **Ann Neurol** 1998; 44 (3 Suppl 1): S72-84.
- Jeon BS, Jackson-Lewis V, Burke RE. 6-Hydroxydopamine lesion of the rat substantia nigra: time course and morphology of cell death. **Neurodegeneration** 1995; 4(2): 131-7.
- Johannot L, Somerset SM. Age-related variations in flavonoid intake and sources in the Australian population. **Public Health Nutr** 2006; 9(8): 1045-54.
- Jones E, Hughes RE. Quercetin, flavonoids and the life-span of mice. **Exp Gerontol** 1982; 17(3): 213-7.
- Jung M, Park M. Acetylcholinesterase inhibition by flavonoids from *Agrimonia pilosa*. **Molecules** 2007; 12(9): 2130-9.

- Justino GC, Santos MR, Canario S, Borges C, Florencio MH, Mira L. Plasma quercetin metabolites: structure-antioxidant activity relationships. **Arch Biochem Biophys** 2004; 432(1): 109-21.
- Kaariainen TM, Piltonen M, Ossola B, Kekki H, Lehtonen S, Nenonen T, et al. Lack of robust protective effect of quercetin in two types of 6-hydroxydopamine-induced parkinsonian models in rats and dopaminergic cell cultures. **Brain Res** 2008; 1203: 149-59.
- Kamel F, Tanner C, Umbach D, Hoppin J, Alavanja M, Blair A, et al. Pesticide exposure and self-reported Parkinson's disease in the agricultural health study. **Am J Epidemiol** 2007; 165(4): 364-74.
- Kanthasamy AG, Kitazawa M, Kanthasamy A, Anantharam V. Dieldrin-induced neurotoxicity: relevance to Parkinson's disease pathogenesis. **Neurotoxicology** 2005; 26(4): 701-19.
- Kavya R, Saluja R, Singh S, Dikshit M. Nitric oxide synthase regulation and diversity: implications in Parkinson's disease. **Nitric Oxide** 2006; 15(4): 280-94.
- Kenawy el R, Bowlin GL, Mansfield K, Layman J, Simpson DG, Sanders EH, et al. Release of tetracycline hydrochloride from electrospun poly(ethylene-co-vinylacetate), poly(lactic acid), and a blend. **J Control Release** 2002; 81(1-2): 57-64.
- Kim K, Luu YK, Chang C, Fang D, Hsiao BS, Chu B, et al. Incorporation and controlled release of a hydrophilic antibiotic using poly(lactide-co-glycolide)-based electrospun nanofibrous scaffolds. **J Control Release** 2004; 98(1): 47-56.
- Kim S, Iwao H. Stress and vascular responses: mitogen-activated protein kinases and activator protein-1 as promising therapeutic targets of vascular remodeling. **J Pharmacol Sci** 2003; 91(3): 177-81.
- Kimura M, Arai Y, Shimoi K, Watanabe S. Japanese intake of flavonoids and isoflavonoids from foods. **J Epidemiol** 1998; 8(3): 168-75.
- Kish SJ, Shannak K, Hornykiewicz O. Uneven pattern of dopamine loss in the striatum of patients with idiopathic Parkinson's disease. Pathophysiologic and clinical implications. **N Engl J Med** 1988; 318(14): 876-80.

- Kish SJ, Shannak K, Rajput A, Deck JH, Hornykiewicz O. Aging produces a specific pattern of striatal dopamine loss: implications for the etiology of idiopathic Parkinson's disease. **J Neurochem** 1992; 58(2): 642-8.
- Kitada T, Asakawa S, Hattori N, Matsumine H, Yamamura Y, Minoshima S, et al. Mutations in the parkin gene cause autosomal recessive juvenile parkinsonism. **Nature** 1998; 392(6676): 605-8.
- Knekt P, Jarvinen R, Seppanen R, Hellevoora M, Teppo L, Pukkala E, et al. Dietary flavonoids and the risk of lung cancer and other malignant neoplasms. **Am J Epidemiol** 1997; 146(3): 223-30.
- Kniesel U, Wolburg H. Tight junctions of the blood-brain barrier. **Cell Mol Neurobiol** 2000; 20(1): 57-76.
- Knott C, Stern G, Wilkin GP. Inflammatory regulators in Parkinson's disease: iNOS, lipocortin-1, and cyclooxygenases-1 and -2. **Mol Cell Neurosci** 2000; 16(6): 724-39.
- Koller WC. Sensory symptoms in Parkinson's disease. **Neurology** 1984; 34(7): 957-9. _____, Glatt S, Vetere-Overfield B, Hassanein R. Falls and Parkinson's disease. **Clin Neuropharmacol** 1989; 12(2): 98-105.
- Korczyn AD. Dementia in Parkinson's disease. **J Neurol** 2001; 248 Suppl 3: III1-4.
- Kril JJ, Halliday GM, Svoboda MD, Cartwright H. The cerebral cortex is damaged in chronic alcoholic. **Neurosci** 1997; 79(4): 983-8.
- Krishnamurty HG, Cheng KJ, Jones GA, Simpson FJ, Watkin JE. Identification of products produced by the anaerobic degradation of rutin and related flavonoids by *Butyrivibrio* sp. C3. **Can J Microbiol** 1970; 16(8): 759-67.
- Kubiak R, Rudek Z. SCEs and chromosome aberrations in mammalian cells in vitro treated with quercetin. **Acta Biol Hung** 1990; 41(1-3): 121-4.
- Kuhnau J. The flavonoids. A class of semi-essential food components: their role in human nutrition. **World Rev Nutr Diet** 1976; 24: 117-91.
- Kumar R, Agarwal AK, Seth PK. Free radical-generated neurotoxicity of 6-hydroxydopamine. **J Neurochem** 1995; 64(4): 1703-7.
- Kuzuhara S. [Neurologic disorders caused by adverse effects of drugs--with special reference to iatrogenic nervous system diseases of the current interest]. **Nippon Naika Gakkai Zasshi** 1998; 87(9): 1885-91.

