



**DEPARTAMENT DE CIÈNCIES FISIOLÒGIQUES I
LABORATORI DE NEUROFISIOLOGIA**

TESIS DOCTORAL

**IMPLICACIONES FUNCIONALES DE LA
SEÑALIZACIÓN PURINÉRGICA
EN LA RED TRABECULAR**

**DAVID SOTO DEL CERRO
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7. REFERENCIAS

- Abbracchio MP**, Boeynaems JM, Barnard EA, Boyer JL, Kennedy C, Miras-Portugal MT, King BF, Gachet C, Jacobson KA, Weisman GA, Burnstock G. Characterization of the UDP-glucose receptor (re-named here the P2Y₁₄ receptor) adds diversity to the P2Y receptor family. *Trends Pharmacol Sci* **2003**; 24: 52-55.
- Aihara M**, Lindsey JD, Weinreb RN. Aqueous humor dynamics in mice. *Invest Ophthalmol Vis Sci* **2003**; 44: 5168-5173.
- Al-Aswad LA**, Gong H, Lee D, O'Donnell ME, Brandt JD, Ryan WJ, Schroeder A, Erickson KA. Effects of Na-K-2Cl cotransport regulators on outflow facility in calf and human eyes in vitro. *Invest Ophthalmol Vis Sci* **1999**; 40: 1695-1701.
- Alvarado J**, Murphy C, Juster R. Trabecular meshwork cellularity in primary open-angle glaucoma and nonglaucomatous normals. *Ophthalmology*. **1984**; 91: 564-579.
- Anthony TL**, Pierce KL, Stamer WD, Regan JW. Prostaglandin F₂ Ω -receptors in the human trabecular meshwork. *Invest Ophthalmol Vis Sci* **1998**; 39: 315-321.
- Avila MY**, Stone RA, Civan MM. A₁, A_{2A} and A₃ subtype adenosine receptors modulate intraocular pressure in the mouse. *Br J Pharmacol* **2001**; 134 :241-245.
- Avila MY**, Seidler RW, Stone RA, Civan MM. Inhibitors of NHE-1 Na⁺/H⁺ exchange reduce mouse intraocular pressure. *Invest Ophthalmol Vis Sci* **2002**; 43: 1897-1902.
- Avila MY**, Mitchell CH, Stone RA, Civan MM. Noninvasive assessment of aqueous humor turnover in the mouse eye. *Invest Ophthalmol Vis Sci* **2003**; 44: 722-727.
- Barman SA**, Zhu S, White RE. PKC activates BK_{Ca} channels in rat pulmonary arterial smooth muscle via cGMP-dependent protein kinase. *Am J Physiol Lung Cell Mol Physiol* **2004**; 286: L1275-L1281
- Baulmann DC**, Ohlmann A, Flugel-Koch C, Goswami S, Cvekl A, Tamm ER. Pax6 heterozygous eyes show defects in chamber angle differentiation that are associated with a wide spectrum of other anterior eye segment abnormalities. *Mech Dev* **2002**; 118: 3-17.

- Bell RM**, Hannun YA, Loomis CR. Mechanism of regulation of protein kinase C by lipid second messengers. *Symp Fundam Cancer Res*. **1986**; 39: 145-156.
- Bellezza AJ**, Rintalan CJ, Thompson HW, Downs JC, Hart RT, Burgoyne CF. Deformation of the lamina cribrosa and anterior scleral canal wall in early experimental glaucoma. *Invest Ophthalmol Vis Sci* **2003**; 44: 623-637.
- Berridge MJ**. Inositol trisphosphate and calcium signalling. *Nature* **1993**; 361: 315-325.
- Berridge MJ**, Lipp P, Bootman MD. The versatility and universality of calcium signalling. *Nat Rev Mol Cell Biol*. **2000**; 1: 11-21.
- Bhattacharya SK**, Rockwood EJ, Smith SD, Bonilha VL, Crabb JS, Kuchtey RW, Robertson NG, Peachey NS, Morton CC, Crabb JW. Proteomics reveal Cochlin deposits associated with glaucomatous trabecular meshwork. *J Biol Chem* **2005**; 280: 6080-6084.
- Bill A**. The role of ciliary blood flow and ultrafiltration in aqueous humor formation. *Exp Eye Res* **1973**; 16: 287-298.
- Bill A**. Blood circulation and fluid dynamics in the eye. *Physiol Rev*. **1975**; 55: 383-417.
- Bito LZ**, Merritt SQ, DeRousseau CJ. Intraocular pressure of rhesus monkey (*Macaca mulatta*). I. An initial survey of two free-breeding colonies. *Invest Ophthalmol Vis Sci* **1979**; 18: 785-793.
- Bleasdale JE**, Fisher SK. Use of U-73122 as an inhibitor of phospholipase C-dependent processes. *Neuroprotocols* **1993**; 3: 125-133.
- Bodin P**, Burnstock G. Increased release of ATP from endothelial cells during acute inflammation. *Inflamm Res* **1998**; 47: 351-354.
- Borrás T**, Rowlette LL, Tamm ER, Gottanka J, Epstein DL. Effects of elevated intraocular pressure on outflow facility and TIGR/MYOC expression in perfused human anterior segments. *Invest Ophthalmol Vis Sci* **2002a**; 43: 33-40.

- Borrás T**, Brandt CR, Nickells R, Ritch R. Gene therapy for glaucoma: treating a multifaceted, chronic disease. *Invest Ophthalmol Vis Sci* **2002b**; 43: 2513-2518.
- Borrás T**. Gene expression in the trabecular meshwork and the influence of intraocular pressure. *Progr Retin Eye Res* **2003**; 22: 435-463.
- Boudreault F**, Grygorczyk R. Cell swelling-induced ATP release and gadolinium-sensitive channels. *Am J Physiol Cell Physiol*. **2002**; 282: C219-C226.
- Bradley JM**, Vranka J, Colvis CM, Conger DM, Alexander JP, Fisk AS, Samples JR, Acott TS. Effect of matrix metalloproteinases activity on outflow in perfused human organ culture. *Invest Ophthalmol Vis Sci* **1998**; 39: 2649-2658.
- Bradley JM**, Kelley MJ, Zhu X, Anderssohn AM, Alexander JP, Acott TS. Effects of mechanical stretching on trabecular matrix metalloproteinases. *Invest Ophthalmol Vis Sci* **2001**; 42: 1505-1513.
- Brandle U**, Guenther E, Irrle C, Wheeler-Schilling TH. Gene expression of the P2X receptors in the rat retina. *Brain Res Mol Brain Res* 1998; 59: 269-272.
- Braunstein GM**, Roman RM, Clancy JP, Kudlow BA, Taylor AL, Shylonsky VG, Jovov B, Peter K, Jilling T, Ismailov II, Benos DJ, Schwiebert LM, Fitz JG, Schwiebert EM. Cystic fibrosis transmembrane conductance regulator facilitates ATP release by stimulating a separate ATP release channel for autocrine control of cell volume regulation. *J Biol Chem* **2001**; 276: 6621-6630.
- Brindikova TA**, Bourcier N, Torres B, Pchejetski D, Gekle M, Maximov GV, Montminy V, Insel PA, Orlov SN, Isenring P. Purinergic-induced signaling in C11-MDCK cells inhibits the secretory Na-K-Cl cotransporter. *Am J Physiol Cell Physiol* **2003**; 285: C1445-C1453.
- Bringmann A**, Pannicke T, Weick M, Biedermann B, Uhlmann S, Kohen L, Wiedemann P, Reichenbach A. Activation of P2Y receptors stimulates potassium and cation currents in acutely isolated human Müller (glial) cells. *Glia* **2002**; 37: 139-152.

- Brubaker RF.** The effect of intraocular pressure on conventional outflow resistance in the enucleated human eye. *Invest Ophthalmol* **1975**; 14: 286-292.
- Bruce JI, Straub SV, Yule DI.** Crosstalk between cAMP and Ca²⁺ signaling in non-excitabile cells. *Cell Calcium* **2003**; 34: 431-44.
- Burke AG, Zhou W, O'Brien ET, Roberts BC, Stamer WD.** Effect of hydrostatic pressure gradients and Na₂EDTA on permeability of human Schlemm's canal cell monolayers. *Curr Eye Res* **2004**; 28: 391-398.
- Busch MJ, Kobayashi K, Hoyng PF, Mittag TW.** Adenylyl cyclase in human and bovine trabecular meshwork. *Invest Ophthalmol Vis Sci* **1993**; 34: 3028-3034.
- Buvinic S, Briones R, Huidobro-Toro JP.** P2Y₁ and P2Y₂ receptors are coupled to the NO/cGMP pathway to vasodilate the rat arterial mesenteric bed. *Br J Pharmacol* **2002**; 136: 847-856.
- Bylsma SS, Samples JR, Acott TS, Van Buskirk EM.** Trabecular cell division after argon laser trabeculoplasty. *Arch Ophthalmol* 1988; 106: 544-547.
- Bylund DB, Iversen LJ, Matulka WJ, Chacko DM.** Characterization of Ω_{2D} -adrenergic receptor subtypes in bovine ocular tissue homogenates. *J Pharmacol Exp Ther* **1997**; 281: 1171-1177.
- Caprioli J.** The ciliary epithelia and aqueous humor. En: *Adler's Physiology of the eye*. **1994**; 9th Ed. Hart WM, editor. Mosby, St. Louis, Missouri.
- Cattaneo M, Lecchi A, Ohno M, Joshi BV, Besada P, Tchilibon S, Lombardi R, Bischofberger N, Harden TK, Jacobson KA.** Antiaggregatory activity in human platelets of potent antagonists of the P2Y₁ receptor. *Biochem Pharmacol* **2004**; 68: 1995-2002.
- Cha SH, Hahn TW, Sekine T, Lee KH, Endou H.** Purinoceptor-mediated calcium mobilization and cellular proliferation in cultured bovine corneal endothelial cells. *Jpn J Pharmacol* **2000**; 82: 181-187.

