

## Ana María Cárdenas Díaz - Professor

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### Current academic positions

Full Professor at the Universidad de Valparaíso, Faculty of Sciences  
Principal Investigator at Centro Interdisciplinario de Neurociencia de Valparaíso

### Educational Summary

Chemistry and Pharmacy, Universidad de Chile, 1984  
Ph.D. in Pharmacology, Universidad Complutense de Madrid, 1988  
Postdoctoral training at National Institutes of Health, USA, 1992-1994

### Current Projects:

- Contribution of Src kinases, N-Wasp and Cortactin to cortical actin rearrangement and exocytosis dynamics in chromaffin cells. Fondecyt Regular 1110552. IP: AM Cárdenas
- Molecular and cellular mechanisms of muscular dystrophy related to mutations of dysferlin. Proyecto Anillo ACT1121. IP: P. Caviedes, CI: J. Bevilacqua, AM Cárdenas.
- Role of overexpressed DSCAM and APP in PAK kinase derregulation, and the consequent neuronal dysfunction in in vitro models of Down syndrome: A quest for cellular therapeutical targets. Fondecyt Regular 1130241. IP: P. Caviedes, CI: AM Cárdenas.

### List of scientific publications

1. Fernández, E., Cárdenas, A.M. & Martínez, G. (1987) "Phototoxicity from nalidixic acid: oxygen-dependent photohemolysis" *Farmaco* 42:681-690.
2. Cárdenas, A.M., Montiel, C., Artalejo, A.R., Sánchez-García, P., García, A.G. (1988) "Sodium-dependent inhibition by PN200-110 enantiomers of nicotinic adrenal catecholamin release" *British Journal of Pharmacology* 95:9-14.
3. Cárdenas, A.M., Montiel, C., Esteban, C., Borges, R. & García, A.G. (1988) "Secretion from adrenaline and nor-adrenaline storing adrenomedullary cells is regulated by a common dihydropyridine-sensitive calcium channel" *Brain Research* 456:364-366.
4. Fernández, E. & Cárdenas, A.M. (1990) "The mechanism of photohemolysis by photoproducts of nalidixic acid" *Journal of Photochemistry and Photobiology, B:Biological* 4:329-333.
5. Cárdenas, A.M., Montiel, C., García, AG. & Sanchez-García, P. (1991) "Mechanism of blockade by (+)isradipine of adrenal catecholamine release" *European Journal of Pharmacology* 192:243-251.
6. Cortés, MP, Cárdenas, A.M., Navarrete, E. & Fernández, E. (1991) "Phototoxic ability of nalidixic and oxolinic acids: decrease in cell survival of chick embryo fibroblast and Hep-2 cells" *J. Photochem. Photobiol, B:Biological* 9:229-234.
7. Cárdenas, A.M., Vargas, F., Fernández, E. & Hidalgo, M.E. (1991) "Phototoxic potential of quinolones" *J. Photochem. Photobiol., B:Biological* 10:249-255.
8. Cárdenas, A.M., Cortés, M.P., Fernández, E. & Peña, W. (1992) "Lipid peroxidation and loss of potassium from red blood cells produced by phototoxic quinolones" *Toxicology* 72:145-151.
9. Hidalgo, M.E., Pessoa, C., Fernández, E. & Cárdenas, A.M. (1993) "Comparative determination of photodegradation kinetics of quinolones" *J. Photochem. Photobiol. A:Chem.* 73:135-138.

10. Cortés, M.P., Cárdenas, A.M., Hidalgo, M.E., Glenda, C., Fernández, E. & Sunkel, C. (1993) "New 4-alkyl-1,4-dihydropyridines: evaluation of photostability and phototoxic potential" *J. Photochem. Photobiol. B: Biol.* 19:135-138.
11. Cárdenas, A.M., Kuijpers, G.A.J., Pollard, H.B. (1995) "Effect of protein synthesis inhibitors on synexin levels and secretory response in bovine adrenal medullary chromaffin cells" *Biochimica et Biophysica Acta* 1234:255-260.
12. Gandía, L, López, MG, Villarroya, M., Gilabert, A., Cárdenas, A.M., García, A.G. & Borges, R. (1996) "Otilonium blocks calcium channels and secretion in rat chromaffin cells" *European Journal of Pharmacology* 298:199-205.
13. Cárdenas, A.M. & Cortés, M.P. "Photochemistry and photobiology of quinolones" (1997) *En Modern Topics in Photochemistry and Photobiology* ed. por F. Vargas, Research Signpost (India) pgs. 103-113.
14. Cárdenas, A.M., Vizcarra, J., Raffo, M., Pincheira, R., Inostroza, O. & García, R. (1998) "Clinical evaluation of the effect of calcium-channel blockers on verbal learning" *European Neuropsychopharmacology* 8, 187-189.
15. Sepúlveda, C.M., Troncoso, C.C., Lara, H., Cárdenas, A.M. (1998) "Intracellular calcium and arachidonic acid increase SNAP-25 expression in cultured rat hippocampal explants, but not in cultured cerebellar explants" *Neuroscience Letters* 252, 127-130.
16. Cárdenas, A.M., Rodríguez, M.P., Cortés, M.P., Alvarez, R.M., Wei, W., Rapoport, S.I., Shimahara, T., Caviedes, R., Caviedes, P. (1999) "Calcium signals in cell lines derived from the cerebral cortex of normal and trisomy 16 mice" *Neuroreport* 10, 363-369.
17. García-Palomero, E., Montiel, C., García, A.G., Alvarez, R., Arnalich, FM, Herrero, Renart, J. Lara, H., Cárdenas, A.M. (2000) "Multiple calcium pathways induce the expression of SNAP-25 protein in chromaffin cells" *J. Neurochem.* 74:1049-1058.
18. Allen, D., Martin, J., Arriagada, C., Cárdenas, A.M., Rapoport, S.I., Caviedes, R., Caviedes, P. (2000) "Impaired cholinergic function in cell lines derived from the cerebral cortex of normal and trisomy 16 mice" *Eur. J. Neurosci.* 12:3259-3264.
19. Tapia, J.C., Cárdenas, A.M., Nualart, F., Mentis, G.Z., Navarrete, R., Aguayo, L.G. (2000) "Neurite outgrowth in developing mouse spinal cord neurons is modulated by glycine receptors" *Neuroreport* 11:3007-3010.
20. Cárdenas, A.M., Allen, D., Arriagada, C., Olivares, A., Bennett, L., Caviedes, R., Dagnino-Subiabre, A., Mendoza, I.E., Segura-Aguilar, J., Rapoport, S., Caviedes, P. (2002) "Establishment and characterization of immortalized neuronal cell lines derived from the spinal cord of normal and trisomy 16 fetal mice, an animal model of Down Syndrome". *Journal of Neuroscience Research* 68:46-58.
21. Allen, D., Cárdenas, A.M., Arriagada, C., Bennett, C., García, C.J., Caviedes, R., Rapoport, S.I., Caviedes, P. (2002) "A dorsal root ganglia cell line derived from of trisomy 16 fetal mice, a model for Down Syndrome". *Neuroreport* 13:491-496.
22. Cárdenas, A.M., Arriagada, C., Cortes, J.F., Allen, D., Martín, J., Couve, E., Rapoport, S.I., Shimahara, T., Caviedes, R., Caviedes, P. (2002) "Neuronal cell lines from the hippocampus of the normal and trisomy 16 mouse fetus (a model for down syndrome) exhibit neuronal markers, cholinergic function and functional neurotransmitter receptors". *Experimental Neurology* 177:159-170.
23. Mendoza, I., Tonk, E., Díaz-Raya, P., Cárdenas, A.M. (2002) "Mitogen-activated protein kinase is activated by Ca(2+) entry through L- and N-Type channels and regulates Ca(2+)-induced SNAP-25 expression". *Ann. N. Y. Acad. Sci.* 971:159-161.
24. Montiel, C., Mendoza, I., García, C.J., Awad, Y., Olivares-García, J., Solis-Garrido, L.M., Lara H, García AG, Cárdenas AM. (2003) "Distinct Protein Kinases Regulate the SNAP-25 Expression in Chromaffin Cells". *Journal of Neuroscience Research* 71, 353-364.

