



Prof. Dr. Francisco J. Barrantes (MD, PhD) University of Buenos Aires, Argentina. Postdoctoral research with Prof. Gregorio Weber at the Univ. of Illinois. Dr. Barrantes worked at the Department of Molecular Biology (Dr. Thomas M. Jovin, Max-Planck Institute for Biophysical Chemistry in Göttingen, Germany) until 1977, with short intermissions at the Unité de Neurobiologie of the Pasteur Institute, as an EMBO fellow, with Prof. Jean-Pierre Changeux. In 1979 Dr. Barrantes joined with Bert Sakmann and Erwin Neher as head of a new group stemming from the departments of Molecular Biology, Neurobiology, and Molecular Systems, respectively, at the Max-Planck Institute for Biophysical Chemistry in Göttingen. They were awarded a five-year period as leaders of a scientifically independent group within the institute. During this period, Dr. Barrantes undertook structural work on the acetylcholine receptor, producing the first images of the membrane-bound protein at 2.0 nm resolution by a combination of low-dose electron microscopy and single-particle image reconstruction techniques. The description of the ligand-recognition site on the two α -subunits of the receptor at 1.8 nm resolution also stems from this period. In collaboration with Dr. Derek Marsh, also at the MPI in Göttingen, he described for the first time the lipid microenvironment of the membrane-bound receptor using ESR techniques. In 1982 Dr. Barrantes returned to his home country, Argentina, as head of the Institute of Biochemistry and Professor at the Department of Biology, Biochemistry and Pharmacy of the Universidad Nacional del Sur in Bahía Blanca. He is Chairholder of the UNESCO Chair of Biophysics and Molecular Neurobiology since 1998, and head of the Scientific and Technological Res. Center-CONICET since 2007.

Membership in Scientific Academies

- 2007-2009. Appointed Chairman of the TWAS Prize Committee in the field of Biology for the period 2007-2009.
- 2006-2012. Elected by direct vote member of the Council, Latin American Academy of Science (Academia de Ciencias de América Latina, ACAL).
- 2005. Elected Foreign Fellow of the Indian National Science Academy (INSA).
- 1998. Elected Corresponding Member. Brazilian Academy of Sciences.
- 1994. Elected Full Member. Latin American Academy of Sciences (ACAL).
- 2004. Appointed Member of Council, Latin American Regional Office of the Academy of Sciences for the Developing World (TWAS), Rio de Janeiro, Brazil.
- 2004. Appointed Full Member, European Academy of Sciences and Arts.
- 1999. Elected Corresponding Member, National Academy of Medicine, Buenos Aires, Argentina.
- 1993. Elected Fellow (Full Member) of the Academy of Sciences for the Developing World.
- 1991. Elected Corresponding Fellow of the Academy of Sciences for the Developing World (TWAS).

Awards and Honours

- 2007, Appointed Director of the Scientific and Technological Center CONICET-Bahia Blanca (Institutes of Biochemistry, Mathematics, Electronic Engineering, Center for the Study of Semi-Arid Regions, Pilot Plant of Chemical Engineering, Oceanography and Geology).
- 2006-2008. Elected member of Council of the International Union of Pure and Applied Biophysics (IUPAB). Reelected in the 2008 election.
- 2006. Awarded the Prémio União Latina. Lisboa, Portugal, together with Prof. Dr. M. Prieto.
- 2006. Awarded the Chancellor's Award in the Neurosciences, Univ. Louisiana, U.S.A.
- 2005. Elected Member of the Board of Directors (Council), International Society for Neurochemistry (ISN) (2005-2008 period).
- 2005. Fulbright Scholar. Harvard Medical School, Boston, MA, USA.