- Chang AT**, Polansky JR, Crook RB. Natriuretic peptide receptors on human trabecular meshwork cells. *Curr Eye Res* **1996**; 15: 137-143.
- Chen ZP**, Krull N, Xu S, Levy A, Lightman SL. Molecular cloning and functional characterization of a rat pituitary G protein-coupled adenosine triphosphate (ATP) receptor. *Endocrinology* **1996**; 137: 1833-1840.
- Choritz L**, Meißner S, Satpathy M, Yue B, Thieme H, Srinivas SP. Extracellular ATP induces contraction of bovine trabecular meshwork [Abstract]. *Invest Ophthalmol Vis Sci* **2004**; 45: E4417.
- Chow J**, Liton P, Wong F, González P. Alteration of P2Y receptor-mediated calcium response in senescent trabecular meshwork cells [Abstract]. *Invest Ophthalmol Vis Sci* **2005**; 4: B360.
- Chu TC**, Keith C, Green K. Intracellular pH regulation by a Na⁺/H⁺ exchanger in cultured bovine trabecular cells. *Acta Ophthalmol (Copenh)* **1992**; 70: 772-779.
- Clark AF**. Steroids, ocular hypertension, and glaucoma. *J Glaucoma* **1995**; 4: 354-369
- Coca-Prados M**, Escribano J, Ortego J. Differential gene expression in the human ciliary epithelium. *Prog Retin Eye Res* **1999**; 18: 403-429.
- Cole DF**. Secretion of the aqueous humour. *Exp Eye Res* **1977**; 25 Suppl: 161-176.
- Comes N**, Gasull X, Gual A, Borrás T. Differential expression of the human chloride channel genes in the trabecular meshwork under stress conditions. *Exp Eye Res*. **2005a**; 80: 801-813.
- Comes N**, Borrás T, Morales M, Gual A, Gasull X. Identification and electrophysiological characterization of CLC-2 Chloride Channels in Trabecular Meshwork Cells: Modulation by pH and Cell Swelling [Abstract]. *Invest Ophthalmol Vis Sci* **2005b**; 4: B123
- Conley SM**, Bruhn RL, Morgan PV, Stamer WD. Selenium's effects on MMP-2 and TIMP-1 secretion by human trabecular meshwork cells. *Invest Ophthalmol Vis Sci* **2004**;45: 473-47

- Coroneo MT**, Korbmayer C, Flügel C, Stiemer B, Lütjen-Drecoll E, Wiederholt M. Electrical and morphological evidence for heterogeneous populations of cultured bovine trabecular meshwork cells. *Exp Eye Res* **1991**; 52: 375-388.
- Counillon L**, Touret N, Bidet M, Peterson-Yantorno K, Coca-Prados M, Stuart-Tilley A, Wilhelm S, Alper SL, Civan MM. Na⁺/H⁺ and Cl⁻/HCO₃⁻ antiporters of bovine pigmented ciliary epithelial cells. *Pflugers Arch* **2000**; 440: 667-678.
- Cowlen MS**, Zhang VZ, Warnock L, Moyer CF, Peterson WM, Yerxa BR. Localization of ocular P2Y₂ receptor gene expression by in situ hybridization. *Exp Eye Res* **2003**; 77: 77-84.
- Croft MA**, Hubbard WC, Kaufman PL. Effect of ethacrynic acid on aqueous outflow dynamics in monkeys. *Invest Ophthalmol Vis Sci* **1994**; 35: 1167-1175.
- Crosson CE**. Adenosine receptor activation modulates intraocular pressure in rabbits. *J Pharmacol Exp Ther* **1995**; 273: 320-326.
- Crosson CE**, Gray T. Characterization of ocular hypertension induced by adenosine agonists. *Invest Ophthalmol Vis Sci* **1996**; 37:1833-1839.
- Crosson CE**. Intraocular pressure responses to the adenosine agonist cyclohexyladenosine: evidence for a dual mechanism of action. *Invest Ophthalmol Vis Sci* **2001**; 42: 1837-1840.
- Crosson CE**, Yates PW, Bhat AN, Mukhin YV, Husain S. Evidence for multiple P2Y receptors in trabecular meshwork cells. *J Pharmacol Exp Ther* **2004**; 309: 484-489.
- Cui M**, Srinivas SP, Mutharasan R, Sun XC, Bonanno JA, Yue BYJT. Mechanotransduction in cultured trabecular meshwork cells [Abstract]. *Invest Ophthalmol Vis Sci* **2001**; 42: S140.
- Cullinane AB**, Coca-Prados M, Harvey BJ. Extracellular ATP effects on calcium signaling in cultured human non-pigmented ciliary body epithelium. *Curr Eye Res* **2001**; 23: 448-454.

- Daines BS**, Kent AR, McAleer MS, Crosson CE. Intraocular adenosine levels in normal and ocular-hypertensive patients. *J Ocul Pharmacol Ther* **2003**; 19: 113-119.
- Day J**, Grierson I, Unger WG, Robins E. Some effects of phagocytosis on bovine meshwork cells in culture. *Exp Eye Res* **1986**; 43: 1077-1087.
- de Kater AW**, Spurr-Michaud SJ, Gipson IK. Localization of smooth muscle myosin-containing cells in the aqueous outflow pathway. *Invest Ophthalmol Vis Sci* **1990**; 31: 347-353.
- de Kater AW**, Shahsafaei A, Epstein DL. Localization of smooth and nonmuscle actin isoforms in the human aqueous outflow pathway. *Invest Ophthalmol Vis Sci* **1992**; 33: 424-429.
- Dernouchamps JP**. The proteins of the aqueous humour. *Doc Ophthalmol* **1982**; 53: 193-248.
- Di Polo A**, Aigner LJ, Dunn RJ, Bray GM, Aguayo AJ. Prolonged delivery of brain-derived neurotrophic factor by adenovirus-infected Müller cells temporarily rescues injured retinal ganglion cells. *Proc Natl Acad Sci U S A* **1998**; 95: 3978-3983.
- Dickerson JE Jr**, Steely HT Jr, English-Wright SL, Clark AF. The effect of dexamethasone on integrin and laminin expression in cultured human trabecular meshwork cells. *Exp Eye Res* **1998**; 66: 731-738.
- Dijkstra BG**, Schneemann A, Hoyng PF. Flow after prostaglandin E₁ is mediated by receptor-coupled adenylyl cyclase in human anterior segments. *Invest Ophthalmol Vis Sci* **1999**; 40: 2622-2626.
- Eldred JA**, Sanderson J, Wormstone M, Reddan JR, Duncan G. Stress-induced ATP release from and growth modulation of human lens and retinal pigment epithelial cells. *Biochem Soc Trans* **2003**; 31: 1213-1215.
- Elliott WJ**, Karnezis TA, Silverman RA, Geanon J, Tripathi RC, Murphy MB. Intraocular pressure increases with fenoldopam, but not nitroprusside, in hypertensive humans. *Clin Pharmacol Ther* **1991**; 49: 285-293.

- Epstein DL**, Rowlette LL, Roberts BC. Acto-myosin drug effects and aqueous outflow function. *Invest Ophthalmol Vis Sci* **1999**; 40: 74-81.
- Erb C**, Nau-Staudt K, Flammer J, Nau W. Ascorbic acid as a free radical scavenger in porcine and bovine aqueous humour. *Ophthalmic Res* **2004**; 36: 38-42.
- Erickson-Lamy K**, Rohen JW, Grant WM. Outflow facility studies in the perfused bovine aqueous outflow pathways. *Curr Eye Res* **1988**; 7: 799-807.
- Erickson-Lamy K**, Rohen JW, Grant WM. Outflow facility studies in the perfused human ocular anterior segment. *Exp Eye Res* **1991**; 52: 723-731.
- Erickson-Lamy KA**, Nathanson JA. Epinephrine increases facility of outflow and cyclic AMP content in the human eye in vitro. *Invest Ophthalmol Vis Sci* **1992**; 33: 2672-2678.
- Erickson KA**, Schroeder A, Netland PA. Verapamil increases outflow facility in the human eye. *Exp Eye Res* **1995**; 61: 565-567.
- Ethier CR**, Coloma FM. Effects of ethacrynic acid on Schlemm's canal inner wall and outflow facility in human eyes. *Invest Ophthalmol Vis Sci* **1999**; 40: 1599-1607.
- Falke LC**, Gillis KD, Pressel DM, Mislis S. 'Perforated patch recording' allows long-term monitoring of metabolite-induced electrical activity and voltage-dependent Ca^{2+} currents in pancreatic islet B cells. *FEBS Lett* **1989**; 251: 167-172.
- Fanchaouy M**, Serir K, Meister JJ, Beny JL, Bychkov R. Intercellular communication: role of gap junctions in establishing the pattern of ATP-elicited Ca^{2+} oscillations and Ca^{2+} -dependent currents in freshly isolated aortic smooth muscle cells. *Cell Calcium*. **2005**; 37: 25-34.
- Farahbakhsh NA**, Cilluffo MC. Synergistic increase in Ca^{2+} produced by A_1 adenosine and muscarinic receptor activation via a pertussis-toxin-sensitive pathway in epithelial cells of the rabbit ciliary body. *Exp Eye Res* **1997**; 64: 173-179.
- Farahbakhsh NA**, Cilluffo MC. P2 purinergic receptor-coupled signaling in the rabbit ciliary body epithelium. *Invest Ophthalmol Vis Sci* **2002**; 43: 2317-2325.