25. Mendoza, I.E., Schmachtenberg, O., Tonk, E., Fuentealba, J., Díaz-Raya, P., Lagos, V.L., García, A.G., Cárdenas, A.M. (2003) "Depolarization-induced ERK phosphorylation depends on the cytosolic  $Ca^{2+}$  level rather than on the  $Ca^{2+}$  channel subtype of chromaffin cells". *J. Neurochem* 86, 1477-1486.
26. Silva, A., Collao, A., Orellana, M., Meléndez, J., Caviedes, P., Cárdenas, A.M. (2003) "Zopiclone, but not brotizolam, impairs memory storage during sleep". *Neurosci. Res.* 47, 241-243.
27. Cárdenas, A.M. (2004) "Recent advances in chromaffin cell biology: Summing up the last. International Symposium on Chromaffin Cell Biology". *Biol. Res.* 37:7-10.
28. Meléndez, J., Galli, I., Boric, K., Ortega, A., Zuñiga, L., Henríquez, C.F., Cárdenas, A.M. (2005) "Zolpidem and triazolam do not affect sleep-induced memory improvement". *Psychopharmacology* 181:21-26.
29. Allen, D., Caviedes, R., Cárdenas, A.M., Shimahara, T., Segura-Aguilar, J., Caviedes, P. (2005) "Cell lines as in vitro models for drug screening and toxicity studies". *Drug Dev Ind Pharm* 31:757-68.
30. Saud, K., Arriagada, C., Cárdenas, A.M., Shimahara, T., Allen, D.D., Caviedes, R., Caviedes, P. (2006) "Neuronal dysfunction in Down syndrome: Contribution of neuronal models in cell culture". *J. Physiol. Paris* 99:201-10.
31. Ardiles, A., Maripillan, J., Lagos, V., Toro, R., Mora, I.G., Villarroel, L., Ales, E., Borges, R., Cárdenas, A.M. (2006) "A rapid exocytosis mode in chromaffin cells with a neuronal phenotype". *J. Neurochem.* 99:29-41.
32. Opazo, P., Saud, K., de Saint Pierre M., Cárdenas, A.M., Allen, D., Segura-Aguilar, J., Caviedes, R., Caviedes, P. (2006) "Knockdown of amyloid precursor protein normalizes cholinergic function in a cell line derived from the cerebral cortex of a trisomy 16 mouse, an animal model of Down syndrome". *J. Neurosci. Res.* 84:1303-1310
33. Ardiles A, González-Jamett, A.M., Maripillan, J., Naranjo, D., Caviedes, P., Cárdenas, A.M. (2007) "Calcium channel subtypes differentially regulate fusion pore stability and expansion". *J. Neurochem.*103:1574-81.
34. Rojas, G., Cárdenas, A.M., Fernández-Olivares, P., Shimahara, T., Segura-Aguilar, J., Caviedes, R., Caviedes, P. (2008) "Effect of the knockdown of amyloid precursor protein on intracellular calcium increases in a neuronal cell line derived from the cerebral cortex of a trisomy 16 mouse". *Experimental Neurology* 209:234-42
35. Paula-Lima AC, Arriagada C, Toro R, Cárdenas AM, Caviedes R, Ferreira St, Caviedes P (2008) "Small- molecule aggregation inhibitors reduce excess amyloid in a trisomy 16 mouse cortical cell line" *Biological Research* 41:129-36.
36. González-Jamett AM, Báez-Matus X, Hevia M, Guerra MJ, Martínez AD, Neely A, Cárdenas AM (2010) "The association of dynamin with synaptophysin regulates quantal size and duration of exocytotic events in chromaffin cells". *Journal of Neuroscience* 30:10683-10691.
37. Cárdenas AM, Marengo F (2010) "Rapid Endocytosis and Vesicle Recycling in Neuroendocrine Cells". *Cellular and Molecular Neurobiology Cell Mol Neurobiol* 30:1365-70.
38. Acuña MA, Pérez-Nuñez R, Noriega J, Cárdenas AM, Bacigalupo J, Delgado R, Arriagada C, Segura-Aguilar J, Caviedes R, Caviedes P (2012) "Altered voltage-dependent calcium currents in a neuronal cell line derived from the cerebral cortex of a trisomy 16 fetal mouse, an animal model of Down syndrome". *Neurotoxicity Research* 22:59-68.
39. Cárdenas AM, Ardiles AO, Barraza N, Baez-Matus X, Caviedes P (2012) "Role of protein tau in neuronal damage in Alzheimer's disease and Down syndrome". *Archives of Medical Research* 43:645-654.
40. González-Jamett AM, Momboisse F, Guerra MJ, Ory S, Báez-Matus X, Barraza N, Calco V, Houy S, Couve E, Neely A, Martínez AD, Gasman S, Cárdenas AM (2013) Dynamin-2 regulates fusion pore

expansion and quantal release through a mechanism that involves actin dynamics in neuroendocrine chromaffin cells. PLoS One 8:70638

41. González-Jamett AM, Momboisse F, Haro-Acuña V, Bevilacqua JA, Caviedes P, Cárdenas AM (2013) Dynamin-2 function and dysfunction along the secretory pathway. *Front. Endocrinol.* 4:126.
42. González-Jamett AM, Haro-Acuña V, Momboisse F, Caviedes P, Bevilacqua JA, Cárdenas AM (2014) Dynamin-2 in nervous system disorders. *J Neurochem.* 128:210-23.
43. Olivares MJ, González-Jamett AM, Guerra MJ, Baez-Matus X, Haro-Acuña V, Martínez-Quiles N, Cárdenas AM (2014) Src kinases regulate de novo actin polymerization during exocytosis in neuroendocrine chromaffin cells. *PLoS One* 9:e99001.
44. Momboisse F, Olivares MJ, Báez-Matus X, Guerra MJ, Flores-Muñoz C, Sáez JC, Martínez AD, Cárdenas AM (2014) Pannexin 1 channels: new actors in the regulation of catecholamine release from adrenal chromaffin cells. *Frontiers in Cellular Neuroscience.* 8:270
45. Ardiles AO, Flores-Muñoz C, Toro-Ayala G, Cárdenas AM, Palacios AG, Muñoz P, Fuenzalida M, Saez JC, Martinez AD (2014) Pannexin 1 Regulates Bidirectional Hippocampal Synaptic Plasticity in Adult Mice. *Frontiers in Cellular Neuroscience.* 8:326.