- Kuzuhara S, Mori H, Izumiyama N, Yoshimura M, Ihara Y. Lewy bodies are ubiquitinated. A light and electron microscopic immunocytochemical study. **Acta Neuropathol** 1988; 75(4): 345-53.
- Lamson DW, Brignall MS. Antioxidants and cancer, part 3: quercetin. **Altern Med Rev** 2000; 5(3): 196-208.
- Langer R. Transdermal drug delivery: past progress, current status, and future prospects. **Adv Drug Deliv Rev** 2004; 56(5): 557-8.
- Langston JW, Ballard P, Tetrud JW, Irwin I. Chronic Parkinsonism in humans due to a product of meperidine-analog synthesis. **Science** 1983; 219(4587): 979-80.
- _____, Ballard PA, Jr. Parkinson's disease in a chemist working with 1-methyl-4-phenyl-1,2,5,6-tetrahydropyridine. **N Engl J Med** 1983; 309(5): 310.
- Lee RG, Tatton WG. Motor responses to sudden limb displacements in primates with specific CNS lesions and in human patients with motor system disorders. **Can J Neurol Sci** 1975; 2(3): 285-93.
- Lee SJ, Liu J, Oh SH, Soker S, Atala A, Yoo JJ. Development of a composite vascular scaffolding system that withstands physiological vascular conditions. **Biomaterials** 2008; 29(19): 2891-8.
- Lesser S, Cermak R, Wolfram S. Bioavailability of quercetin in pigs is influenced by the dietary fat content. **J Nutr** 2004; 134(6): 1508-11.
- Liberatore GT, Jackson-Lewis V, Vukosavic S, Mandir AS, Vila M, McAuliffe WG, et al. Inducible nitric oxide synthase stimulates dopaminergic neurodegeneration in the MPTP model of Parkinson disease. **Nat Med** 1999; 5(12): 1403-9.
- Lin MT, Beal MF. Mitochondrial dysfunction and oxidative stress in neurodegenerative diseases. **Nature** 2006; 443(7113): 787-95.
- Liou HH, Tsai MC, Chen CJ, Jeng JS, Chang YC, Chen SY, et al. Environmental risk factors and Parkinson's disease: a case-control study in Taiwan. **Neurology** 1997; 48(6): 1583-8.
- Llinas R, Jahnsen H. Electrophysiology of mammalian thalamic neurones in vitro. **Nature** 1982; 297(5865): 406-8.

- Lo Bianco C, Ridet JL, Schneider BL, Deglon N, Aebischer P. alpha - Synucleinopathy and selective dopaminergic neuron loss in a rat lentiviral-based model of Parkinson's disease. **Proc Natl Acad Sci U S A** 2002; 99(16): 10813-8.
- Lowry OH, Roseburgh NJ, Farr AL, Randall RJ. Protein measurement with Folin phenol reagent. **J Biol Chem** 1951; 193(1); 265-75.
- Lu J, Zheng YL, Luo L, Wu DM, Sun DX, Feng YJ. Quercetin reverses D-galactose induced neurotoxicity in mouse brain. **Behav Brain Res** 2006; 171(2): 251-60.
- Luo Y, Umegaki H, Wang X, Abe R, Roth GS. Dopamine induces apoptosis through an oxidation-involved SAPK/JNK activation pathway. **J Biol Chem** 1998; 273(6): 3756-64.
- Luthman J, Fredriksson A, Sundstrom E, Jonsson G, Archer T. Selective lesion of central dopamine or noradrenaline neuron systems in the neonatal rat: motor behavior and monoamine alterations at adult stage. **Behav Brain Res** 1989; 33(3): 267-77.
- Manach C, Morand C, Crespy V, Demigne C, Texier O, Regerat F, et al. Quercetin is recovered in human plasma as conjugated derivatives which retain antioxidant properties. **FEBS Lett** 1998; 426(3): 331-6.
- _____, Morand C, Demigne C, Texier O, Regerat F, Remesy C. Bioavailability of rutin and quercetin in rats. **FEBS Lett** 1997; 409(1): 12-6.
- _____, Morand C, Texier O, Favier ML, Agullo G, Demigne C, et al. Quercetin metabolites in plasma of rats fed diets containing rutin or quercetin. **J Nutr** 1995; 125(7): 1911-22.
- _____, Texier O, Morand C, Crespy V, Regerat F, Demigne C, et al. Comparison of the bioavailability of quercetin and catechin in rats. **Free Radic Biol Med** 1999; 27(11-12): 1259-66.
- Mandel RJ. Effect of acute L-DOPA pretreatment on apomorphine-induced rotational behavior in a rat model of Parkinson's disease. **Exp Neurol** 2000; 161: 212-9.

- Marchese R, Diverio M, Zucchi F, Lentino C, Abbruzzese G. The role of sensory cues in the rehabilitation of parkinsonian patients: a comparison of two physical therapy protocols. **Mov Disord** 2000; 15(5): 879-83.
- Marti MJ, James CJ, Oo TF, Kelly WJ, Burke RE. Early developmental destruction of terminals in the striatal target induces apoptosis in dopamine neurons of the substantia nigra. **J Neurosci** 1997; 17(6): 2030-9.
- Marzel P. General principle and procedure for drug metabolism in vitro. In: La Du BN, Mandel HG, Way EL, editors. **Fundamental of drug metabolism and drug deposition**. New York: Krieger Publishing Company; 1979. p. 527-52.
- Mattson MP. Apoptosis in neurodegenerative disorders. **Nat Rev Mol Cell Biol** 2000; 1(2): 120-9.
- Mayeux R, Chen J, Mirabello E, Marder K, Bell K, Dooneief G, et al. An estimate of the incidence of dementia in idiopathic Parkinson's disease. **Neurology** 1990; 40(10): 1513-7.
- _____, Denaro J, Hemenegildo N, Marder K, Tang MX, Cote LJ, et al. A population-based investigation of Parkinson's disease with and without dementia. Relationship to age and gender. **Arch Neurol** 1992; 49(5): 492-7.
- _____, Stern Y, Rosen J, Leventhal J. Depression, intellectual impairment, and Parkinson disease. **Neurology** 1981; 31(6): 645-50.
- _____, Stern Y, Rosenstein R, Marder K, Hauser A, Cote L, et al. An estimate of the prevalence of dementia in idiopathic Parkinson's disease. **Arch Neurol** 1988; 45(3): 260-2.
- Mazzulli JR, Mishizen AJ, Giasson BI, Lynch DR, Thomas SA, Nakashima A, et al. Cytosolic catechols inhibit alpha-synuclein aggregation and facilitate the formation of intracellular soluble oligomeric intermediates. **J Neurosci** 2006; 26(39): 10068-78.
- McAnlis GT, McEneny J, Pearce J, Young IS. Absorption and antioxidant effects of quercetin from onions, in man. **Eur J Clin Nutr** 1999; 53(2): 92-6.
- McCord JM, Fridovich I. Superoxide dismutase. An enzymic function for erythrocuprein (hemocuprein). **J Biol Chem** 1969; 244(22): 6049-6055, 1969.
- McGeer PL, Itagaki S, Akiyama H, McGeer EG. Rate of cell death in parkinsonism indicates active neuropathological process. **Ann Neurol** 1988; 24(4): 574-6.

- McGeer PL, Itagaki S, Boyes BE, McGeer EG. Reactive microglia are positive for HLA-DR in the substantia nigra of Parkinson's and Alzheimer's disease brains. **Neurology** 1988; 38(8): 1285-91.
- _____, McGeer EG, Suzuki JS. Aging and extrapyramidal function. *Arch Neurol* 1977; 34(1): 33-5.
- Medical Statistics of Prasat Neurology Institute. Number of outpatients [online] 2008 [cited 2009 Aug 20]. Available from: http://www.pni.go.th/pnigoth/?page_id=574
- Mena I, Marin O, Fuenzalida S, Cotzias GC. Chronic manganese poisoning. Clinical picture and manganese turnover. **Neurology** 1967; 17(2): 128-36.
- Menza MA, Palermo B, DiPaola R, Sage JI, Ricketts MH. Depression and anxiety in Parkinson's disease: possible effect of genetic variation in the serotonin transporter. **J Geriatr Psychiatry Neurol** 1999; 12(2): 49-52.
- Merante F, Raha S, Reod JK, Proteau G. The Simultaneous Isolation of RNA and DNA from Tissues and Cultured Cells. In: Harwood AJ. editor. **Methods in Molecular Biology: Basic DNA and RNA Protocols**. London: Humana Press; 1996; p. 3-9.
- Metodiewa D, Jaiswal AK, Cenas N, Dickancaite E, Segura-Aguilar J. Quercetin may act as a cytotoxic prooxidant after its metabolic activation to semiquinone and quinoidal product. **Free Radic Biol Med** 1999; 26(1-2): 107-16.
- Middleton E, Jr., Kandaswami C, Theoharides TC. The effects of plant flavonoids on mammalian cells: implications for inflammation, heart disease, and cancer. **Pharmacol Rev** 2000; 52(4): 673-751.
- Mielke K, Herdegen T. JNK and p38 stresskinases--degenerative effectors of signal-transduction-cascades in the nervous system. **Prog Neurobiol** 2000; 61(1): 45-60.
- Mirza B, Hadberg H, Thomsen P, Moos T. The absence of reactive astrocytosis is indicative of a unique inflammatory process in Parkinson's disease. **Neuroscience** 2000; 95(2): 425-32.
- Moghal S, Rajput AH, D'Arcy C, Rajput R. Prevalence of movement disorders in elderly community residents. **Neuroepidemiology** 1994; 13(4): 175-8.

- Mogi M, Togari A, Tanaka K, Ogawa N, Ichinose H, Nagatsu T. Increase in level of tumor necrosis factor (TNF)-alpha in 6-hydroxydopamine-lesioned striatum in rats without influence of systemic L-DOPA on the TNF-alpha induction. **Neurosci Lett** 1999; 268(2): 101-4.
- Moghini HR, Williams AC, Barry BW. A lamellar matrix model for stratum corneum intercellular lipids II. Effect of geometry of the stratum corneum on permeation of model drugs 5-fluorouracil and oestradiol. **Int J Pharmaceutics** 1996; 131(2): 117-29.
- Monville C, Torres EM, Dunnett SB. Validation of the l-dopa-induced dyskinesia in the 6-OHDA model and evaluation of the effects of selective dopamine receptor agonists and antagonists. **Brain Res Bull** 2005; 68(1-2): 16-23.
- Moon SK, Cho GO, Jung SY, Gal SW, Kwon TK, Lee YC, et al. Quercetin exerts multiple inhibitory effects on vascular smooth muscle cells: role of ERK1/2, cell-cycle regulation, and matrix metalloproteinase-9. **Biochem Biophys Res Commun** 2003; 301(4): 1069-78.
- Morand C, Crespy V, Manach C, Besson C, Demigne C, Remesy C. Plasma metabolites of quercetin and their antioxidant properties. **Am J Physiol** 1998; 275(1 Pt 2): R212-9.
- _____, Manach C, Crespy V, Remesy C. Quercetin 3-O-beta-glucoside is better absorbed than other quercetin forms and is not present in rat plasma. **Free Radic Res** 2000; 33(5): 667-76.
- _____, Manach C, Crespy V, Remesy C. Respective bioavailability of quercetin aglycone and its glycosides in a rat model. **Biofactors** 2000; 12(1-4): 169-74.
- Morino K, Matsukara N, Kawachi T, Ohgaki H, Sugimura T, Hirono I. Carcinogenicity test of quercetin and rutin in golden hamsters by oral administration. **Carcinogenesis** 1982; 3(1): 93-7.
- Morrice PC, Wood SG, Duthie GG. High-performance liquid chromatographic determination of quercetin and isorhamnetin in rat tissues using beta-glucuronidase and acid hydrolysis. **J Chromatogr B Biomed Sci Appl** 2000; 738(2): 413-7.
- Morris RGM: Spatial localization does not require the presence of local cues. **Learning Motivation** 1981; 12: 239-61.

- Mosharov EV, Staal RG, Bove J, Prou D, Hananiya A, Markov D, et al. Alpha-synuclein overexpression increases cytosolic catecholamine concentration. **J Neurosci** 2006; 26(36): 9304-11.
- Mullen W, Boitier A, Stewart AJ, Crozier A. Flavonoid metabolites in human plasma and urine after the consumption of red onions: analysis by liquid chromatography with photodiode array and full scan tandem mass spectrometric detection. **J Chromatogr A** 2004; 1058(1-2): 163-8.
- _____, Graf BA, Caldwell ST, Hartley RC, Duthie GG, Edwards CA, et al. Determination of flavonol metabolites in plasma and tissues of rats by HPLC-radiocounting and tandem mass spectrometry following oral ingestion of [2-(14)C]quercetin-4'-glucoside. **J Agric Food Chem** 2002; 50(23): 6902-9.
- Mura A, Feldon J. Spatial learning in rats is impaired after degeneration of the nigrostriatal dopaminergic system. **Mov Disord** 2003; 18(8): 860-71.
- Murota K, Shimizu S, Chujo H, Moon JH, Terao J. Efficiency of absorption and metabolic conversion of quercetin and its glucosides in human intestinal cell line Caco-2. **Arch Biochem Biophys** 2000; 384(2): 391-7.
- _____, Terao J. Quercetin appears in the lymph of unanesthetized rats as its phase II metabolites after administered into the stomach. **FEBS Lett** 2005; 579(24): 5343-6.
- Murray CW, Booth AN, Deeds F, Jones FT. Absorption and metabolism of rutin and quercetin in the rabbit. **J Am Pharm Assoc Am Pharm Assoc (Baltim)** 1954; 43(6:1): 361-4.
- Naidu PS, Singh A, Kulkarni SK. Reversal of reserpine-induced orofacial dyskinesia and cognitive dysfunction by quercetin. **Pharmacology** 2004; 70(2): 59-67.
- Naik A, Kalia YN, Guy RH. Transdermal drug delivery: overcoming the skin's barrier function. **Pharm Sci Technolo Today** 2000; 3(9): 318-26.
- Nakagawa Y, Shetlar MR, Wender SH. Urinary Products from Quercetin in Neomycin-Treated Rats. **Biochim Biophys Acta** 1965; 97: 233-41.
- Nakamura Y, Ishimitsu S, Tonogai Y. Effects of quercetin and rutin on serum and hepatic lipid concentrations, fecal steroid excretion and serum antioxidant properties. **J Health Sci (Tokyo)** 2000; 46(4): 229-40.