- Farahbakhsh NA.** Purinergic signaling in the rabbit ciliary body epithelium. *J Exp Zoolol A Comp Exp Biol* **2003**; 300: 14-24.
- Feranchak AP,** Fitz JG, Roman RM. Volume-sensitive purinergic signaling in human hepatocytes. *J Hepatol* **2000**; 33: 174-182.
- Fernández-Durango R,** Moya FJ, Ripodas A, de Juan JA, Fernández-Cruz A, Bernal R. Type B and type C natriuretic peptide receptors modulate intraocular pressure in the rabbit eye. *Eur J Pharmacol* **1999**; 364: 107-13.
- Fernández-Fernández JM,** Nobles M, Currid A, Vazquez E, Valverde MA. Maxi K⁺ channel mediates regulatory volume decrease response in a human bronchial epithelial cell line. *Am J Physiol Cell Physiol*. **2002**; 283: C1705-C1714.
- Fleischhauer JC,** Mitchell CH, Peterson-Yantorno K, Coca-Prados M, Civan MM. PGE₂, Ca²⁺, and cAMP mediate ATP activation of Cl⁻ channels in pigmented ciliary epithelial cells. *Am J Physiol Cell Physiol* **2001**; 281: C1614-C1623.
- Fleischhauer JC,** Mitchell CH, Stamer WD, Karl MO, Peterson-Yantorno K, Civan MM. Common actions of adenosine receptor agonists in modulating human trabecular meshwork cell transport. *J Membrane Biol* **2003**; 193: 121-136.
- Friedman Z,** Hackett SF, Linden J, Campochiaro PA. Human retinal pigment epithelial cells in culture possess A₂-adenosine receptors. *Brain Res* **1989**; 492: 29-35.
- Friedman Z,** Bloom E, Polansky JR. Adrenergic drug effects on cyclic AMP in cultured human trabecular meshwork cells. *Ophthalmic Res* **1999**; 31: 53-58.
- Fries JE,** Wheeler-Schilling TH, Guenther E, Kohler K. Expression of P2Y₁, P2Y₂, P2Y₄, and P2Y₆ receptor subtypes in the rat retina. *Invest Ophthalmol Vis Sci* **2004**; 45: 3410-3417.
- Fuder H,** Muth U. ATP and endogenous agonists inhibit evoked [3H]-noradrenaline release in rat iris via A1 and P2y-like purinoceptors. *Naunyn Schmiedeberg's Arch Pharmacol* **1993**; 348: 352-357.

- Fumagalli M**, Trincavelli L, Lecca D, Martini C, Ciana P, Abbracchio MP. Cloning, pharmacological characterisation and distribution of the rat G-protein-coupled P2Y₁₃ receptor. *Biochem Pharmacol* **2004**; 68: 113-124.
- Gaasterland DE**, Pederson JE, MacLellan HM, Reddy VN. Rhesus monkey aqueous humor composition and a primate ocular perfusate. *Invest Ophthalmol Vis Sci*. **1979**; 18: 1139-50.
- Gabelt BT**, Kaufman PL. Prostaglandin F_{2Ω} increases uveoscleral outflow in the cynomolgus monkey. *Exp Eye Res* **1989**; 49: 389-402.
- Gabelt BT**, Wiederholt M, Clark AF, Kaufman PL. Anterior segment physiology after bumetanide inhibition of Na-K-Cl cotransport. *Invest Ophthalmol Vis Sci* **1997**; 38: 1700-1707.
- Gasull X**. Understanding trabecular meshwork function will improve glaucoma treatment. *Archivos de la Sociedad Española de Oftalmología* **2003**; 7.
- Gasull X**, Ferrer E, Llobet A, Castellano A, Nicolás JM, Palés J, Gual A. Cell membrane stretch modulates the high-conductance Ca²⁺-activated K⁺ channel in bovine trabecular meshwork cells. *Invest Ophthalmol Vis Sci* **2003**; 44: 706-714.
- Gasull X**, Gomez-Cabrero A, Comes N, Pales J, Gual A, Morales M. Effects of the Fusion Protein PTD4-Profilin I on trabecular meshwork cells and outflow facility [Abstract]. *Invest Ophthalmol Vis Sci* **2005**; 4: B61.
- Gelatt KN**, MacKay EO. Distribution of intraocular pressure in dogs. *Vet Ophthalmol* **1998**; 1: 109-114.
- Geyer O**, Podos SM, Mittag T. Nitric oxide synthase activity in tissues of the bovine eye. *Graefes Arch Clin Exp Ophthalmol* **1997**; 235: 786-793.
- Gilabert R**, Gasull X, Pales J, Belmonte C, Bergamini MV, Gual A. Facility changes mediated by cAMP in the bovine anterior segment in vitro. *Vision Res* **1997**; 37: 9-15.

- Gills JP**, Roberts BC, Epstein DL. Microtubule disruption leads to cellular contraction in human trabecular meshwork cells. *Invest Ophthalmol Vis Sci* **1998**; 39: 653-658.
- Gourine AV**, Llaudet E, Dale N, Spyer KM. Release of ATP in the ventral medulla during hypoxia in rats: role in hypoxic ventilatory response. *J Neurosci* **2005**; 25: 1211-1218.
- Green K**, Pederson JE. Aqueous humor formation. *Exp Eye Res* **1973**; 16: 273-286.
- Grierson I**, Lee WR. Pressure-induced changes in the ultrastructure of the endothelium lining Schlemm's canal. *Am J Ophthalmol* **1975**; 80: 863-884.
- Grierson I**, Howes RC. Age-related depletion of the cell population in the human trabecular meshwork. *Eye* **1987**; 1: 204-210.
- Grierson JP**, Meldolesi J. Shear stress-induced $[Ca^{2+}]_i$ transients and oscillations in mouse fibroblasts are mediated by endogenously released ATP. *J Biol Chem* **1995**; 270: 4451-4456.
- Grynkiewicz G**, Poenie M, Tsien RY. A new generation of Ca^{2+} indicators with greatly improved fluorescence properties. *J Biol Chem* **1985**; 260: 3440-3450.
- Gual A**, Llobet A, Gilabert R, Borrás M, Pales J, Bergamini MV, Belmonte C. Effects of time of storage, albumin, and osmolality changes on outflow facility (C) of bovine anterior segment in vitro. *Invest Ophthalmol Vis Sci* **1997**; 38: 2165-2171.
- Gupta N**, Drance SM, McAllister R, Prasad S, Rootman J, Cynader MS. Localization of M_3 muscarinic receptor subtype and mRNA in the human eye. *Ophthalmic Res* **1994**; 26: 207-213.
- Hamanaka T**, Bill A, Ichinohasama R, Ishida T. Aspects of the development of Schlemm's canal. *Exp Eye Res* **1992**; 55: 479-488.
- Hamill OP**, Marty A, Neher E, Sakmann B, Sigworth FJ. Improved patch-clamp techniques for high-resolution current recording from cells and cell-free membrane patches. *Pflugers Arch* **1981**; 391: 85-100.

- Hanley PJ**, Musset B, Renigunta V, Limberg SH, Dalpke AH, Sus R, Heeg KM, Preisig-Muller R, Daut J. Extracellular ATP induces oscillations of intracellular Ca^{2+} and membrane potential and promotes transcription of IL-6 in macrophages. *Proc Natl Acad Sci U S A*. **2004**; 101: 9479-9484.
- Hart WM**. Intraocular pressure. En: *Adler's Physiology of the eye*. 9th Ed. Hart WM, editor. Mosby, St. Louis, Missouri. **1994**.
- Haas M**, Forbush B 3rd. The Na-K-Cl cotransporter of secretory epithelia. *Annu Rev Physiol*. **2000**; 62: 515-534.
- Hilderman RH**, Christensen EF. P^1, P^4 -diadenosine 5' tetraphosphate induces nitric oxide release from bovine aortic endothelial cells. *FEBS Lett* **1998**; 427: 320-324.
- Hosoya K**, Ueda H, Kim KJ, Lee VH. Nucleotide stimulation of Cl^- secretion in the pigmented rabbit conjunctiva. *J Pharmacol Exp Ther* **1999**; 291: 53-59.
- Howard GC**, Roberts BC, Epstein DL, Pizzo SV. Characterization of Ω_2 -macroglobulin binding to human trabecular meshwork cells: presence of the Ω_2 -macroglobulin signaling receptor. *Arch Biochem Biophys* **1996**; 333: 19-26.
- Howard M**, Sen HA, Capoor S, Herfel R, Crooks PA, Jacobson MK. Measurement of adenosine concentration in aqueous and vitreous. *Invest Ophthalmol Vis Sci* **1998**; 39: 1942-1946.
- Hoyle C**, Hilderman R, Pintor J, Schlüter H, King BF. Diadenosine poliphosphates as extracellular signal molecules. *Drug Dev Res* **2001**; 52: 260-273.
- Ikeuchi Y**, Nishizaki T. The P2Y purinoceptor-operated potassium channel is possibly regulated by the beta gamma subunits of a pertussis toxin-insensitive G-protein in cultured rat inferior colliculus neurons. *Biochem Biophys Res Commun* **1995a**; 214: 589-596.
- Ikeuchi Y**, Nishizaki T. ATP-evoked potassium currents in rat striatal neurons are mediated by a P2 purinergic receptor. *Neurosci Lett* **1995b**; 190: 89-92.

- Ishii K**, Kaneda M, Li H, Rockland KS, Hashikawa T. Neuron-specific distribution of P2X₇ purinergic receptors in the monkey retina. *J Comp Neurol* **2003**; 459: 267-277.
- Jabs R**, Guenther E, Marquardt K, Wheeler-Schilling TH. Evidence for P2X₃, P2X₄, P2X₅ but not for P2X₇ containing purinergic receptors in Müller cells of the rat retina. *Brain Res Mol Brain Res* **2000**; 76: 205-210.
- Jacob R**. Calcium oscillations in endothelial cells. *Cell Calcium*. **1991**; 12: 127-134.
- Jaggar JH**, Porter VA, Lederer WJ, Nelson MT. Calcium sparks in smooth muscle. *Am J Physiol Cell Physiol* **2000**; 278: C235-C256.
- Johnson DH**. The effect of cytochalasin D on outflow facility and the trabecular meshwork of the human eye in perfusion organ culture. *Invest Ophthalmol Vis Sci* **1997**; 38: 2790-2799.
- Johnson M**, Chan D, Read AT, Christensen C, Sit A, Ethier CR. The pore density in the inner wall endothelium of Schlemm's canal of glaucomatous eyes. *Invest Ophthalmol Vis Sci*. **2002**; 43: 2950-2955.
- Johnstone MA**, Grant WG. Pressure-dependent changes in structures of the aqueous outflow system of human and monkey eyes. *Am J Ophthalmol* **1973**; 75: 365-383.
- Joseph SM**, Buchakjian MR, Dubyak GR. Colocalization of ATP release sites and ecto-ATPase activity at the extracellular surface of human astrocytes. *J Biol Chem* **2003**; 278: 23331-23342.
- Jumblatt JE**, Jumblatt MM. Regulation of ocular mucin secretion by P2Y₂ nucleotide receptors in rabbit and human conjunctiva. *Exp Eye Res* **1998**; 67: 341-346.
- Junankar PR**, Karjalainen A, Kirk K. The role of P2Y₁ purinergic receptors and cytosolic Ca²⁺ in hypotonically activated osmolyte efflux from a rat hepatoma cell line. *J Biol Chem*. **2002**; 277: 40324-40334.

