

## REFERENCES

- Acheampong, A.A., Chien, D.S., Lam, S., Vekich, S., Breau, A., Usansky, J. Hascourt, D., Nguyen, H., Garst, M. and Tang-Liu, D. 1996. Characterization of brimonidine metabolism with rat, rabbit, dog, monkey, and human liver fractions and rabbit liver aldehyde oxidase. *Xenobiotica*. 26(10):1035-55.
- Ahmed, F.A., Hegazy, K., Chaudhary, P. and Sharma, S.C. 2001. Neuroprotective effect of alpha (2) agonist (brimonidine) on adult rat retinal ganglion cells after increased intraocular pressure. *Brain Res*. 913(2): 133-139.
- Alblas, J., van Corven, E.J., Hordijk, P.L., Milligan, G. and Mooleenaar, W.H. 1993. Gi-mediated activation of the p21ras-mitogen-activated protein kinase pathway by alpha 2-adrenergic receptors expressed in fibroblasts. *J. Biol. Chem*. 268: 22235-22238.
- Allen, A.M., and Guyenet, P.G. 1993.  $\alpha_2$ -Adrenoceptor-mediated inhibition of bulbospinal barosensitive cells of rat rostral medulla. *Am. J. Physiol*. 265(34): R1065-R1075.
- Allergan, Inc. 2001. Alphagan®, Product information.
- Angelov, O.V., Wiese, A.G., Tang-Liu, D.D., Acheampong, A.A., Ismail, I.M. and Grar, B.S. 1996. Preclinical safety profile of brimonidine. *Eur. J. Ophthalmol*. 6(1):21-5.
- Arata, A., Onimaru, H., and Homma, I. 1998. The adrenergic modulation of firings of respiratory rhythm-generating neurons in medulla-spinal cord preparation from newborn rat. *Exp. Brain Res*. 119(4): 399-408.
- Baum, M. 1987. Insulin stimulates volume absorption in the rabbit proximal convoluted tubule. *J. Clin. Invest*. 79:1104-1109.
- Bernstein, I.M., Shapiro, R.E., Whitsel, A. and Schonberg, A.L. 2003. Relationship of plasma volume to sympathetic tone in nulliparous women. *Am. J. Obstet Gynecol*. 188(4):938-42.
- Blandford, D.E. and Smyth, D.D. 1988. Dose selective dissociation of water and solute excretion after renal alpha-2 adrenoceptor stimulation. *J. Pharmacol. Exp. Ther*. 247: 1181 - 1186.

- Bock, C., Niederhoffer, N. and Szabo, B. 1999. Analysis of receptor involved in the central hypotensive effect of rilmenidine and moxonidine. *Naunyn-Schmiedeberg's Arch Pharmacol.* 359: 262-271.
- Brooks, D.P., Edwards, R.M., Depalma, P.D., Fredrickson, T.A., Hieble, J.P. and Gellai, M. 1991. The water diuretic effect of the alpha 2- adrenoceptor agonist, AGN190851, is species dependent. *J. Pharmacol. Exp. Ther.* 259(3): 1277-82.
- Burke, J., Kharlamb, A., Shan, T., Runde, E., Padillo, E., Manlapaz, C. and Wheeler, L. 1995. Adrenergic and imidazoline receptor-mediated responses to UK-14, 304-18 (brimonidine) in rabbits and monkeys. A species difference. *Ann. N. Y. Acad. Sci.* 10(3): 220-226.
- Cantor, L.B. 2000. The evolving pharmacotherapeutic profile of brimonidine, and alpha 2 adrenergic agonist, after four years of continuous use . *Expert. Opin. Pharmacother.* 1(4): 815-834. (abstract)
- Carlsen, J.O., Zabriskie, N.A., Kwon, Y.H., Barbe, M.E. and Scott W.E. 1999. Apparent central nervous system depression in infants after the use of topical brimonidine. *Am. J. Ophthalmol.* 128(2): 255-6.
- Chen, L., Reif, M.C. and Schafer, J.A. 1991. Clonidine and PGE<sub>2</sub> have different effects on Na<sup>+</sup> and water transport in rat and rabbit CCD. *Am. J. Physiol. Renal Fluid Electrolyte Physiol.* 261: F126-F136.
- Chotani, M.A., Mitra, S., Su, B.Y., Flavahan, S., Eid, A.H., Clark, K.R., Montague, C.R., Paris, H., Handy, D.E. and Flavahan, N.A. 2004. Regulation of alpha (2)-adrenoceptors in human vascular smooth muscle cells. *Am. J. Physiol. Heart Circ. Physiol.* 286(1):H59-67.
- Cullen, L.K. 1996. Medetomidine sedation in dogs and cats: a review of its pharmacology, antagonism and dose. *Brit. Vet. J.* 152: 519-535.
- DeFronzo, R.A., Cooke, C.R., Andres, R., Faloona, G.R. and Davis, P.J. 1975. The effect of insulin on renal handling of sodium, potassium, calcium and phosphorus in man. *J. Clin. Invest.* 55: 845-855.
- DeFronzo, R.A., Goldberg, M., and Agus, Z.S. 1976. The effects of glucose and insulin on renal electrolyte transport. *J. Clin. Invest.* 58:83-90.
- Devedjian, J.C., Pujol, A., Cayla, C., George, M., Casellas, A., Paris, H. and Bosch, F. 2000. Transgenic mice overexpressing alpha2A-adrenoceptors in pancreatic