- Nambu A, Yoshida S, Jinnai K. Discharge patterns of pallidal neurons with input from various cortical areas during movement in the monkey. **Brain Res** 1990; 519(1-2): 183-91.
- National Statistical Office. **Thai aging population** [online] 2007 [cited 2009 Aug 19]. Available from: <http://tgri.thailand.org/index.php?module=edoc&page=detail&id=123>
- Nelson K, Golnick J, Korn T, Angle C. Manganese encephalopathy: utility of early magnetic resonance imaging. **Br J Ind Med** 1993; 50(6): 510-3.
- Nemeth K, Plumb GW, Berrin JG, Juge N, Jacob R, Naim HY, et al. Deglycosylation by small intestinal epithelial cell beta-glucosidases is a critical step in the absorption and metabolism of dietary flavonoid glycosides in humans. **Eur J Nutr** 2003; 42(1): 29-42.
- Ngomuo AJ, Jones RS. Genotoxicity studies of quercetin and shikimate in vivo in the bone marrow of mice and gastric mucosal cells of rats. **Vet Hum Toxicol** 1996; 38(3): 176-80.
- Nicklas WJ, Vyas I, Heikkila RE. Inhibition of NADH-linked oxidation in brain mitochondria by 1-methyl-4-phenyl-pyridine, a metabolite of the neurotoxin, 1-methyl-4-phenyl-1,2,5,6-tetrahydropyridine. **Life Sci** 1985; 36(26): 2503-8.
- _____, Youngster SK, Kindt MV, Heikkila RE. MPTP, MPP+ and mitochondrial function. **Life Sci** 1987; 40(8): 721-9.
- Nikkhah G, Olsson M, Eberhard J, Bentlage C, Cunningham MG, Bjorklund A. A microtransplantation approach for cell suspension grafting in the rat Parkinson model: a detailed account of the methodology. **Neuroscience** 1994; 63(1): 57-72.
- Norton WT, Aquino DA, Hozumi I, Chiu FC, Brosnan CF. Quantitative aspects of reactive gliosis: a review. **Neurochem Res** 1992; 17(9): 877-85.
- Office of Agricultural Economics. **Agricultural Statistic of Thailand 2009** [online] 2009 [cited 2010 Nov 15]. Available from: http://www.oae.go.th/download/download_journal/yearbook2552.pdf
- O'Hare MJ, Kushwaha N, Zhang Y, Aleyasin H, Callaghan SM, Slack RS, et al. Differential roles of nuclear and cytoplasmic cyclin-dependent kinase 5 in apoptotic and excitotoxic neuronal death. **J Neurosci** 2005; 25(39): 8954-66.

- Ohnishi E, Bannai H. Quercetin potentiates TNF-induced antiviral activity. **Antiviral Res** 1993; 22(4): 327-31.
- Ohkawa H, Ohishi N, Yagi K. Assay for lipid peroxide in animal tissues by thiobabaturic acid reaction. **Anal Biochem** 1979; 95(2): 351-8.
- Okamoto T. Safety of quercetin for clinical application (Review). **Int J Mol Med** 2005; 16(2): 275-8.
- Olanow CW. The pathogenesis of cell death in Parkinson's disease--2007. **Mov Disord** 2007; 22 Suppl 17: S335-42.
- _____, Fahn S, Langston JW, Godbold J. Selegiline and mortality in Parkinson's disease. **Ann Neurol** 1996; 40(6): 841-5.
- O'Leary KA, Day AJ, Needs PW, Mellon FA, O'Brien NM, Williamson G. Metabolism of quercetin-7- and quercetin-3-glucuronides by an in vitro hepatic model: the role of human beta-glucuronidase, sulfotransferase, catechol-O-methyltransferase and multi-resistant protein 2 (MRP2) in flavonoid metabolism. **Biochem Pharmacol** 2003; 65(3): 479-91.
- Oliveira EJ, Watson DG. In vitro glucuronidation of kaempferol and quercetin by human UGT-1A9 microsomes. **FEBS Lett** 2000; 471(1): 1-6.
- Olthof MR, Hollman PC, Buijsman MN, van Amelsvoort JM, Katan MB. Chlorogenic acid, quercetin-3-rutinoside and black tea phenols are extensively metabolized in humans. **J Nutr** 2003; 133(6): 1806-14.
- Oo TF, Burke RE. The time course of developmental cell death in phenotypically defined dopaminergic neurons of the substantia nigra. **Brain Res Dev Brain Res** 1997; 98(2): 191-6.
- Pamukcu AM, Yalciner S, Hatcher JF, Bryan GT. Quercetin, a rat intestinal and bladder carcinogen present in bracken fern (*Pteridium aquilinum*). **Cancer Res** 1980; 40(10): 3468-72.
- Papapetropoulos S, Ellul J, Polychronopoulos P, Chroni E. A registry-based, case-control investigation of Parkinson's disease with and without cognitive impairment. **Eur J Neurol** 2004; 11(5): 347-51.
- Patil B, Pike L, Hamilton B. Changes in quercetin concentration in onion owing to location, growth stage and soil type. **New Phytol** 1995; 130(3): 349-55

- Patil B, Pike L. Distribution of quercetin content in different rings of various coloured onion (*Allium cepa* L.) cultivars. **J Horticulture Sci** 1995; 70(4): 643-50.
- Paxinos G, Chorles W. Cresyl Violet. In: Paxinos G, Chorles W, editors. **The rat brain in stereotaxic coordinates**. London: Academic Press; 1981. p. 9-17.
- Paxinos G, Watson C. **The rat brain in stereotaxic coordinates**. 2nd ed. San Diego: Academic Press; 1986.
- Pereira MA, Grubbs CJ, Barnes LH, Li H, Olson GR, Eto I, et al. Effects of the phytochemicals, curcumin and quercetin, upon azoxymethane-induced colon cancer and 7,12-dimethylbenz[a]anthracene-induced mammary cancer in rats. **Carcinogenesis** 1996; 17(6): 1305-11.
- Perese DA, Ulman J, Viola J, Ewing SE, Bankiewicz KS. A 6-hydroxydopamine-induced selective parkinsonian rat model. **Brain Res** 1989; 494(2): 285-93.
- Perry EK, Curtis M, Dick DJ, Candy JM, Atack JR, Bloxham CA, et al. Cholinergic correlates of cognitive impairment in Parkinson's disease: comparisons with Alzheimer's disease. **J Neurol Neurosurg Psychiatry** 1985; 48(5): 413-21.
- Perry TL, Godin DV, Hansen S. Parkinson's disease: a disorder due to nigral glutathione deficiency? **Neurosci Lett** 1982; 33(3): 305-10.
- Perumal AS, Gopal VB, Tordzro WK, Cooper TB, Cadet JL. Vitamin E attenuates the toxic effects of 6-hydroxydopamine on free radical scavenging systems in rat brain. **Brain Res Bull** 1992; 29(5): 699-701.
- Peters HA, Levine RL, Matthews CG, Chapman LJ. Extraparamidal and other neurologic manifestations associated with carbon disulfide fumigant exposure. **Arch Neurol** 1988; 45(5): 537-40.
- Petrakis PL, Kallianos AG, Wender SH, Shetlar MR. Metabolic studies of quercetin labeled with C14. **Arch Biochem Biophys** 1959; 85: 264-71.
- Pietta PG, Gardana C, Mauri PL. Identification of Gingko biloba flavonol metabolites after oral administration to humans. **J Chromatogr B Biomed Sci Appl** 1997; 693(1): 249-55.
- Prasad KN, Cole WC, Kumar B. Multiple antioxidants in the prevention and treatment of Parkinson's disease. **J Am Coll Nutr** 1999; 18(5): 413-23.