- Kaneda M**, Ishii K, Morishima Y, Akagi T, Yamazaki Y, Nakanishi S, Hashikawa T. OFF-cholinergic-pathway-selective localization of P2X₂ purinoceptors in the mouse retina. *J Comp Neurol* **2004**; 476: 103-111.
- Karl MO**, Fleischhauer JC, Stamer WD, Peterson-Yantorno K, Mitchell CH, Stone RA, Civan MM. Differential P1-purinergic modulation of human Schlemm's canal inner-wall cells. *Am J Physiol Cell Physiol* **2005**; 288: C784-C794
- Karnezis TA**, Tripathi BJ, Dawson G, Murphy MB, Tripathi RC. Effects of dopamine receptor activation on the level of cyclic AMP in the trabecular meshwork. *Invest Ophthalmol Vis Sci* **1989**; 30: 1090-1094.
- Kass MA**, Hart WM Jr, Gordon M, Miller JP. Risk factors favoring the development of glaucomatous visual field loss in ocular hypertension. *Surv Ophthalmol.* **1980**; 25: 155-162.
- Kaufman PL**. Adenosine 3',5'-cyclic-monophosphate and outflow facility in monkey eyes with intact and retrodisplaced ciliary muscle. *Exp Eye Res* **1987**; 44: 415-423.
- Kaufman PL**, Mittag TW. Therapy of glaucoma. Medical therapy of glaucoma. En: *Glaucoma*. Vol. 7 Kaufman PL, Mittag TW, editores. Mosby-Wolfe, London. **1994**.
- Kee C**, Kaufman PL, Gabelt BT. Effect of 8-Br cGMP on aqueous humor dynamics in monkeys. *Invest Ophthalmol Vis Sci* **1994**; 35: 2769-2773.
- Kee C**, Sohn S, Hwang JM. Stromelysin gene transfer into cultured human trabecular cells and rat trabecular meshwork in vivo. *Invest Ophthalmol Vis Sci* **2001**; 42: 2856-2860.
- Kellerman DJ**. P2Y₂ receptor agonists: a new class of medication targeted at improved mucociliary clearance. *Chest.* **2002**; 121: 201S-205S.
- Khurana RN**, Deng PF, Epstein DL, Vasantha Rao P. The role of protein kinase C in modulation of aqueous humor outflow facility. *Exp Eye Res* **2003**; 76: 39-47.
- Kimura K**, Nishimura T, Satoh Y. Effects of ATP and its analogues on [Ca²⁺]_i dynamics in the rabbit corneal epithelium. *Arch Histol Cytol* **1999**; 62: 129-138.

- Kinsey VE.** The chemical composition and the osmotic pressure of the aqueous humor and plasma of the rabbit. *J Gen Physiol* **1950**; 34: 389.
- Kisselev LL,** Justesen J, Wolfson AD, Frolova LY. Diadenosine oligophosphates (Ap_nA), a novel class of signalling molecules? *FEBS Lett* **1998**; 427: 157-163.
- Klenkler B,** Sheardown H. Growth factors in the anterior segment: role in tissue maintenance, wound healing and ocular pathology. *Exp Eye Res* **2004**; 79: 677-688.
- Klisovic DD,** O'Dorizio MS, Katz SE, Sall JW, Balster D, O'Dorizio TM, Craig E, Lubow M. Somatostatin receptor gene expression in human ocular tissues: RT-PCR and immunohistochemical study. *Invest Ophthalmol Vis Sci* **2001**; 42: 2193-2201.
- Koh SW,** Yue BY. Effects of agonists on the intracellular cyclic AMP concentration in monkey trabecular meshwork cells. *Curr Eye Res* **1988**; 7: 75-80.
- Koh SW,** Yeh TH, Morris SM, Leffler M, Higginbotham EJ, Brenneman DE, Yue BY. Vasoactive intestinal peptide stimulation of human trabecular meshwork cell growth. *Invest Ophthalmol Vis Sci* **1997**; 38: 2781-2789.
- Kohmoto H,** Matsumoto S, Serizawa T. Effects of endothelin-1 on [Ca²⁺]_i and pH_i in trabecular meshwork cells. *Curr Eye Res* **1994**; 13: 197-202.
- Kotikoski H,** Vapaatalo H, Oksala O. Nitric oxide and cyclic GMP enhance aqueous humor outflow facility in rabbits. *Curr Eye Res* **2003**; 26: 119-123.
- Kotsis DH,** Spence DM. Detection of ATP-induced nitric oxide in a biomimetic circulatory vessel containing an immobilized endothelium. *Anal Chem.* **2003**; 75: 145-151
- Krauss AH,** Wiederholt M, Sturm A, Woodward DF. Prostaglandin effects on the contractility of bovine trabecular meshwork and ciliary muscle. *Exp Eye Res.* **1997**; 64: 447-453.
- Kubo-Watanabe S,** Goto S, Saino T, Tazawa Y, Satoh YI. ATP-induced [Ca²⁺]_i changes in the human corneal epithelium. *Arch Histol Cytol* **2003**; 66: 63-72.

- Kvanta A**, Seregard S, Sejersen S, Kull B, Fredholm BB. Localization of adenosine receptor messenger RNAs in the rat eye. *Exp Eye Res* **1997**; 65: 595-602.
- Lambrecht G**. Agonists and antagonists acting at P2X receptors: selectivity profiles and functional implications. *Naunyn Schmiedebergs Arch Pharmacol* **2000**; 362: 340-350.
- Lazarowski ER**, Watt WC, Stutts MJ, Boucher RC, Harden TK. Pharmacological selectivity of the cloned human P2U-purinoceptor: potent activation by diadenosine tetraphosphate. *Br J Pharmacol*. **1995**; 116: 1619-1627.
- Lazarowski ER**, Boucher RC. UTP as an extracellular signaling molecule. *News Physiol Sci* **2001**; 16: 1-5.
- Lemon G**, Brockhausen J, Li GH, Gibson WG, Bennett MR. Calcium mobilization and spontaneous transient outward current characteristics upon agonist activation of P2Y₂ receptors in smooth muscle cells. *Biophys J* **2005**; 88: 1507-1523.
- Lepple-Wienhues A**, Stahl F, Wiederholt M. Differential smooth muscle-like contractile properties of trabecular meshwork and ciliary muscle. *Exp Eye Res* **1991**; 53: 33-38.
- Lepple-Wienhues A**, Rauch R, Clark AF, Grassmann A, Berweck S, Wiederholt M. Electrophysiological properties of cultured human trabecular meshwork cells. *Exp Eye Res* **1994**; 59: 305-311.
- Leurs R**, Church MK, Taglialatela M. H1-antihistamines: inverse agonism, anti-inflammatory actions and cardiac effects. *Clin Exp Allergy*. **2002**; 32: 489-498.
- Li AF**, Tane N, Roy S. Fibronectin overexpression inhibits trabecular meshwork cell monolayer permeability. *Mol Vis* **2004**; 10: 750-757.
- Li Y**, Kuang K, Yerxa B, Wen Q, Rosskothan H, Fischbarg J. Rabbit conjunctival epithelium transports fluid, and P2Y₂ receptor agonists stimulate Cl⁻ and fluid secretion. *Am J Physiol Cell Physiol* **2001**; 281: C595-C602.

- Liang LL**, Epstein DL, de Kater AW, Shahsafaei A, Erickson-Lamy KA. Ethacrynic acid increases facility of outflow in the human eye in vitro. *Arch Ophthalmol* **1992**; 110: 106-109.
- Light DB**, Dahlstrom PK, Gronau RT, Baumann NL. Extracellular ATP activates a P2 receptor in neotoma erythrocytes during hypotonic swelling. *J Membr Biol* **2001**; 182: 193-202.
- Liu X**, Brandt CR, Gabelt BT, Bryar PJ, Smith ME, Kaufman PL. Herpes simplex virus mediated gene transfer to primate ocular tissues. *Exp Eye Res* **1999**; 69: 385-395.
- Liu X**, Wu Z, Sheibani N, Brandt CR, Polansky JR, Kaufman PL. Low dose latrunculin-A inhibits dexamethasone-induced changes in the actin cytoskeleton and alters extracellular matrix protein expression in cultured human trabecular meshwork cells. *Exp Eye Res* **2003**; 77: 181-188.
- Llobet A**, Gasull X, Canals L, Nicolas JM, Gual A. Bradykinin effects on trabecular meshwork cells [Abstract]. *Invest Ophthalmol Vis Sci* **1998**; 39: S799.
- Llobet A**, Gual A, Palés J, Barraquer R, Tobías E, Nicolás JM. Bradykinin decreases of outflow facility in perfused anterior segments and induces shape changes in passaged BTM cells in vitro. *Invest Ophthalmol Vis Sci* **1999**; 40: 113-125.
- Llobet A**, Gasull X, Palés J, Martí E, Gual A. Identification of Kir2.1 channel activity in cultured trabecular meshwork cells. *Invest Ophthalmol Vis Sci* **2001**; 42: 2371-2379.
- Llobet A**, Gasull X, Gual A. Understanding trabecular meshwork physiology: a key to the control of intraocular pressure? *News Physiol Sci* **2003**; 18: 205-209.
- Lütjen-Drecoll E**, Shimizu T, Rohrbach M, Rohen JW. Quantitative analysis of 'plaque material' in the inner- and outer wall of Schlemm's canal in normal- and glaucomatous eyes. *Exp Eye Res*. **1986**; 42: 443-455.
- Lütjen-Drecoll E**, Rohen JW. The normal anterior segment. Anatomy of aqueous humor formation and drainage En: *Glaucoma*. Vol. 7 Kaufman PL, Mittag TW, editores. Mosby-Wolfe, London. **1994**.

- Lütjen-Drecoll E.** Functional morphology of the trabecular meshwork in primate eyes. *Progr Retin Eye Res* **1999**; 18: 91-119.
- Mäepea O, Bill A.** The pressures in the episcleral veins, Schlemm's canal and the trabecular meshwork in monkeys: effects of changes in intraocular pressure. *Exp Eye Res* **1989**; 49: 645-663.
- Mäepea O, Bill A.** Pressures in the juxtacanalicular tissue and Schlemm's canal in monkeys. *Exp Eye Res* **1992**; 54: 879-883.
- Maminishkis A, Jalickee S, Blaug SA, Rymer J, Yerxa BR, Peterson WM, Miller SS.** The P2Y₂ receptor agonist INS37217 stimulates RPE fluid transport in vitro and retinal reattachment in rat. *Invest Ophthalmol Vis Sci* **2002**; 43: 3555-3566.
- Marsault R, Vigne P, Frelin C.** The effect of extracellular calcium on the contractile action of endothelin. *Biochem Biophys Res Commun* **1990**; 171: 301-305.
- Marshall GE, Konstas AG, Lee WR.** Immunogold ultrastructural localization of collagens in the aged human outflow system. *Ophthalmology* **1991**; 98: 692-700.
- Marteau F, Le Poul E, Communi D, Communi D, Labouret C, Savi P, Boeynaems JM, González NS.** Pharmacological characterization of the human P2Y₁₃ receptor. *Mol Pharmacol* **2003**; 64: 104-112.
- Matsumoto Y, Johnson DH.** Trabecular meshwork phagocytosis in glaucomatous eyes. *Ophthalmologica* **1997a**; 211: 147-52.
- Matsumoto Y, Johnson DH.** Dexamethasone decreases phagocytosis by human trabecular meshwork cells in situ. *Invest Ophthalmol Vis Sci* **1997b**; 38: 1902-1907.
- Matsuo T, Osumi-Yamashita N, Noji S, Ohuchi H, Koyama E, Myokai F, Matsuo N, Taniguchi S, Doi H, Iseki S, et al.** A mutation in the Pax-6 gene in rat small eye is associated with impaired migration of midbrain crest cells. *Nat Genet* **1993**; 3: 299-304.
- Maul E, Sears M.** ATP is released into the rabbit eye by antidromic stimulation of the trigeminal nerve. *Invest Ophthalmol Vis Sci* **1979**; 18: 256-262.

- McFadzean I**, Gibson A. The developing relationship between receptor-operated and store-operated calcium channels in smooth muscle. *Br J Pharmacol* **2002**; 135: 1-13.
- Melena J**, Zalduendi A, Arcocha P, Santafe J, Segarra J. Topical verapamil lowers outflow facility in the rabbit eye. *J Ocul Pharmacol Ther* **1999**; 15: 199-205.
- Merriman-Smith R**, Tunstall M, Kistler J, Donaldson P, Housley G, Eckert R. Expression profiles of P2-receptor isoforms P2Y₁ and P2Y₂ in the rat lens. *Invest Ophthalmol Vis Sci* **1998**; 39: 2791-2796.
- Mettu PS**, Deng PF, Misra UK, Gawdi G, Epstein DL, Rao PV. Role of lysophospholipid growth factors in the modulation of aqueous humor outflow facility. *Invest Ophthalmol Vis Sci*. **2004**; 45: 2263-2271.
- Mitchell CH**, Carre DA, McGlenn AM, Stone RA, Civan MM. A release mechanism for stored ATP in ocular ciliary epithelial cells. *Proc Natl Acad Sci U S A*. **1998**; 95: 7174-7178.
- Mitchell CH**, Peterson-Yantorno K, Carre DA, McGlenn AM, Coca-Prados M, Stone RA, Civan MM. A₃ adenosine receptors regulate Cl⁻ channels of nonpigmented ciliary epithelial cells. *Am J Physiol* **1999**; 276: C659-C666.
- Mitchell CH**, Fleischhauer JC, Stamer WD, Peterson-Yantorno K, Civan MM. Human trabecular meshwork cell volume regulation. *Am J Physiol Cell Physiol* **2002**; 283: C315-C326.
- Murakami T**, Fujihara T, Horibe Y, Nakamura M. Diquafosol elicits increases in net Cl⁻ transport through P2Y₂ receptor stimulation in rabbit conjunctiva. *Ophthalmic Res* **2004**; 36: 89-93.
- Nathanson JA**, McKee M. Identification of an extensive system of nitric oxide-producing cells in the ciliary muscle and outflow pathway of the human eye. *Invest Ophthalmol Vis Sci* **1995a**; 36: 1765-1773.
- Nathanson JA**, McKee M. Alterations of ocular nitric oxide synthase in human glaucoma. *Invest Ophthalmol Vis Sci* **1995b**; 36: 1774-1784.

- Neary JT**, Rathbone MP, Cattabeni F, Abbracchio MP, Burnstock G. Trophic actions of extracellular nucleotides and nucleosides on glial and neuronal cells. *Trends Neurosci* **1996**; 19: 13-18.
- Nelson MT**, Cheng H, Rubart M, Santana LF, Bonev AD, Knot HJ, Lederer WJ. Relaxation of arterial smooth muscle by calcium sparks. *Science* **1995**; 270: 633-637.
- Nguyen KP**, Chung ML, Anderson PJ, Johnson M, Epstein DL. Hydrogen peroxide removal by the calf aqueous outflow pathway. *Invest Ophthalmol Vis Sci* **1988**; 29: 976-981.
- Nicholas RA**. Identification of the P2Y₁₂ receptor: a novel member of the P2Y family of receptors activated by extracellular nucleotides. *Mol Pharmacol* **2001**; 60: 416-420.
- Nilius B**, Droogmans G. Ion channels and their functional role in vascular endothelium. *Physiol Rev* **2001**; 81: 1415-1459.
- Nilsson SFE**, Bill A. The normal anterior segment. Physiology and neurophysiology of aqueous humor inflow and outflow. En: *Glaucoma*. Vol. 7 Kaufman PL, Mittag TW, editores. Mosby-Wolfe, London. **1994**.
- Nishizaki T**, Ikeuchi Y. Adenosine evokes potassium currents by protein kinase C activated via a novel signaling pathway in superior colliculus neurons. *FEBS Lett* **1996**; 378: 1-6.
- Novak I**. ATP as a signaling molecule: the exocrine focus. *News Physiol Sci* **2003**; 18: 12-17.
- O'Donnell ME**, Brandt JD, Curry FR. Na-K-Cl cotransport regulates intracellular volume and monolayer permeability of trabecular meshwork cells. *Am J Physiol* **1995**; 268: C1067-C1074.
- Ohuchi T**, Tanihara H, Yoshimura N, Kuriyama S, Ito S, Honda Y. Neuropeptide-induced [Ca²⁺]_i transients in cultured bovine trabecular cells. *Invest Ophthalmol Vis Sci* **1992**; 33: 1676-1684.

- Okada SF**, O'Neal WK, Huang P, Nicholas RA, Ostrowski LE, Craigen WJ, Lazarowski ER, Boucher RC. Voltage-dependent anion channel-1 (VDAC-1) contributes to ATP release and cell volume regulation in murine cells. *J Gen Physiol* **2004**; 124: 513-526.
- Okada Y**, Maeno E, Shimizu T, Dezaki K, Wang J, Morishima S. Receptor-mediated control of regulatory volume decrease (RVD) and apoptotic volume decrease (AVD). *J Physiol* **2001**; 532.1: 3-16.
- Okka M**, Tian B, Kaufman PL. Effects of latrunculin B on outflow facility, intraocular pressure, corneal thickness, and miotic and accommodative responses to pilocarpine in monkeys. *Trans Am Ophthalmol Soc* **2004**; 102: 251-259.
- Orio P**, Rojas P, Ferreira G, Latorre R. New disguises for an old channel: MaxiK channel beta-subunits. *News Physiol Sci*. **2002**; 17 :156-1561.
- Orlov SN**, Dulin NO, Gagnon F, Gekle M, Douglas JG, Schwartz JH, Hamet P. Purinergic modulation of Na⁺/2Cl⁻/K⁺ cotransport and MAP kinases is limited to C11-MDCK cells resembling intercalated cells from collecting ducts. *J Membr Biol* **1999**;172: 225-234.
- Pang IH**, Shade DL, Clark AF, Steely HT, DeSantis L. Preliminary characterization of a transformed cell strain derived from human trabecular meshwork. *Curr Eye Res* **1994**; 13: 51-63.
- Pang IH**, Shade DL, Matsumoto S, Steely HT, DeSantis L. Presence of functional type B natriuretic peptide receptor in human ocular cells. *Invest Ophthalmol Vis Sci* **1996**; 37: 1724-1731.
- Pannicke T**, Fischer W, Biedermann B, Schadlich H, Grosche J, Faude F, Wiedemann P, Allgaier C, Illes P, Burnstock G, Reichenbach A. P2X₇ receptors in Müller glial cells from the human retina. *J Neurosci* **2000**; 20: 5965-5972.
- Parekh AB**, Putney JW Jr. Store-operated calcium channels. *Physiol Rev* **2005**; 85: 757-810.

- Patel K**, Barnes A, Camacho J, Paterson C, Boughtflower R, Cousens D, Marshall F. Activity of diadenosine polyphosphates at P2Y receptors stably expressed in 1321N1 cells. *Eur J Pharmacol*. **2001**; 430: 203-210.
- Pendergast W**, Yerxa BR, Douglass JG III, Shaver SR, Dougherty RW, Redick CC, Sims IF, Rideout JL. Synthesis and P2Y receptor activity of a series of uridine dinucleoside 5'-polyphosphates. *Bioorg Med Chem Lett* **2001**; 11:157-160.
- Peterson JA**, Tian B, Bershinsky AD, Volberg T, Gangnon RE, Spector I, Geiger B, Kaufman PL. Latrunculin-A increases outflow facility in the monkey. *Invest Ophthalmol Vis Sci* **1999**; 40: 931-941.
- Peterson WM**, Meggyesy C, Yu K, Miller SS. Extracellular ATP activates calcium signaling, ion, and fluid transport in retinal pigment epithelium. *J Neurosci* **1997**; 17: 2324-2337.
- Pintor J**, Miras-Portugal MT. A novel receptor for diadenosine polyphosphates coupled to calcium increase in rat midbrain synaptosomes. *Br J Pharmacol* **1995**; 115: 895-902.
- Pintor J**, King BF, Miras-Portugal MT, Burnstock G. Selectivity and activity of adenine dinucleotides at recombinant P2X₂ and P2Y₁ purinoceptors. *Br J Pharmacol* **1996**; 119: 1006-1012.
- Pintor J**. Purinergic signalling in the eye. En: *Nervous control of the eye*. **1999**. Burnstock G, Sillito A, editores. Harwood Academic Publishers, Amsterdam.
- Pintor J**, Diaz-Hernández M, Gualix J, Gómez-Villafuertes R, Hernando F, Miras-Portugal MT. Diadenosine polyphosphate receptors. from rat and guinea-pig brain to human nervous system. *Pharmacol Ther* **2000**; 87: 103-115.
- Pintor J**, Peral A. Therapeutic potential of nucleotides in the eye. *Drug Dev Res* **2001**; 52: 190-195.
- Pintor J**, Carracedo G, Alonso MC, Bautista A, Peral A. Presence of diadenosine polyphosphates in human tears. *Pflugers Arch* **2002a**; 443: 432-436.

- Pintor J**, Peral A, Hoyle CH, Redick C, Douglass J, Sims I, Yerxa B. Effects of diadenosine polyphosphates on tear secretion in New Zealand white rabbits. *J Pharmacol Exp Ther* **2002b**; 300: 291-297.
- Pintor J**, Peral A, Peláez T, Martin S, Hoyle CH. Presence of diadenosine polyphosphates in the aqueous humor: their effect on intraocular pressure. *J Pharmacol Exp Ther* **2003a**; 304: 342-348.
- Pintor J**, Peral A, Peláez T, Carracedo G, Bautista A, Hoyle C. Nucleotides and dinucleotides in ocular physiology: new possibilities of nucleotides as therapeutic agents in the eye. *Drug Dev Res* **2003b**; 58: 1-10.
- Pintor J**. Nucleotides as a new alternative for the treatment of ocular hypertension. *Archivos de la Sociedad Española de Oftalmología* **2003c**; 6.
- Pintor J**, Sánchez-Nogueiro J, Irazu M, Mediero A, Peláez T, Peral A. Immunolocalisation of P2Y receptors in the rat eye. *Purinergic Signalling* **2004a**; 1: 83-90.
- Pintor J**, Bautista A, Carracedo G, Peral A. UTP and diadenosine tetraphosphate accelerate wound healing in the rabbit cornea. *Ophthalmic Physiol Opt* **2004b**; 24: 186-193.
- Pintor J**, Peláez T, Peral A. Adenosine tetraphosphate, Ap₄, a physiological regulator of intraocular pressure in normotensive rabbit eyes. *J Pharmacol Exp Ther* **2004c**; 308: 468-473.
- Pojoga LH**, Haghiac M, Hilderman RH. Inhibition by adenine dinucleotides of ATP-induced prostacyclin release by bovine aortic endothelial cells. *Biochem Pharmacol.* **2002**; 64: 405-412.
- Puthussery T**, Fletcher EL. Synaptic localization of P2X₇ receptors in the rat retina. *J Comp Neurol* **2004**; 472: 13-23.
- Putney LK**, Vibat CR, O'Donnell ME. Intracellular Cl regulates Na-K-Cl cotransport activity in human trabecular meshwork cells. *Am J Physiol* **1999a**; 277: C373-C383.

- Putney LK**, Brandt JD, O'Donnell ME. Na-K-Cl cotransport in normal and glaucomatous human trabecular meshwork cells. *Invest Ophthalmol Vis Sci* **1999b**; 40: 425-434.
- Ralevic V**, Burnstock G. Receptors for purines and pyrimidines. *Pharmacol Rev* **1998**; 50: 413-492.
- Rao PV**, Deng PF, Kumar J, Epstein DL. Modulation of aqueous humor outflow facility by the Rho kinase-specific inhibitor Y-27632. *Invest Ophthalmol Vis Sci*. **2001**; 42: 1029-1037.
- Rao PV**, Deng P, Sasaki Y, Epstein DL. Regulation of myosin light chain phosphorylation in the trabecular meshwork: role in aqueous humour outflow facility. *Exp Eye Res* **2005**; 80: 197-206.
- Reifel Saltzberg JM**, Garvey KA, Keirstead SA. Pharmacological characterization of P2Y receptor subtypes on isolated tiger salamander Muller cells. *Glia* **2003**; 42: 149-159.
- Reigada D**, Mitchell CH. Release of ATP from retinal pigment epithelial cells involves both CFTR and vesicular transport. *Am J Physiol Cell Physiol*. **2005**; 288: C132-C140.
- Reiser G**. Ca²⁺ and nitric oxide-dependent stimulation of cyclic GMP synthesis in neuronal cell line induced by P2-purinergic/pyrimidinergic receptor. *J Neurochem*. **1995**; 64: 61-68.
- Reiss GR**, Lee DA, Topper JE, Brubaker RF. Aqueous humor flow during sleep. *Invest Ophthalmol Vis Sci* **1984**; 25: 776-778.
- Rezaie T**, Child A, Hitchings R, Brice G, Miller L, Coca-Prados M, Heon E, Krupin T, Ritch R, Kreutzer D, Crick RP, Sarfarazi M. Adult-onset primary open-angle glaucoma caused by mutations in optineurin. *Science* **2002**; 295: 1077-1079.
- Riley MV**. Intraocular dynamics of lactic acid in the rabbit. Intraocular dynamics of lactic acid in the rabbit. *Invest Ophthalmol* **1972**; 11: 600-607.

- Rossier O**, Abuin L, Fanelli F, Leonardi A, Cotecchia S. Inverse agonism and neutral antagonism at Ω_{1A} and Ω_{1B} adrenergic receptor subtypes. *Mol Pharmacol*. **1999**; 560: 858-866.
- Sabanay I**, Tian B, Gabelt BT, Geiger B, Kaufman PL. Functional and structural reversibility of H-7 effects on the conventional aqueous outflow pathway in monkeys. *Exp Eye Res* **2004**; 78: 137-150.
- Sarfrazi M**. Recent advances in molecular genetics of glaucomas. *Hum Mol Genet*. **1997**; 6: 1667-77.
- Sato T**, Roy S. Effect of high glucose on fibronectin expression and cell proliferation in trabecular meshwork cells. *Invest Ophthalmol Vis Sci* **2002**; 43: 170-175.
- Schachter JB**, Li Q, Boyer JL, Nicholas RA, Harden TK. Second messenger cascade specificity and pharmacological selectivity of the human P2Y₁-purinoceptor. *Br J Pharmacol* **1996**; 118: 167-173.
- Schachtschabel DO**, Binninger E. Aging of trabecular meshwork cells of the human eye in vitro. *Z Gerontol*. 1990; 23: 133-135.
- Schubert R**, Nelson MT. Protein kinases: tuners of the BK_{Ca} channel in smooth muscle. *Trends Pharmacol Sci* **2001**; 22: 505-512.
- Schwartzman ML**, Balazy M, Masferrer J, Abraham NG, McGiff JC, Murphy RC. 12(R)-hydroxyicosatetraenoic acid: a cytochrome-P450-dependent arachidonate metabolite that inhibits Na⁺,K⁺-ATPase in the cornea. *Proc Natl Acad Sci U S A*. **1987**; 84: 8125-8129.
- Seidler NW**, Jona I, Vegh M, Martonosi A. Cyclopiazonic acid is a specific inhibitor of the Ca²⁺-ATPase of sarcoplasmic reticulum. *J Biol Chem* **1989**; 264: 17816-17823.
- Shade DL**, Clark AF, Pang IH. Effects of muscarinic agents on cultured human trabecular meshwork cells. *Exp Eye Res* **1996**; 62: 201-210.

- Shahidullah M**, Wilson WS. Mobilisation of intracellular calcium by P2Y₂ receptors in cultured, non-transformed bovine ciliary epithelial cells. *Curr Eye Res* **1997**; 16: 1006-1016.
- Shahidullah M**, Yap M, To CH. Cyclic GMP, sodium nitroprusside and sodium azide reduce aqueous humour formation in the isolated arterially perfused pig eye. *Br J Pharmacol* **2005** *In Press*;
- Sharif NA**, Xu SX. Pharmacological characterization of bradykinin receptors coupled to phosphoinositide turnover in SV40-immortalized human trabecular meshwork cells. *Exp Eye Res* **1996**; 63: 631-637.
- Shader EA**, Brown PD, Best L. Swelling-induced changes in cytosolic [Ca²⁺] in insulin-secreting cells: a role in regulatory volume decrease? *Mol Cell Endocrinol* **2001**; 181: 179-187.
- Shearer T**, Crosson CE. Activation of extracellular signal-regulated kinase in trabecular meshwork cells. *Exp Eye Res*. **2001**; 73: 25-35.
- Shearer TW**, Crosson CE. Adenosine A₁ receptor modulation of MMP-2 secretion by trabecular meshwork cells. *Invest Ophthalmol Vis Sci* **2002**; 43: 3016-3020.
- Sherwood ME**, Richardson TM. Phagocytosis by trabecular meshwork cells: sequence of events in cats and monkeys. *Exp Eye Res* **1988**; 46: 881-895.
- Shirato S**, Murphy CG, Bloom E, Franse-Carman L, Maglio MT, Polansky JR, Alvarado JA. Kinetics of phagocytosis in trabecular meshwork cells. Flow cytometry and morphometry. *Invest Ophthalmol Vis Sci* **1989**; 30: 2499-2511.
- Skuta GL**. Specific types of glaucoma. The angle-closure glaucomas. En: *Glaucoma*. Vol. 7 Kaufman PL, Mittag TW, editores. Mosby-Wolfe, London. **1994**.
- Soto D**, Comes N, Ferrer E, Morales M, Escalada A, Pales J, Solsona C, Gual A, Gasull X. Modulation of aqueous humor outflow by ionic mechanisms involved in trabecular meshwork cell volume regulation. *Invest Ophthalmol Vis Sci* **2004**; 45: 3650-3661.

- Soto D**, Pintor J, Peral A, Effects of dinucleoside polyphosphates on trabecular meshwork cells and aqueous humor outflow facility. *J Pharmacol Exp Ther* **2005**; [In Press].
- Spencer B**, Agarwala S, Miskulin M, Smith M, Brandt CR. Herpes simplex virus-mediated gene delivery to the rodent visual system. *Invest Ophthalmol Vis Sci* **2000**; 41: 1392-1401.
- Srinivas SP**, Yeh JC, Ong A, Bonanno JA. Ca²⁺ mobilization in bovine corneal endothelial cells by P2 purinergic receptors. *Curr Eye Res* **1998**; 17: 994-1004.
- Srinivas SP**, Maertens C, Goon LH, Goon L, Satpathy M, Yue BY, Droogmans G, Nilius B. Cell volume response to hyposmotic shock and elevated cAMP in bovine trabecular meshwork cells. *Exp Eye Res* **2004**; 78: 15-26.
- Stadtbaumer K**, Kostlin RG, Zahn KJ. Effects of topical 0.5% tropicamide on intraocular pressure in normal cats. *Vet Ophthalmol* **2002**; 5: 107-112.
- Stamer WD**, Snyder RW, Smith BL, Agre P, Regan JW. Localization of aquaporin CHIP in the human eye: implications in the pathogenesis of glaucoma and other disorders of ocular fluid balance. *Invest Ophthalmol Vis Sci* **1994**; 35: 3867-3872.
- Stamer WD**, Seftor RE, Snyder RW, Regan JW. Cultured human trabecular meshwork cells express aquaporin-1 water channels. *Curr Eye Res* **1995a**; 14: 1095-1100.
- Stamer WD**, Seftor REB, Williams SK, Samaha HAM, Snyder RW. Isolation and culture of human trabecular meshwork cells by extracellular matrix digestion. *Curr Eye Res* **1995b**; 14: 611-617.
- Stamer WD**, Huang Y, Seftor RE, Svensson SS, Snyder RW, Regan JW. Cultured human trabecular meshwork cells express functional Ω_{2A} -adrenergic receptors. *Invest Ophthalmol Vis Sci* **1996**; 37: 2426-2433.
- Stamer WD**, Roberts BC, Epstein DL. Hydraulic pressure stimulates adenosine 3',5'-cyclic monophosphate accumulation in endothelial cells from Schlemm's canal. *Invest Ophthalmol Vis Sci* **1999**; 40: 1983-1988.

- Stamer WD**, Peppel K, O'Donnell ME, Roberts BC, Wu F, Epstein DL. Expression of aquaporin-1 in human trabecular meshwork cells: role in resting cell volume. *Invest Ophthalmol Vis Sci* **2001**; 42: 1803-1811.
- Steely HT**, Browder SL, Julian MB, Miggans ST, Wilson KL, Clark AF. The effects of dexamethasone on fibronectin expression in cultured human trabecular meshwork cells. *Invest Ophthalmol Vis Sci* **1992**; 33: 2242-2250.
- Steinhausen K**, Stumpff F, Strauss O, Thieme H, Wiederholt M. Influence of muscarinic agonists and tyrosine kinase inhibitors on L-type Ca^{2+} channels in human and bovine trabecular meshwork cells. *Exp Eye Res* **2000**; 70: 285-293.
- Steinmetz M**, Janssen AK, Pelster F, Rahn KH, Schlatter E. Vasoactivity of diadenosine polyphosphates in human small mesenteric resistance arteries. *J Pharmacol Exp Ther* **2002**; 302: 787-794.
- Stone EM**, Fingert JH, Alward WL, Nguyen TD, Polansky JR, Sunden SL, Nishimura D, Clark AF, Nystuen A, Nichols BE, Mackey DA, Ritch R, Kalenak JW, Craven ER, Sheffield VC. Identification of a gene that causes primary open angle glaucoma. *Science* **1997**; 275: 668-670.
- Stout CE**, Costantin JL, Naus CC, Charles AC. Intercellular calcium signaling in astrocytes via ATP release through connexin hemichannels. *J Biol Chem*. **2002**; 277: 10482-10488.
- Straiker AJ**, Maguire G, Mackie K, Lindsey J. Localization of cannabinoid CB_1 receptors in the human anterior eye and retina. *Invest Ophthalmol Vis Sci* **1999**; 40: 2442-2448.
- Strange PG**. Mechanisms of inverse agonism at G-protein-coupled receptors. *Trends Pharmacol Sci*. **2002**; 23: 89-95.
- Strobaek D**, Christophersen P, Dissing S, Olesen SP. ATP activates K and Cl channels via purinoceptor-mediated release of Ca^{2+} in human coronary artery smooth muscle. *Am J Physiol* **1996**; 271: C1463-C1471.

- Stumpff F**, Strauss O, Boxberger M, Wiederholt M. Characterization of maxi-K-channels in bovine trabecular meshwork and their activation by cyclic guanosine monophosphate. *Invest Ophthalmol Vis Sci* **1997**; 38: 1883-1892.
- Stumpff F**, Que Y, Boxberger M, Strauss O, Wiederholt M. Stimulation of maxi-K channels in trabecular meshwork by tyrosine kinase inhibitors. *Invest Ophthalmol Vis Sci* **1999**; 40: 1404-1417.
- Stumpff F**, Boxberger M, Thieme H, Strauss O, Wiederholt M. Flufenamic acid enhances current through maxi-K channels in the trabecular meshwork of the eye. *Curr Eye Res* **2001**; 22: 427-437.
- Sumiyoshi R**, Nishimura J, Kawasaki J, Kobayashi S, Takahashi S, Kanaide H. Diadenosine polyphosphates directly relax porcine coronary arterial smooth muscle. *J Pharmacol Exp Ther* **1997**; 283: 548-556.
- Suzuki Y**, Nakano T, Sears M. Calcium signals from intact rabbit ciliary epithelium observed with confocal microscopy. *Curr Eye Res* **1997**; 16: 166-175.
- Takahashi J**, Hikichi T, Mori F, Kawahara A, Yoshida A, Peterson WM. Effect of nucleotide P2Y₂ receptor agonists on outward active transport of fluorescein across normal blood-retina barrier in rabbit. *Exp Eye Res* **2004**; 78: 103-108.
- Takashima Y**, Taniguchi T, Yoshida M, Haque MS, Yoshimura N, Honda Y. Ocular hypotensive mechanism of intravitreally injected brain natriuretic peptide in rabbit. *Invest Ophthalmol Vis Sci* **1996**; 37: 2671-2677.
- Takashima Y**, Taniguchi T, Yoshida M, Haque MS, Igaki T, Itoh H, Nakao K, Honda Y, Yoshimura N. Ocular hypotension induced by intravitreally injected C-type natriuretic peptide. *Exp Eye Res* **1998**; 66: 89-96.
- Takata K**, Kasahara T, Kasahara M, Ezaki O, Hirano H. Ultracytochemical localization of the erythrocyte/HepG2-type glucose transporter (GLUT1) in the ciliary body and iris of the rat eye. *Invest Ophthalmol Vis Sci*. **1991**; 32: 1659-66.

- Tanihara H**, Ohuchi T, Yoshimura N, Negishi M, Ito S. Heterogeneous response in calcium signaling by adrenergic and cholinergic stimulation in cultured bovine trabecular cells. *Exp Eye Res* **1991**; 52: 393-396.
- Tao W**, Prasanna G, Dimitrijevic S, Yorio T. Endothelin receptor A is expressed and mediates the $[Ca^{2+}]_i$ mobilization of cells in human ciliary smooth muscle, ciliary nonpigmented epithelium, and trabecular meshwork. *Curr Eye Res* **1998**; 17: 31-38.
- ten Tusscher MP**, Beckers HJ, Vrensen GF, Klooster J. Peripheral neural circuits regulating IOP? A review of its anatomical backbone. *Doc Ophthalmol* **1994**; 87: 291-313.
- Thieme H**, Nass JU, Nuskovski M, Bechrakis NE, Stumpff F, Strauss O, Wiederholt M. The effects of protein kinase C on trabecular meshwork and ciliary muscle contractility. *Invest Ophthalmol Vis Sci* **1999**; 40: 3254-3261.
- Thieme H**, Nuskovski M, Nass JU, Pleyer U, Strauss O, Wiederholt M. Mediation of calcium-independent contraction in trabecular meshwork through protein kinase C and Rho-A. *Invest Ophthalmol Vis Sci*. **2000**; 41: 4240-4246.
- Thieme H**, Stumpff F, Otlecz A, Percicot CL, Lambrou GN, Wiederholt M. Mechanisms of action of unoprostone on trabecular meshwork contractility. *Invest Ophthalmol Vis Sci* **2001a**; 42: 3193-3201.
- Thieme H**, Hildebrandt J, Choritz L, Strauss O, Wiederholt M. Muscarinic receptors of the M2 subtype in human and bovine trabecular meshwork. *Graefes Arch Clin Exp Ophthalmol* **2001b**; 239: 310-315.
- Thomas AP**, Bird GS, Hajnoczky G, Robb-Gaspers LD, Putney JW Jr. Spatial and temporal aspects of cellular calcium signaling. *FASEB J*. **1996**; 10: 1505-1517.
- Tian B**, Gabelt BT, Crosson CE, Kaufman PL. Effects of adenosine agonists on intraocular pressure and aqueous humor dynamics in cynomolgus monkeys. *Exp Eye Res* **1997**; 64:979-989.