2004. Awarded Eduardo De Robertis Medal and delivered the 2004 De Robertis Lecture of the Argentine Society for Neurochemistry (SAN).
2003. Awarded one of the five 2003 Konex Foundation awards in Science and Technology, in the discipline Molecular Biology and Cytology, Argentina (awarded every 10 years).
2002. International Fellow, Sarojini Damodaran International Trust, India.
1999. Elected President, Argentine Society for Neurochemistry (SAN), for the 1999-2001 period.
- 1997-1999. Designated member of the Committee for Aid in Neurochemistry, International Society for Neurochemistry (ISN).
- 1997-1999. Elected Vicepresident, Argentine Society for Neurochemistry (SAN), for the 1997-1999 period.
1998. Awarded Alexander von Humboldt Research Prize (AvH Forschungspreis). Germany.
1996. Designated one of the five members of the Nominations Committee for the election of the Council of the Academy of Sciences for the Developing World for the 1997-1999 period.
- 1995-1998. Elected Member of the Membership Committee in Biology of the Academy of Sciences for the Developing World (TWAS).
- 1995-1997. Elected Member of the Committee for Molecular and Cellular Neurosciences, International Union of Physiological Sciences (IUPS).
- 1995-1997. Elected Chairman of the Committee for Aid in Neurochemistry, International Society for Neurochemistry (ISN).
- 1994-1996. Elected member of the Special Commission on Cell and Membrane Biophysics (IUPAB, International Union of pure and Applied Biophysics).
- 1993-1996. Elected Member of the Board of Directors (Council), International Society for Neurochemistry (ISN).
1993. Elected Member of the Argentine Association for the Advancement of Sciences.
1993. Elected Member of the Committee for Aid in Neurochemistry of the International Society for Neurochemistry (ISN).
1991. Guest Research Fellow. Royal Society, London, U.K.
- 1991-1992. Human Frontier Science Program Fellowship at the LMB, Cambridge, UK.
- 1990-1991. Awarded Fellowship of the John Simon Guggenheim Memorial Foundation, New York.
1989. Academy of Sciences for the Developing World (TWAS) 1988 Award in Biology.
1987. "Bernardo Houssay Award" from the Argentinian Scientific Research Council (CONICET) for work on neurotransmitter receptors.
1986. Fellow. The Neurosciences Institute, New York.
1971. Daniel Goytía Award of the Argentinian Association for the Advancement of Science for the work on "Structure and Function of Biomembranes". Award presented by Nobel Awardee in Chemistry, Prof. Luis F. Leloir.
1970. Wellcome Trust Fellowship, U.K., to conduct short training period with Prof. B. Finean, Univ. Birmingham, England.



Publications since 2003.

- Barrantes, F.J. (2003). Transmembrane modulation of nicotinic acetylcholine receptor function. *Curr. Opinion Drug Disc. & Develop.* 6, 620-632. Francis Medical, London, UK..
- Mantipragada, S. B. L., Horváth, I., Arias, H. R., Schwarzmann, G., Sandhoff, K., Barrantes, F.J. and Marsh, D. Lipid-protein interactions and the effect of local anaesthetics in acetylcholine receptor-rich membranes from *Torpedo marmorata* electric organ. *Biochemistry* 42 (2003) 9167-9175.

- Wenz, J. and Barrantes, F.J. Steroid structural requirements for stabilizing or disrupting lipid domains. *Biochemistry* 42 (2003) 14267-14276.
- de Almeida, R. F. M., Loura, L. M. S., Prieto, M., Watts, A., Fedorov, A. and Barrantes, F. J. Cholesterol modulates the organization of the γ M4 transmembrane domain of the muscle nicotinic acetylcholine receptor. *Biophys. J.* 86 (2004) 2261-2272.
- Barrantes, F.J. (2003). Transmembrane modulation of nicotinic acetylcholine receptor function. *Curr. Opin. Drug Disc. & Develop.* 6, 620-632.
- Antollini, S., Baier, J., Blanton, M., Bonini, I., De los Santos, B., Gallegos, M.C., Garbus, I., Pediconi, M.F., Prieto, M., Roccamo, A.M., Wenz, J. and Barrantes, F.J. (2004). Structure and dynamics of acetylcholine receptor and its lipid microenvironment: from molecule to cell. In: *Cholinergic Mechanisms*. Abraham Fischer & Hermona Soreq, Eds., pp. 33-38. Taylor & Francis Medical, London, UK..



Barrantes, F. J. (2004). Structural basis for lipid modulation of nicotinic acetylcholine receptor function. *Brain Res. Reviews* 47, 71-95.

Cover page article

- Pediconi, M.F., Gallegos, C.E., de los Santos, E.B. and Barrantes, F.J. Metabolic cholesterol depletion hinders cell-surface trafficking of the nicotinic acetylcholine receptor. *Neuroscience* 128 (2004) 239-249.

- Wenz, J. and Barrantes, F.J. Nicotinic acetylcholine receptor induces lateral segregation of phosphatidic acid and phosphatidylcholine in reconstituted membranes. *Biochemistry* 44 (2005) 398-410.

- Xu, Y., Barrantes, F.J., Luo, X., Chen, K., Shen, J. & Jiang, H. Conformational dynamics of the nicotinic acetylcholine receptor channel: A 35-ns molecular dynamics simulation study. *J. Amer. Chem. Soc. (JACS)* 127 (2005) 1291-1299.

- Antollini, S.S., Xu, Y., Jiang, H. and Barrantes, F.J. Fluorescence and molecular dynamics studies of the acetylcholine receptor γ M4 transmembrane peptide in reconstituted systems. *Mol. Membr. Biol.* 22 (2005) 471-483. **[cover page article]**




- Williamson, P.T.F., Zandomenighi, G., Barrantes, F.J., Watts, A. and Meier, B.H. Structural and dynamic studies of the γ -M4 trans-membrane domain of the nicotinic acetylcholine receptor. *Mol. Membr. Biol.* 22 (2005) 485-496.

- Garbus, I., Wenz, J. and Barrantes, F.J. (2005) Nongenomic effects of steroids on the nicotinic acetylcholine receptor. *Current Topics in Neurochem.* 4, 21-34.

- de Almeida, R. F. M., Loura, M. S., Prieto, M., Watts, A., Fedorov, A., and Barrantes, F.J. (2006). Structure and dynamics of the γ M4 transmembrane domain of the acetylcholine receptor in lipid bilayers: insights into receptor assembly and function. *Mol. Membr. Biol.* 23 305-315.

- Xu, Y., Barrantes, F. J., Shen, J., Luo, X., Zhu, W., Chen, X. and Jiang, H. (2006) Blocking of the nicotinic acetylcholine receptor ion channel by chlorpromazine, a noncompetitive inhibitor: A molecular dynamics simulation study. *J. Phys. Chem. B* 110, 20640-20648; doi: [10.1021/jp0604591](https://doi.org/10.1021/jp0604591) (*J Phys Chem B Condens Matter Mater Surf Interfaces Biophys.*). Supporting information: [jp0604591si20060824_092048.pdf](https://doi.org/10.1021/jp0604591si20060824_092048.pdf)

- Borroni, V. Baier, C.J., Lang, T., Bonini, I. White, M.W., Garbus, I. and Barrantes, F.J. (2007). Cholesterol depletion activates rapid internalization of diffraction-limited acetylcholine receptor domains at the cell membrane. *Molec. Membr. Biol.* 24, 1-15. doi: [10.1080/09687860600903387](https://doi.org/10.1080/09687860600903387)

- Kellner, R. Baier, J., Willig, K.I., Hell, S.W. and Barrantes, F.J. (2007). Nanoscale organization of nicotinic acetylcholine receptors revealed by STED microscopy. *Neuroscience* 144, 135-143. doi: [10.1016/neuroscience.2006.08.071/](https://doi.org/10.1016/neuroscience.2006.08.071/)
- Roccamo, A.M. and Barrantes, F.J. (2007). Charged amino acid motifs flanking each extreme of the α M4 transmembrane domain are involved in assembly and cell-surface targeting of the muscle nicotinic acetylcholine receptor. *J. Neurosci. Res.* 85, 285-293. doi: [10.1002/jnr.21123](https://doi.org/10.1002/jnr.21123)
- Vallés, A.S., Garbus, I., and Barrantes, F.J. (2007). The antiepileptic drug lamotrigine exerts a dual agonist/open-channel blocker effect on the nicotinic acetylcholine receptor. *NeuroReport* 18, 45-50.
- Fernández Nievas, G.A., Barrantes, F.J. and Antollini, S.S. (2007). Conformationally sensitive steroid and fatty acid sites in membrane-bound nicotinic acetylcholine receptor *Biochemistry* 46, 3502-3512. <http://dx.doi.org/10.1021/bi061388z>.
- Baier, C. J. and Barrantes, F.J. (2007). Sphingolipids are necessary for nicotinic acetylcholine receptor export in the early secretory pathway. *J. Neurochem.* 101, 1072–1084. doi:[10.1111/j.14714159.2007.04561.x](https://doi.org/10.1111/j.14714159.2007.04561.x)
- Farías, G.G., Vallés, A.S, Colombres, M., Lukas, R., Barrantes, F.J. and Inestrosa, N.C. (2007). Wnt-7a Induced presynaptic colocalization of α 7-nicotinic acetylcholine receptors and adenomatous polyposis coli in hippocampal neurons. *J. Neurosci.* 27, 5313-5325.
- Antollini, S. and Barrantes, F.J. (2007). Laurdan studies of membrane lipid-acetylcholine receptor protein interactions. Chapter 36. In A.M. Dopico, Ed.: *Methods in Membrane Lipids*. The Humana Press Inc., Totowa, New Jersey, USA. ISBN13: 978-1-58829-662-7 ISBN10: 1-58829-662-8. ISSN 1064-3745.
- Barrantes, F.J. (2007). Cholesterol effects on nicotinic acetylcholine receptor. *J. Neurochem.* 103, Suppl. 1, 72-80.
- Gallegos, C.E., Pediconi, M.F. y Barrantes, F.J. (2008). Ceramides modulate cell-surface acetylcholine receptor levels. *Biochimica et Biophysica Acta* 1778, 917-930.
-  Liu, X., Xu, Y., Li, H., Wang, X., Jiang, H. and Barrantes, F. J. (2008). Mechanics of channel gating of the nicotinic acetylcholine receptor. *PLoS Computat. Biol.* 4: 100-110. **Cover page article.**
- Liu, X., Xu, Y., Wang, X., Barrantes, F.J. and Jiang, H. (2008). Unbinding of nicotine from the acetylcholine binding protein: Steered molecular dynamics simulations *J. Phys. Chem. B* 112: 4087-4093. DOI: [10.1021/jpc0716738](https://doi.org/10.1021/jpc0716738)