- beta-cells show altered regulation of glucose homeostasis. *Diabetologia*. 43(7): 899-906.
- Duggan, S., Hong, M., Milne, B. and Jhamandas, K. 1994. The role of excitatory amino acid in the expression of precipitated acute and chronic clonidine withdrawal: an *in vivo* voltammetric study in the rat locus coeruleus. *Brain Res.* 665: 253-261. (abstract)
- Enyedi, L.B. and Freedman, S.F. 2001. Safety and efficacy of brimonidine in children with glaucoma. *J. A. A. P. O. S.* 5(5): 281-284.
- Evans, R.G., Anderson, W.P. 1995. Renal effects of infusion of rilmenidine and guanabenz in conscious dogs: contribution of peripheral and central nervous system alpha 2-adrenoceptors. *Br. J. Pharmacol.* 116(1):1557-70.
- Ferail, E. and Doucet, A. 2001. Sodium-potassium adenosinetriphosphatase-dependent sodium transport in the kidney: hormone control. *Physiological review.* 81(1): 245-481.
- Fiske, C.H. and SubbaRow, Y. 1952. The colorimetric determination of phosphorus *J. Biol. Chem.* 66: 375-400.
- Fitzgerald, L.R., Mannan, I.J., Dytko, G.M., Wu, H.L. and Nambi, P. 1999. Measurement of responses from Gi-, Gs-, or Gq-coupled receptors by a multiple response element/cAMP response element-directed reporter assay. *Anal. Biochem.* 275: 54-61.
- Gabelt, B.T., Robinson, J.C., Hubbard, W.C., Peterson, C.M., Debink, N., Wadhwa, A. and Kaufman, P.L. 1994. Apraclonidine and brimonidine effects on anterior ocular and cardiovascular physiology in normal and sympathectomized monkeys. *Exp. Eye Res.* 59(6): 633-644. (abstract)
- Gao, H., Qiao, X., Cantor, L.B. and Wudunn, D. 2002. Up-regulation of brain-derived neurotrophic factor expression by brimonidine in rat retinal ganglion cells. *Arch. Ophthalmol.* 120: 797-803.
- Garcia-Barrado, M.J., Sancho, C., Palomero, J. and Moratinos, J. 1998. Role of  $\alpha_2$  – adrenoceptors on the hyperglycemic and insulinsecretory effects derived from  $\alpha_1$  – and  $\beta$  -adrenoceptor stimulation in the rabbit. *J. Autonomic Pharmacol.* 18(5): 287. (abstract)

- Gelatt, K.N. 2000. *Essentials of veterinary ophthalmology*. Philadelphia: Lippincott Williams & Wilkins.
- Gesek, F.A. 1996. Alpha 2-adrenergic receptors activate phospholipase C in renal epithelial cells. *Mol. Pharmacol.* 50(2): 407-414.
- Greenfield, D.S., Liebmann, J.M. and Ritch, R., 1997. Brimonidine: a new alpha2-adrenoreceptor agonist for glaucoma. *J. Glaucoma.* 6(4): 250-258.
- Gregorini, L., Marco, J., Farah, B., Bernies, M., Palombo, C., Kozakova, M., Bossi, I.M., Cassagneau, B., Fajadet, J., Di Mario, C., Albiero, R., Cugno, M., Grossi, A. and Heusch, G. 2002. Effects of selective alpha1- and alpha2-adrenergic blockade on coronary flow reserve after coronary stenting. *Circulation.* 106(23): 2901-7.
- Guyenet, P.G. 1997. Invited review: Is the hypotensive effect of clonidine and related drugs due to imidazoline binding sites? *Am. J. Physiol.* 273(5 Pt 2): R1580-4.
- Guyenet, P.G., Stornetta, R.L., Riley, T., Norton, F.R., Rosin, D.L. and Lynch, K.R. 1994. Alpha 2A-adrenergic receptors are present in lower brainstem catecholaminergic and serotonergic neurons innervating spinal cord. *Brain Res.* 638(1-2): 285-94.
- Guyton, A.C. and Hall, J.E. 1996. *Textbook of medical physiology*. 9<sup>th</sup> ed. Philadelphia, W.B. Saunders.
- Hayar, A. and Guyenet, P.G. 1999.  $\alpha_2$ -Adrenoceptor-mediated presynaptic inhibition in bulbospinal neurons of rostral ventrolateral medulla. *Am. J. Physiol.* 277: H1069-H1080.
- Hayar, A. and Guyenet, P.G. 2000. Prototypical imidazoline-1 receptor ligand moxonidine activates alpha2-adrenoceptors in bulbospinal neurons of the RVL. *J. Neurophysiol.* 83: 766-776.
- Hayward, L.F., Riley, A.P. and Felder, R.B. 2002.  $\alpha_2$ -Adrenergic receptors in NTS facilitate baroreflex function in adult spontaneously hypertensive rats. *Am. J. Physiol. Heart Circ. Physiol.* 282: H2336-H2345.
- Janssen, B.J.A., Lukoshkova, E.V. and Head, G.A. 2001. Sympathetic modulation of renal blood flow by rilmenidine and captopril: central vs. peripheral effects. *Am. J. Physiol. Renal. Physiol.* 282: F113-F123.