- Tian B**, Gabelt BT, Peterson JA, Kiland JA, Kaufman PL. H-7 increases trabecular facility and facility after ciliary muscle disinsertion in monkeys. *Invest Ophthalmol Vis Sci* **1999**; 40: 239-242.
- Tian B**, Geiger B, Epstein DL, Kaufman PL. Cytoskeletal involvement in the regulation of aqueous humor outflow. *Invest Ophthalmol Vis Sci* **2000**; 41: 619-623.
- Tian B**, Kiland JA, Kaufman PL. Effects of the marine macrolides swinholide A and jasplakinolide on outflow facility in monkeys. *Invest Ophthalmol Vis Sci* **2001**; 42: 3187-3192.
- Toris CB**, Camras CB, Yablonski ME. Acute versus chronic effects of brimonidine on aqueous humor dynamics in ocular hypertensive patients. *Am J Ophthalmol* **1999**; 128: 8-14.
- Tripathi BJ**, Tripathi RC. Neural crest origin of human trabecular meshwork and its implications for the pathogenesis of glaucoma. *Am J Ophthalmol* **1989**; 107: 583-590.
- Tripathi BJ**, Li T, Li J, Tran L, Tripathi RC. Age-related changes in trabecular cells in vitro. *Exp Eye Res* **1997**; 64: 57-66.
- Tripathi RC**, Li J, Borisuth NS, Tripathi BJ. Trabecular cells of the eye express messenger RNA for transforming growth factor- α and secrete this cytokine. *Invest Ophthalmol Vis Sci* **1993**; 34: 2562-2569.
- Tripathi RC** & Tripathi BJ. *Anatomy, orbit and adnexa of the human eye*. En: The eye. 3rd ed. Davson H, editor Academic Press, Orlando, Florida. **1984**.
- Tumminia SJ**, Mitton KP, Arora J, Zelenka P, Epstein DL, Russell P. Mechanical stretch alters the actin cytoskeletal network and signal transduction in human trabecular meshwork cells. *Invest Ophthalmol Vis Sci* **1998**; 39: 1361-1371.
- Unger WG**, Butler JM. Neuropeptides in the uveal tract. *Eye* **1988**; 2 Suppl: S202-12.

- Vassault A.** Lactate dehydrogenase. UV-method with pyruvate and NADH. En: *Methods of enzymatic analysis* Bergmeyer HU, Bergmeyer J, GraBl M, eds. Weinheim, Basel: Verlag chemie; **1981**:118-126.
- Viana F,** de Smedt H, Droogmans G, Nilius B. Calcium signalling through nucleotide receptor P2Y₂ in cultured human vascular endothelium. *Cell Calcium*. **1998**; 24: 117-127.
- Vittitow JL,** Garg R, Rowlette LL, Epstein DL, O'Brien ET, Borrás T. Gene transfer of dominant-negative RhoA increases outflow facility in perfused human anterior segment cultures. *Mol Vis* **2002**; 8:32-44.
- Vollmayer P,** Clair T, Goding JW, Sano K, Servos J, Zimmermann H. Hydrolysis of diadenosine polyphosphates by nucleotide pyrophosphatases/phosphodiesterases. *Eur J Biochem* **2003**; 270: 2971-2978.
- Wang N,** Chintala SK, Fini ME, Schuman JS. Activation of a tissue-specific stress response in the aqueous outflow pathway of the eye defines the glaucoma disease phenotype. *Nat Med* **2001**; 7: 304-309.
- Wang Y,** Roman R, Lidofsky SD, Fitz JG. Autocrine signaling through ATP release represents a novel mechanism for cell volume regulation. *Proc Natl Acad Sci U S A* **1996**; 93: 12020-12025.
- Wax MB,** Molinoff PB, Alvarado J, Polansky J. Characterization of Ω -adrenergic receptors in cultured human trabecular cells and in human trabecular meshwork. *Invest Ophthalmol Vis Sci* **1989**; 30: 51-57.
- Wax MB,** Tezel G, Kobayashi S, Hernández MR. Responses of different cell lines from ocular tissues to elevated hydrostatic pressure. *Br J Ophthalmol* **2000**; 84: 423-428.
- Webb JG,** Shearer TW, Yates PW, Mukhin YV, Crosson CE. Bradykinin enhancement of PGE₂ signalling in bovine trabecular meshwork cells. *Exp Eye Res* **2003**; 76: 283-289.

- Weinreb RN**, Bloom E, Baxter JD, Alvarado J, Lan N, O'Donnell J, Polansky JR. Detection of glucocorticoid receptors in cultured human trabecular cells. *Invest Ophthalmol Vis Sci* **1981**; 21: 403-407.
- Weinreb RN**, Lindsey JD. Metalloproteinase gene transcription in human ciliary muscle cells with latanoprost. *Invest Ophthalmol Vis Sci* **2002**; 43:716-722.
- Weinreb RN**, Khaw PT. Primary open-angle glaucoma. *Lancet* **2004**; 363:1711-1720.
- Weiskamp M**, Seidl W, Grissmer S. Characterization of the increase in $[Ca^{2+}]_i$ during hypotonic shock and the involvement of Ca^{2+} -activated K^+ channels in the regulatory volume decrease in human osteoblast-like cells. *J Membr Biol*. **2000**; 178: 11-20.
- Wheeler-Schilling TH**, Marquardt K, Kohler K, Jabs R, Guenther E. Expression of purinergic receptors in bipolar cells of the rat retina. *Brain Res Mol Brain Res* **2000**; 76: 415-418.
- Wheeler-Schilling TH**, Marquardt K, Kohler K, Guenther E, Jabs R. Identification of purinergic receptors in retinal ganglion cells. *Brain Res Mol Brain Res* **2001**; 92: 177-180.
- White PJ**, Webb TE, Boarder MR. Characterization of a Ca^{2+} response to both UTP and ATP at human $P2Y_{11}$ receptors: evidence for agonist-specific signaling. *Mol Pharmacol* **2003**; 63: 1356-1363.
- Wiederholt M**, Helbig H, Korbmacher C. Ion transport across the ciliary epithelium: Lessons from cultured cells and proposed role of the carbonic anhydrase. En: *Carbonic anhydrase*. Botré F, Gross G, Storey BT, editores. New York, Basel, Cambridge. Weinheim. **1991**.
- Wiederholt M**, Sturm A, Lepple-Wienhues A. Relaxation of trabecular meshwork and ciliary muscle by release of nitric oxide. *Invest Ophthalmol Vis Sci* **1994**; 35: 2515-2520.
- Wiederholt M**, Bielka S, Schweig F, Lütjen-Drecoll E, Lepple-Wienhues A. Regulation of outflow rate and resistance in the perfused anterior segment of the bovine eye. *Exp Eye Res* **1995**; 61: 223-234.

- Wiederholt M**, Dorschner N, Groth J. Effect of diuretics, channel modulators and signal interceptors on contractility of the trabecular meshwork. *Ophthalmologica* **1997**; 211: 153-160.
- Wiederholt M**, Stumpff F. The trabecular meshwork and aqueous humor reabsorption. En: *The Eye's aqueous humor. From secretion to glaucoma*. Civan MM editor. Academic press, San Diego: **1998**; vol 45: 163-202.
- Wiederholt M**, Thieme H, Stumpff F. The regulation of trabecular meshwork and ciliary muscle contractility. *Prog Retin Eye Res* **2000**; 19: 271-295.
- Viggiano SR**, Abboud CF, Brubaker RF. Effect of desmopressin on aqueous humor flow in humans. *Am J Ophthalmol*. **1993**; 115: 511-516.
- Wildman SS**, Unwin RJ, King BF. Extended pharmacological profiles of rat P2Y₂ and rat P2Y₄ receptors and their sensitivity to extracellular H⁺ and Zn²⁺ ions. *Br J Pharmacol* **2003**; 140: 1177-1186.
- Wilensky JT**. Specific types of glaucoma. Epidemiology of open-angle glaucoma. En: *Glaucoma*. Vol. 7 Kaufman PL, Mittag TW, editores. Mosby-Wolfe, London. **1994**.
- WoldeMussie E**, Ruiz G. Effect of histamine on signal transduction in cultured human trabecular meshwork cells. *Curr Eye Res* **1992**; 11: 987-995.
- WuDunn D**. The effect of mechanical strain on matrix metalloproteinase production by bovine trabecular meshwork cells. *Curr Eye Res* **2001**; 22: 394-397.
- Yazulla S**, Studholme KM. Vanilloid receptor like 1 (VRL1) immunoreactivity in mammalian retina: colocalization with somatostatin and purinergic P2X₁ receptors. *J Comp Neurol* **2004**; 474: 407-418.
- Yerxa BR**, Sabater JR, Davis CW, Stutts MJ, Lang-Furr M, Picher M, Jones AC, Cowlen M, Dougherty R, Boyer J, Abraham WM, Boucher RC. Pharmacology of INS37217 [P(1)-(uridine 5')-P(4)- (2'-deoxycytidine 5')tetrphosphate, tetrasodium salt], a next-generation P2Y₂ receptor agonist for the treatment of cystic fibrosis. *J Pharmacol Exp Ther*. **2002**; 302: 871-880.

- Zarbin MA**, Anholt RR. Benzodiazepine receptors in the eye. *Invest Ophthalmol Vis Sci* **1991**; 32: 2579-2587.
- Zhang X**, Wang N, Schroeder A, Erickson KA. Expression of adenylate cyclase subtypes II and IV in the human outflow pathway. *Invest Ophthalmol Vis Sci* **2000**; 41: 998-1005.
- Zhao C**, Fujimoto N, Shichi H. Immunocytochemical localization of prostaglandin E₂ receptor subtypes in porcine ocular tissues. I. Uveal tissues. *J Ocul Pharmacol Ther* **1995**; 11: 421-435.
- Zhong L**, Chu E, Chu J, Chu TC. CNP-induced changes in pHi, cGMP/cAMP and mRNA expression of natriuretic peptide receptors in human trabecular meshwork cells. *J Ocul Pharmacol Ther* **2003**; 19: 425-436.
- Zhou L**, Li Y, Yue BY. Alteration of cytoskeletal structure, integrin distribution, and migratory activity by phagocytic challenge in cells from an ocular tissue--the trabecular meshwork. *In Vitro Cell Dev Biol Anim* **1999**; 35: 144-149.
- Zimmermann H**, Braun N. Ecto-nucleotidases-molecular structures, catalytic properties, and functional roles in the nervous system. *Prog Brain Res*. **1999**; 120: 371-385.