- Przedborski S, Levivier M, Jiang H, Ferreira M, Jackson-Lewis V, Donaldson D, et al. Dose-dependent lesions of the dopaminergic nigrostriatal pathway induced by intrastriatal injection of 6-hydroxydopamine. **Neuroscience** 1995; 67(3): 631-47.
- Purdon-Martin J. **The Basal Ganglia and Posture**. Philadelphia: JB Lippincott; 1967.
- Qu D, Rashidian J, Mount MP, Aleyasin H, Parsanejad M, Lira A, et al. Role of Cdk5-mediated phosphorylation of Prx2 in MPTP toxicity and Parkinson's disease. **Neuron** 2007; 55(1): 37-52.
- Rangan GK, Wang Y, Harris DC. Dietary quercetin augments activator protein-1 and does not reduce nuclear factor-kappa B in the renal cortex of rats with established chronic glomerular disease. **Nephron** 2002; 90(3): 313-9.
- Rapp PR, Gallagher M. Preserved neuron number in the hippocampus of aged rats with spatial learning deficits. **Proc Natl Acad Sci U S A** 1996; 93(18): 9926-30.
- Rechner AR, Kuhnle G, Bremner P, Hubbard GP, Moore KP, Rice-Evans CA. The metabolic fate of dietary polyphenols in humans. **Free Radic Biol Med** 2002; 33(2): 220-35.
- Reynolds MR, Berry RW, Binder LI. Nitration in neurodegeneration: deciphering the "Hows" "nYs". **Biochemistry** 2007; 46(25): 7325-36.
- Rice JE, Antic R, Thompson PD. Disordered respiration as a levodopa-induced dyskinesia in Parkinson's disease. **Mov Disord** 2002; 17(3): 524-7.
- Rice-Evans CA, Miller NJ, Paganga G. Structure-antioxidant activity relationships of flavonoids and phenolic acids. **Free Radic Biol Med** 1996; 20(7): 933-56.
- Riederer P, Sofic E, Rausch WD, Schmidt B, Reynolds GP, Jellinger K, et al. Transition metals, ferritin, glutathione, and ascorbic acid in parkinsonian brains. **J Neurochem** 1989; 52(2): 515-20.
- Rietjens IM, Boersma MG, van der Woude H, Jeurissen SM, Schutte ME, Alink GM. Flavonoids and alkenylbenzenes: mechanisms of mutagenic action and carcinogenic risk. **Mutat Res** 2005; 574(1-2): 124-38.

- Rimm EB, Katan MB, Ascherio A, Stampfer MJ, Willett WC. Relation between intake of flavonoids and risk for coronary heart disease in male health professionals. **Ann Intern Med** 1996; 125(5): 384-9.
- Robert MS, Cross SE, Pellett MA. Skin transport. In: Walters KA, editor. **Dermatological and transdermal formulation: Drugs and the Pharmaceutical Science**. New York: Marcel Dekker ; 2002. p. 89-195.
- Robertson RT, Holunann CF, Bruce JL, Coyle JT. Neonatal enucleation reduces specificity activity of acetylcholinesterase and developing rat visual cortex. **Dev Brain Res.**, 1988; 39: 298-302.
- Rodier J. Manganese poisoning in Moroccan miners. **Br J Ind Med** 1955; 12(1): 21-35.
- Rodriguez M, Barroso-Chinea P, Abdala P, Obeso J, Gonzalez-Hernandez T. Dopamine cell degeneration induced by intraventricular administration of 6-hydroxydopamine in the rat: similarities with cell loss in parkinson's disease. **Exp Neurol** 2001; 169(1): 163-81.
- Roghani M, Behzadi G. Neuroprotective effect of vitamin E on the early model of Parkinson's disease in rat: behavioral and histochemical evidence. **Brain Res** 2001; 892(1): 211-7.
- Rothwell JC, Obeso JA, Traub MM, Marsden CD. The behaviour of the long-latency stretch reflex in patients with Parkinson's disease. **J Neurol Neurosurg Psychiatry** 1983; 46(1): 35-44.
- Royland JE, Langston JW. MPTP: a dopamine neurotoxin. In: Kostrzewa RM, editor. **Highly Selective Neurotoxins**. Totowa, N.J.: Humana Press; 1998. p. 141-194.
- Rubin LL, Staddon JM. The cell biology of the blood-brain barrier. **Annu Rev Neurosci** 1999; 22: 11-28.
- Rubinsztein DC. The roles of intracellular protein-degradation pathways in neurodegeneration. **Nature** 2006; 443(7113): 780-6.
- Ruiz MJ, Fernandez M, Estela JM, Asensi MA, Manes J, Pico Y. Short-term oral toxicity of quercetin and pterostibene in Swiss mic. **Toxicol Lett** 2006; 164: 275-6.

- Sachs C, Jonsson G. Mechanisms of action of 6-hydroxydopamine. **Biochem Pharmacol** 1975; 24(1): 1-8.
- Saito D, Shirai A, Matsushima T, Sugimura T, Hirono I. Test of carcinogenicity of quercetin, a widely distributed mutagen in food. **Teratog Carcinog Mutagen** 1980; 1(2): 213-21.
- Sampson L, Rimm E, Hollman PC, de Vries JH, Katan MB. Flavonol and flavone intakes in US health professionals. **J Am Diet Assoc** 2002; 102(10): 1414-20.
- Savitt JM, Dawson VL, Dawson TM. Diagnosis and treatment of Parkinson disease: molecules to medicine. **J Clin Invest** 2006; 116(7): 1744-54.
- Scalbert A, Morand C, Manach C, Remesy C. Absorption and metabolism of polyphenols in the gut and impact on health. **Biomed Pharmacother** 2002; 56(6): 276-82.
- Schapira AH. Mitochondria in the aetiology and pathogenesis of Parkinson's disease. **Lancet Neurol** 2008; 7(1): 97-109.
- _____, Cooper JM, Dexter D, Jenner P, Clark JB, Marsden CD. Mitochondrial complex I deficiency in Parkinson's disease. **Lancet** 1989; 1(8649): 1269.
- _____, Mann VM, Cooper JM, Krige D, Jenner PJ, Marsden CD. Mitochondrial function in Parkinson's disease. The Royal Kings and Queens Parkinson's Disease Research Group. **Ann Neurol** 1992; 32 Suppl: S116-24.
- Scheline RR. The metabolism of drugs and other organic compounds by the intestinal microflora. **Acta Pharmacol Toxicol (Copenh)** 1968; 26(4): 332-42.
- Scherman D, Desnos C, Darchen F, Pollak P, Javoy-Agid F, Agid Y. Striatal dopamine deficiency in Parkinson's disease: role of aging. **Ann Neurol** 1989; 26(4): 551-7.
- Scheuplein RJ, Blank IH. Permeability of the skin. **Physiol Rev** 1971; 51(4): 702-47.
- Schober A. Classic toxin-induced animal models of Parkinson's disease: 6-OHDA and MPTP. **Cell Tissue Res** 2004; 318(1): 215-24.
- Schrag A, Jahanshahi M, Quinn N. How does Parkinson's disease affect quality of life? A comparison with quality of life in the general population. **Mov Disord** 2000; 15(6): 1112-8.

- Schroeter H, Boyd C, Spencer JP, Williams RJ, Cadenas E, Rice-Evans C. MAPK signaling in neurodegeneration: influences of flavonoids and of nitric oxide. **Neurobiol Aging** 2002; 23(5): 861-80.
- Schultz W. Depletion of dopamine in the striatum as an experimental model of Parkinsonism: direct effects and adaptive mechanisms. **Prog Neurobiol** 1982; 18(2-3): 121-66.
- Schwartz RK, Huston JP. The unilateral 6-hydroxydopamine lesion model in behavioral brain research. Analysis of functional deficits, recovery and treatments. **Prog Neurobiol** 1996; 50(2-3): 275-331.
- Sechi GP, Agnetti V, Piredda M, Canu M, Deserra F, Omar HA, et al. Acute and persistent parkinsonism after use of diquat. **Neurology** 1992; 42(1): 261-3.
- Sedelis M, Schwartz RK, Huston JP. Behavioral phenotyping of the MPTP mouse model of Parkinson's disease. **Behav Brain Res** 2001; 125(1-2): 109-25.
- Shali NA, Curtis CG, Powell GM, Roy AB. Sulphation of the flavonoids quercetin and catechin by rat liver. **Xenobiotica** 1991; 21(7): 881-93.
- Shimura H, Hattori N, Kubo S, Mizuno Y, Asakawa S, Minoshima S, et al. Familial Parkinson disease gene product, parkin, is a ubiquitin-protein ligase. **Nat Genet** 2000; 25(3): 302-5.
- _____, Hattori N, Kubo S, Yoshikawa M, Kitada T, Matsumine H, et al. Immunohistochemical and subcellular localization of Parkin protein: absence of protein in autosomal recessive juvenile parkinsonism patients. **Ann Neurol** 1999; 45(5): 668-72.
- Shiryaeva NV, Vshivtseva VV, Mal'tsev NA, Sukhorukov VN, Vaido AI. Neuron density in the hippocampus in rat strains with contrasting nervous system excitability after prolonged emotional-pain stress. **Neurosci Behav Physiol** 2008; 38(4): 355-7.
- Shutenko Z, Henry Y, Pinard E, Seylaz J, Potier P, Berthet F, et al. Influence of the antioxidant quercetin in vivo on the level of nitric oxide determined by electron paramagnetic resonance in rat brain during global ischemia and reperfusion. **Biochem Pharmacol** 1999; 57(2): 199-208.

- Silva MM, Santos MR, Caroco G, Rocha R, Justino G, Mira L. Structure-antioxidant activity relationships of flavonoids: a re-examination. **Free Radic Res** 2002; 36(11): 1219-27.
- Sikareepaisan P, Suksamrarn A, Supaphol P. Electrospun gelatin fiber mats containing a herbal – *Centella asiatica* – extract and release characteristic of asiaticoside, **Nanotechnology** 2008; 19(1): 1–10.
- Singh S, Singh J. Transdermal drug delivery by passive diffusion and iontophoresis: a review. **Med Res Rev** 1993; 13(5): 569-621.
- Sjogren B, Iregren A, Frech W, Hagman M, Johansson L, Tesarz M, et al. Effects on the nervous system among welders exposed to aluminium and manganese. **Occup Environ Med** 1996; 53(1): 32-40.
- Slimestad R, Fossen T, Vagen IM. Onions: a source of unique dietary flavonoids. **J Agric Food Chem** 2007; 55(25): 10067-80.
- Smith PD, Mount MP, Shree R, Callaghan S, Slack RS, Anisman H, et al. Calpain-regulated p35/cdk5 plays a central role in dopaminergic neuron death through modulation of the transcription factor myocyte enhancer factor 2. **J Neurosci** 2006; 26(2): 440-7.
- Snider SR, Fahn S, Isgreen WP, Cote LJ. Primary sensory symptoms in parkinsonism. **Neurology** 1976; 26(5): 423-9.
- Sohal RS. Role of oxidative stress and protein oxidation in the aging process. **Free Radic Biol Med** 2002; 33(1): 37-44.
- Soto-Otero R, Mendez-Alvarez E, Hermida-Ameijeiras A, Munoz-Patino AM, Labandeira-Garcia JL. Autoxidation and neurotoxicity of 6-hydroxydopamine in the presence of some antioxidants: potential implication in relation to the pathogenesis of Parkinson's disease. **J Neurochem** 2000; 74(4): 1605-12.
- Spencer JP, Chowrimootoo G, Choudhury R, Debnam ES, Srail SK, Rice-Evans C. The small intestine can both absorb and glucuronidate luminal flavonoids. **FEBS Lett** 1999; 458(2): 224-30.
- Spillantini MG, Crowther RA, Jakes R, Hasegawa M, Goedert M. alpha-Synuclein in filamentous inclusions of Lewy bodies from Parkinson's disease and dementia with lewy bodies. **Proc Natl Acad Sci U S A** 1998; 95(11): 6469-73.

- Spillantini MG, Schmidt ML, Lee VM, Trojanowski JQ, Jakes R, Goedert M. Alpha-synuclein in Lewy bodies. **Nature** 1997; 388(6645): 839-40.
- Stamler JS, Simon DI, Osborne JA, Mullins ME, Jaraki O, Michel T, et al. S-nitrosylation of proteins with nitric oxide: synthesis and characterization of biologically active compounds. **Proc Natl Acad Sci U S A** 1992; 89(1): 444-8.
- Stelzig DA, Ribeiro S. Metabolism of quercetin and tricetin in the male rat. **Proc Soc Exp Biol Med** 1972; 141(1): 346-9.
- Stevenson JC, Crook D, Godsland IF, Lees B, Whitehead MI. Oral versus transdermal hormone replacement therapy. **Int J Fertil Menopausal Stud** 1993; 38 Suppl 1: 30-5.
- Stoewsand GS, Anderson JL, Boyd JN, Hrazdina G, Babish JG, Walsh KM, et al. Quercetin: a mutagen, not a carcinogen, in Fischer rats. **J Toxicol Environ Health** 1984; 14(2-3): 105-14.
- Sullivan M, Follis RH, Jr., Hilgartner M. Toxicology of podophyllin. **Proc Soc Exp Biol Med** 1951; 77(2): 269-72.
- Sulzer D. Multiple hit hypotheses for dopamine neuron loss in Parkinson's disease. **Trends Neurosci** 2007; 30(5): 244-50.
- Sun SW, Yu HQ, Zhang H, Zheng YL, Wang JJ, Luo L. Quercetin attenuates spontaneous behavioral and spatial memory impairment in D-galactose-treated mice by increasing brain antioxidant capacity. **Nutr Res** 2007; 27(3): 169-175.
- Swanson LW. The projections of the ventral tegmental area and adjacent regions: a combined fluorescent retrograde tracer and immunofluorescence study in the rat. **Brain Res Bull** 1982; 9(1-6): 321-53.
- Swart PJ, De Zeeuw RA. Extensive gastrointestinal metabolic conversion limits the oral bioavailability of the dopamine D2 agonist N-0923 in freely moving rats. **Pharmazie** 1992; 47(8): 613-5.
- Swartz HM, Sarna T, Zecca L. Modulation by neuromelanin of the availability and reactivity of metal ions. **Ann Neurol** 1992; 32 Suppl: S69-75.
- Swerdlow RH, Parks JK, Miller SW, Tuttle JB, Trimmer PA, Sheehan JP, et al. Origin and functional consequences of the complex I defect in Parkinson's disease. **Ann Neurol** 1996; 40(4): 663-71.