- Kirchner, K.A. 1988. Insulin increases loop segment reabsorption in the euglycemic rat. *Am. J. Physiol. Renal Fluid Electrolyte Physiol.* 255: F1206-1213.
- Kubo, T., Goshima, Y., Hata, H. and Misu, Y. 1990. Evidence that endogenous catecholamines are involved in  $\alpha_2$  adrenoceptor-mediated modulation of the aortic baroreceptor reflex in the nucleus tractus solitarii of the rat. *Brain Res.* 526: 313-317. (abstract)
- Kuusela, E., Raekallio, M., Vaisanen, M., Mykkanen, K., Ropponen, H. and Vainio, O. 2001. Comparison of medetomidine and dexmedetomidine as premedicants in dogs undergoing propofol-isoflurane anesthesia. *Am. J. Vet. Res.* 62(7): 1073-1080.
- Lafuente, M.P., Villegas-Perez, M.P., Mayor, S., Aguilra, M.E., Miralles de Imperial, J. and Vidal-San, Z.M. 2001. Neuroprotective effects of brimonidine against transient ischemia-induced retinal ganglion cell death: a dose response *in vivo* study. *Exp. Eye Res.* 74(2): 181-189.
- Lakhlani, P.P., Lovinger, D.M. and Limbird, L.E. (1996). Genetic evidence for involvement of multiple effector system in alpha 2A-adrenergic receptor inhibition of stimulus-secretion coupling. *Mol. Pharmacol.* 50:96-103.
- Li, Y.W., Bayliss, D.A. and Guyenet, P.G. 1995. C1 neurons of neonatal rats: intrinsic beating properties and alpha 2-adrenergic receptors. *Am. J. Physiol. Regul Integr. Comp. Physiol.* 269: R1356-R1369.
- Marchetti, A., Magar, R., An, P. and Nichol, M. 2001. Clinical and economic impact of new trends in glaucoma treatment. *Med. Gen. Med.* 3(4): 6
- Menegaz, R.G., Kapusta, D.R. and Cabral, A.M. 2000. Role of intrarenal alpha2-adrenoceptors in the renal responses to xylazine in rats. *Am. J. Physiol. Regulatory Integrative Comp. Physiol.* 278: R1074-R1081.
- McGhie, K. 2001. Brimonidine An alpha-2 adrenergic agonist for glaucoma. *Journal of the Pharmacy Society of Wisconsin.* May/June: 32-36.
- Muir, W.W. and Piper, F.S. 1977. Effect of xylazine on indices of myocardial contractility in the dog. *Am. J. Vet. Res.* 38(7): 931-934
- Mussie, E.W., Ruiz, G., Wijono, M. and Wheeler, L.A. 2001. Neuroprotection of retinal ganglion cells by brimonidine in rats with laser-induced chronic ocular hypertension. *Invest. Oph. Visual. Sci.* 42: 2849-2855