- Szabo C, Ischiropoulos H, Radi R. Peroxynitrite: biochemistry, pathophysiology and development of therapeutics. **Nat Rev Drug Discov** 2007; 6(8): 662-80.
- Tadaiesky MT, Dombrowski PA, Figueiredo CP, Cargnin-Ferreira E, Da Cunha C, Takahashi RN. Emotional, cognitive and neurochemical alterations in a premotor stage model of Parkinson's disease. **Neuroscience** 2008; 156(4): 830-40.
- Taepaiboon P, Rungsardthong U, Supaphol P. Vitamin-loaded electrospun cellulose acetate nanofiber mats as transdermal and dermal therapeutic agents of vitamin A acid and vitamin E. **Eur J Pharm Biopharm** 2007; 67(2): 387-97.
- Taj S, Nagarajan B. Inhibition by quercetin and luteolin of chromosomal alterations induced by salted, deep-fried fish and mutton in rats. **Mutat Res** 1996; 369 (1-2): 97-106.
- Takahama U. [Scavenging of active oxygen by flavonoids]. **Tanpakushitsu Kakusan Koso** 1988; 33(16): 2994-9.
- Takizawa S, Fukuyama N, Hirabayashi H, Kohara S, Kazahari S, Shinohara Y, et al. Quercetin, a natural flavonoid, attenuates vacuolar formation in the optic tract in rat chronic cerebral hypoperfusion model. **Brain Res** 2003; 980(1): 156-60.
- Tamai I, Tsuji A. Transporter-mediated permeation of drugs across the blood-brain barrier. **J Pharm Sci** 2000; 89(11): 1371-88.
- Tanila H, Bjorklund M, Riekkinen P, Jr. Cognitive changes in mice following moderate MPTP exposure. **Brain Res Bull** 1998; 45(6): 577-82.
- Tanner CM. Epidemiology of Parkinson's disease. **Neurol Clin** 1992; 10(2): 317-29.
- _____, Goldman SM. Epidemiology of Parkinson's disease. **Neurol Clin** 1996; 14(2): 317-35.
- Thomas BJ, Finnin BC. The transdermal revolution. **Drug Discov Today** 2004; 9(16): 697-703.
- Thomson RF. **The Brain: A Neuroscience Primer**. New York: W.H. Freeman and Company; 1993.
- Togo T, Iseki E, Marui W, Akiyama H, Ueda K, Kosaka K. Glial involvement in the degeneration process of Lewy body-bearing neurons and the degradation process of Lewy bodies in brains of dementia with Lewy bodies. **J Neurol Sci** 2001; 184(1): 71-5.

- Tojo K, Chiang CC, Chien YW. Drug permeation across the skin: effect of penetrant hydrophilicity. **J Pharm Sci** 1987; 76(2): 123-6.
- Torres M, Forman HJ. Redox signaling and the MAP kinase pathways. **Biofactors** 2003; 17(1-4): 287-96.
- Traub MM, Rothwell JC, Marsden CD. Anticipatory postural reflexes in Parkinson's disease and other akinetic-rigid syndromes and in cerebellar ataxia. **Brain** 1980; 103(2): 393-412.
- Ueno I, Kohno M, Haraikawa K, Hirono I. Interaction between quercetin and superoxide radicals. Reduction of the quercetin mutagenicity. **J Pharmacobiodyn** 1984; 7(11): 798-803.
- _____, Nakano N, Hirono I. Metabolic fate of [14C] quercetin in the ACI rat. **Jpn J Exp Med** 1983; 53(1): 41-50.
- Uitti RJ, Snow BJ, Shinotoh H, Vingerhoets FJ, Hayward M, Hashimoto S, et al. Parkinsonism induced by solvent abuse. **Ann Neurol** 1994; 35(5): 616-9.
- Ungerstedt U. 6-Hydroxy-dopamine induced degeneration of central monoamine neurons. **Eur J Pharmacol** 1968; 5(1): 107-10.
- _____. Postsynaptic supersensitivity after 6-hydroxy-dopamine induced degeneration of the nigro-striatal dopamine system. **Acta Physiol Scand Suppl** 1971; 367: 69-93.
- _____, Arbuthnott GW. Quantitative recording of rotational behavior in rats after 6-hydroxy-dopamine lesions of the nigrostriatal dopamine system. **Brain Res** 1970; 24(3): 485-93.
- Verma AK, Johnson JA, Gould MN, Tanner MA. Inhibition of 7,12-dimethylbenz(a)anthracene- and N-nitrosomethylurea-induced rat mammary cancer by dietary flavonol quercetin. **Cancer Res** 1988; 48(20): 5754-8.
- Vila M, Jackson-Lewis V, Guegan C, Wu DC, Teismann P, Choi DK, et al. The role of glial cells in Parkinson's disease. **Curr Opin Neurol** 2001; 14(4): 483-9.
- Volles MJ, Lansbury PT, Jr. Vesicle permeabilization by protofibrillar alpha-synuclein is sensitive to Parkinson's disease-linked mutations and occurs by a pore-like mechanism. **Biochemistry** 2002; 41(14): 4595-602.

- Volles MJ, Lee SJ, Rochet JC, Shtilerman MD, Ding TT, Kessler JC, et al. Vesicle permeabilization by protofibrillar alpha-synuclein: implications for the pathogenesis and treatment of Parkinson's disease. **Biochemistry** 2001; 40(26): 7812-9.
- Wakabayashi K, Engelender S, Yoshimoto M, Tsuji S, Ross CA, Takahashi H. Synphilin-1 is present in Lewy bodies in Parkinson's disease. **Ann Neurol** 2000; 47(4): 521-3.
- _____, Hayashi S, Yoshimoto M, Kudo H, Takahashi H. NACP/alpha-synuclein-positive filamentous inclusions in astrocytes and oligodendrocytes of Parkinson's disease brains. **Acta Neuropathol** 2000; 99(1): 14-20.
- Walle T, Otake Y, Walle UK, Wilson FA. Quercetin glucosides are completely hydrolyzed in ileostomy patients before absorption. **J Nutr** 2000; 130(11): 2658-61.
- _____, Walle UK, Halushka PV. Carbon dioxide is the major metabolite of quercetin in humans. **J Nutr** 2001; 131(10): 2648-52.
- Wang FM, Yao TW, Zeng S. Determination of quercetin and kaempferol in human urine after orally administrated tablet of ginkgo biloba extract by HPLC. **J Pharm Biomed Anal** 2003; 33(2): 317-21.
- _____, Yao TW, Zeng S. Disposition of quercetin and kaempferol in human following an oral administration of Ginkgo biloba extract tablets. **Eur J Drug Metab Pharmacokin** 2003; 28(3): 173-7.
- Wang JD, Huang CC, Hwang YH, Chiang JR, Lin JM, Chen JS. Manganese induced parkinsonism: an outbreak due to an unrepaired ventilation control system in a ferromanganese smelter. **Br J Ind Med** 1989; 46(12): 856-9.
- Wang L, Morris ME. Liquid chromatography-tandem mass spectroscopy assay for quercetin and conjugated quercetin metabolites in human plasma and urine. **J Chromatogr B Analyt Technol Biomed Life Sci** 2005; 821(2): 194-201.
- Wang Y, White MG, Akay C, Chodroff RA, Robinson J, Lindl KA, et al. Activation of cyclin-dependent kinase 5 by calpains contributes to human immunodeficiency virus-induced neurotoxicity. **J Neurochem** 2007; 103(2): 439-55.

- Watanabe T, Yamagata N, Takasaki K, Sano K, Hayakawa K, Katsurabayashi S, et al. Decreased acetylcholine release is correlated to memory impairment in the Tg2576 transgenic mouse model of Alzheimer's disease. **Brain Res** 2009; 1249: 222-8.
- Waters CH. Side effects of selegiline (Eldepryl). **J Geriatr Psychiatry Neurol** 1992; 5(1): 31-4.
- Washington N, Washington C, Wilson CG. Transdermal Drug Delivery. In: Washington N, editor. **Physiological Pharmaceutics**. 2nd ed. London: Taylor and Francis ; 2001. p. 181-198.
- Weldin J, Jack R, Dugaw K, Kapur RP. Quercetin, an over-the-counter supplement, causes neuroblastoma-like elevation of plasma homovanillic acid. **Pediatr Dev Pathol** 2003; 6(6): 547-51.
- Wendel A. Glutathione Peroxidase. In: Jakoby WB, editor. **Enzymatic basis of detoxification**. New York: Academic Press; 1980. p. 333-53.
- Whitlock CM, Jr., Amuso SJ, Bittenbender JB. Chronic neurological disease in two manganese steel workers. **Am Ind Hyg Assoc J** 1966; 27(5): 454-9.
- Williams ML, Elias PM. The extracellular matrix of stratum corneum: role of lipids in normal and pathological function. **Crit Rev Ther Drug Carrier Syst** 1987; 3(2): 95-122.
- Williams-Gray CH, Foltynie T, Brayne CE, Robbins TW, Barker RA. Evolution of cognitive dysfunction in an incident Parkinson's disease cohort. **Brain** 2007; 130(Pt 7): 1787-98.
- Williamson G, Day AJ, Plumb GW, Couteau D. Human metabolic pathways of dietary flavonoids and cinnamates. **Biochem Soc Trans** 2000; 28(2): 16-22.
- Winkler C, Kirik D, Bjorklund A, Dunnett SB. Transplantation in the rat model of Parkinson's disease: ectopic versus homotopic graft placement. **Prog Brain Res** 2000; 127: 233-65.
- Winklhofer KF, Henn IH, Kay-Jackson PC, Heller U, Tatzelt J. Inactivation of parkin by oxidative stress and C-terminal truncations: a protective role of molecular chaperones. **J Biol Chem** 2003; 278(47): 47199-208.

- Winnicka MM, Wisniewski K. Bilateral 6-OHDA lesions to the hippocampus attenuate the facilitatory effect of CCK-8 and caerulein on memory in rats. **Pharmacol Res** 2000; 41(3): 347-53.
- Winterbourn CC. Reconciling the chemistry and biology of reactive oxygen species. **Nat Chem Biol** 2008; 4(5): 278-86.
- Wood GS, Warnke R. Suppression of endogenous avidin-binding activity in tissues and its relevance to biotin-avidin detection systems. **J Histochem Cytochem** 1981; 29(10): 1196-204.
- Xia Z, Dickens M, Ringeaud J, Davis RJ, Greenberg ME. Opposing effects of ERK and JNK-p38 MAP kinases on apoptosis. **Science** 1995; 270(5240): 1326-31.
- Yoshikawa T. Free radicals and their scavengers in Parkinson's disease. **Eur Neurol** 1993; 33 Suppl 1: 60-8.
- Youdim KA, Qaiser MZ, Begley DJ, Rice-Evans CA, Abbott NJ. Flavonoid permeability across an in situ model of the blood-brain barrier. **Free Radic Biol Med** 2004; 36(5): 592-604.
- Young JF, Nielsen SE, Haraldsdottir J, Daneshvar B, Lauridsen ST, Knuthsen P, et al. Effect of fruit juice intake on urinary quercetin excretion and biomarkers of antioxidative status. **Am J Clin Nutr** 1999; 69(1): 87-94.
- Yuan H, Sarre S, Ebinger G, Michotte Y. Histological, behavioural and neurochemical evaluation of medial forebrain bundle and striatal 6-OHDA lesions as rat models of Parkinson's disease. **J Neurosci Methods** 2005; 144(1): 35-45.
- Yuan J, Yankner BA. Apoptosis in the nervous system. **Nature** 2000; 407(6805): 802-9.
- Zafar KS, Siddiqui A, Sayeed I, Ahmad M, Salim S, Islam F. Dose-dependent protective effect of selenium in rat model of Parkinson's disease: neurobehavioral and neurochemical evidences. **J Neurochem** 2003; 84(3): 438-46.
- Zesiewicz TA, Gold M, Chari G, Hauser RA. Current issues in depression in Parkinson's disease. **Am J Geriatr Psychiatry** 1999; 7(2): 110-8.

- Zhang Y, Yang Y, Tang K, Hu X, Zou G. Physicochemical characterization and antioxidant activity of quercetin-loaded chitosan nanoparticles. **J Appl Polym Sci** 2008; 107(2): 891–7.
- Zhu BT, Ezell EL, Liehr JG. Catechol-O-methyltransferase-catalyzed rapid O-methylation of mutagenic flavonoids. Metabolic inactivation as a possible reason for their lack of carcinogenicity in vivo. **J Biol Chem** 1994; 269(1): 292-9.
- Zorzon M, Capus L, Pellegrino A, Cazzato G, Zivadinov R. Familial and environmental risk factors in Parkinson's disease: a case-control study in north-east Italy. **Acta Neurol Scand** 2002; 105(2): 77-82.