- Newman-Tancredi, A., Nicolas, J.P., Audinot, V., Gavaudan, S., Verrielle, L., Touzard, M., Chaput, C., Richard, N. and Millan, M.J. 1998. Action of alpha<sub>2</sub> adrenoceptor ligands at alpha<sub>2A</sub> and 5-HT<sub>1A</sub> receptors: the antagonist, atipamezole, and the agonist, dexmedetomidine, are highly selective for alpha<sub>2A</sub> adrenoceptors. *Naunyn-Schmiedeberg's Arch Pharmacol.* 358: 197-206.
- Ojiri, Y., Noguchi, K., Chibana, T. and Sakanashi, M. 1993. Effects of adrenergic stimulants on the splenic diameter, haemoglobin content and haematocrit in anaesthetized dogs: determination of the adrenoceptor subtype responsible for changes in the splenic diameter. *Acta Physiol. Scand.* 149(1): 31-9.
- Ota, K., Kimura, T., Shoji, M., Inoue, M., Sato, K., Ohta, M., Yamamoto, T., Tsunoda, K., Abe, K. and Yoshinaga, K. 1990. Effects of intracerebroventricular administration of adrenoceptor-agonists on the regulation of renal water and electrolytes handling through endocrine, renal and hemodynamic function. *Tohoku J. Exp. Med.* 162(1): 27-39.
- Pypendop, B.H. and Verstegen, J.P. 2000. Cardiovascular effects of romifidine in dogs. *Am. J. Vet. Res.* 62(4): 490-495.
- Richer, C., Lefevre-Borg, F., Lechaire, J., Gomeni, C., Gomeni, R., Giudicelli, J.F. and Cavero, I. 1987. Systemic and regional hemodynamic characterization of alpha-1 and alpha-2 adrenoceptor agonists in pithed rats. *Am. Soc. Pharmacol. Exp. Ther.* 240(3): 944-953.
- Shoji, T., Tsuru, H. and Shigei, T. 1983. A regional difference in the distribution of postsynaptic alpha-adrenoceptor subtypes in canine veins. *Naunyn Schmiedebergs Arch Pharmacol.* 324(4): 246-55.
- Smyth, D.D., Umemura, S., and Pettinger, W.A. 1985. Renal nerve stimulation causes alpha 1-adrenoceptor-mediated sodium retention but not alpha 2-adrenoceptor antagonism of vasopressin. *Circ. Res.* 57(2): 304-11.
- Standhoy, J.W. 1985. Role of alpha-2 receptors in the regulation of renal function. *J. Cardiovasc. Pharmacol.* 7 suppl 8: s28-33. (abstract)
- Stanton, B., Puglisi, E. and Gellai, M. 1987. Localization of  $\alpha_2$ -adrenoceptor-mediated increase in renal Na<sup>+</sup>, K<sup>+</sup>, and water excretion. *Am. J. Physiol. Renal Fluid Electrolyte Physiol.* 252: F1016-F1021.



- Sved, A.F., Tsukamoto, K. and Schreihofner, A.M. 1992. Stimulation of  $\alpha_2$ -adrenergic receptors in the nucleus tractus solitarius is required for the baroreceptor reflex. *Brain Res.* 576: 297-303. (abstract)
- Sztajn bok, J. 2002, Failure of naloxone to reverse brimonidine-induced coma in an infant. *J. Pediatr.* 140(4): 485-6.
- Takahashi, K., Hisa, H. and Satoh, S. 1984. Effects of alpha-agonist on rennin and prostaglandin E<sub>2</sub> release in anesthetized dogs. *Am. J. Physiol.* 247(5P+1): E604-8.
- Tilley, L.P. 1992. *Essentials of canine and feline electrocardiography*. 3<sup>rd</sup> ed. USA: Lea & Febiger.
- Umemura, S., Marver, D., Smyth, D.D. and Pettinger, W.A. 1985. Alpha<sub>2</sub>-adrenoceptors and cellular cAMP levels in single nephron segments from the rat. *Am. J. Physiol. Renal Physiol.* 249: 28 - 33. (abstract)
- Vander, A.J. 1995. *Renal physiology*. 5<sup>th</sup> ed. USA: McGraw-Hill, Inc.
- Walters, T.R. 1996. Development and use brimonidine in treatment acute and chronic elevation of intraocular pressure: a review of safety, efficacy, dose response and dosing studies. *Surv. Ophthalmol.* 41 suppl 1: s19-26.
- Welch, S.L. and Richardson, J.A., 2002. Clinical effects of brimonidine ophthalmic drops ingestion in 52 dogs. *Veterinary and human toxicology.* 44(1): 34
- Wilensky, J.T. 1996. The role of briminidine in the treatment of open-angle glaucoma. *Surv. Ophthalmol.* 41(1): s3-7.
- Yamazaki, T., and Ninomiya, I. 1993. Norepinephrine contributes to modulation of the carotid sinus baroreflex in the nucleus tractus solitarii area in the rabbit. *Acta Physiol. Scand.* 149: 1-6. (abstract)
- Zornow, M.H. 1991. Ventilatory, hemodynamic and sedative effects of the alpha 2 adrenergic agonist, dexmedetomidine. *Neuropharmacology.* 30(10): 1065-71.

## BIOGRAPHY

Mr. Siram Suvarnavibhaja was born on January 20, 1977 in Bangkok, Thailand. He graduated from the Faculty of Veterinary Science, Chulalongkorn University. He received the degree of Doctor of the Veterinary Medicine in 2000.



ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย