## BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors in the order listed on Form Page 2.
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

| NAME | POSITION TITLE |
|---|---|
| Robert L. Rosenberg | Professor of Pharmacology and Cell & Molecular Physiology |
| eRA COMMONS USER NAME<br>Robert Rosenberg | |

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

| INSTITUTION AND LOCATION | DEGREE *(if applicable)* | YEAR(s) | FIELD OF STUDY |
|---|---|---|---|
| Oberlin College | A.B. | 1973-1977 | Physics |
| Yale University | Ph.D. | 1979-1985 | Physiology |
| Yale University | Postdoc. | 1985-1988 | Physiology |

Please refer to the application instructions in order to complete sections A, B, and C of the Biographical Sketch.

### A. Positions and Honors

1977-1979 Research Assistant, Department of Biochemistry, Brandeis University. Dr. Christopher Miller
1984-1985 Postdoctoral Fellow, Department of Physiology, Yale University. Dr. William S. Agnew
1985-1988 Postdoctoral Fellow, Department of Physiology, Yale University. Dr. Richard W. Tsien

1988-1994 Assistant Professor of Pharmacology and Physiology, University of North Carolina at Chapel Hill
1994-2002 Associate Professor of Pharmacology and Cell & Molecular Physiology, UNC-CH
2002-present Professor of Pharmacology and Cell & Molecular Physiology, UNC-CH
2005-2006 Benedict Visiting Distinguished Professor of Biology, Carleton College, Northfield MN

1990-1995 American Heart Association Established Investigatorship Award
1995-1999 Instructor and guest lecturer, Neurobiology Course, Marine Biological Lab, Woods Hole, MA.
1995-1999 Director of Graduate Studies, Department of Pharmacology, UNC-CH
2006-present Director, Curriculum in Neurobiology, UNC-CH

1999-2003 NINDS Initial Review Group, Subcommittee C (NSD-C)

### B. Selected peer-reviewed publications

Rosenberg, R.L., Tomiko, S.A. and Agnew, W.S. (1984). Reconstitution of neurotoxin-modulated ion transport by the voltage-regulated sodium channel isolated from the electroplax of *Electrophorus electricus*. *Proc. Natl. Acad. Sci. USA* **81**, 1239-1243.

Rosenberg, R.L., Tomiko, S.A. and Agnew, W.S. (1984). Single-channel properties of the reconstituted voltage-regulated Na channel isolated from the electroplax of *Electrophorus electricus*. *Proc. Natl. Acad. Sci. USA* **81**, 5594-5598.

Agnew, W.S., Rosenberg, R.L. and Tomiko, S.A. (1986). Functional reconstitution of the voltage-regulated sodium channel from *Electrophorus electricus*. In "Ion Channel Reconstitution" (C. Miller, ed.), Plenum Publishing Corp., New York, pp. 307-335.

Rosenberg, R.L., Hess, P., Reeves, J.P., Smilowitz, H. and Tsien, R.W. (1986). Calcium channels in planar lipid bilayers: Insights into mechanisms of ion permeation and gating. *Science* **231**, 1564-1566.

Tsien, R.W., Hess, P., McCleskey, E.W., and Rosenberg, R.L. (1987). Calcium channels: Mechanisms of selectivity, permeation and block. *Ann. Rev. Biophys. Biophys. Chem.* **16**, 265-290.

Rosenberg, R.L., Hess P. and Tsien, R.W. (1988). Cardiac calcium channels in planar lipid bilayers. L-type channels and calcium-permeable channels open at negative membrane potentials. *J. Gen. Physiol.* **92**, 27-54.

Rosenberg, R.L., McCleskey, E.W., Hess, P. and Tsien, R.W. (1988). Cardiac calcium channels: Pore size and symmetry of energy profile. In "Molecular Biology of Ion Channels" (Agnew, W.S., Claudio, T. and Sigworth, F.J., eds.), *Current Topics in Membranes and Transport*, Vol. 33, Academic Press Inc., San Diego, pp. 393-413.

Rosenberg, R.L., Isaacson, J.S. and Tsien, R.W. (1989). Solubilization, partial purification, and properties of ω-conotoxin receptors associated with voltage-dependent calcium channels from rat brain synaptosomes. *Ann. N.Y. Acad. Sci.* **560**, 39-52.

Rosenberg, R.L. and Chen, X.-h. (1991) Characterization and localization of two ion-binding sites within the pore of cardiac L-type calcium channels. *J. Gen. Physiol.* **97**, 1207-1225

Wang, Y. and Rosenberg, R.L. (1991) Ethaverine, a derivative of papaverine, inhibits cardiac L-type calcium channels. *Molec. Pharmacol.* **40**, 750-755.

Hijioka, T., Rosenberg, R.L., Lemasters, J.J., and Thurman, R.G. (1992) Kuppfer cells contain voltage-dependent calcium channels. *Mol. Pharml.* **41**, 435-440.

Rosenberg, R.L. and East, J.E. (1992) Cell-free expression of functional *Shaker* potassium channels. *Nature* **360**, 166-169.

Wang, Y., Townsend, C., and Rosenberg, R.L. (1993) Regulation of cardiac L-type Ca channels in planar lipid bilayers by G-proteins and protein phosphorylation. *Am. J. Physiol. **264** (Cell Physiol. 33)*, C1473-1479.

Haack, J.A. and Rosenberg, R.L. (1994) Calcium-dependent inactivation of L-type calcium channels in planar lipid bilayers. *Biophys. J.* **66**, 1051-1060.

Townsend, C, and Rosenberg, R.L. (1995) Characterization of a chloride channel reconstituted from cardiac sarcoplasmic reticulum. *J. Membr. Biol.* **147**, 121-136.

Liu, Q.-Y. and Rosenberg, R.L. (1996) Activation and inhibition of reconstituted cardiac L-type calcium channels by palmitoyl-L-carnitine. *Biochem. Biophys. Res. Comm.* **228**, 252-258

Koplas, P.A., Rosenberg, R.L., and Oxford G.S. (1997) The role of calcium in the desensitization of capsaicin responses in rat dorsal root ganglion neurons. *J. Neuroscience* **17**, 3525-3537.

Desai, S. A. and Rosenberg, R.L. (1997) Pore size of the malaria parasite's nutrient channel. *Proc. Natl. Acad. Sci. USA* **94**, 2045-2049.

Chen, J., Capdevila, J.H., Zeldin, D.C., and Rosenberg, R.L. (1999) Inhibition of cardiac L-type calcium channels by epoxyeicosatrienoic acids. *Mol. Pharml.* **55**, 288-295.

Lyford, L.K. and Rosenberg, R.L. (1999) Cell-free expression and functional reconstitution of homo-oligomeric 7 nicotinic acetylcholine receptors into planar lipid bilayers. *J. Biol. Chem.* **274**, 25675-25681.

Liu, Q.-Y. and Rosenberg, R.L. (2001) Stimulation of reconstituted cardiac L-type calcium channels by extracellular ATP. *Am. J. Physiol. (Cell Physiol.)* **280**, C1107-C1113.

Qu, W., Bradbury, J.A., Tsao, C.-C., Maronpot, R., Harry, J.G., Davis, L.S., Breyer, M.D., Falck, J.R., Chen, J., Rosenberg, R.L. and Zeldin, D.C. (2001) Cloning, characterization, and functional significance of CYP2J9, a new mouse cytochrome P450 arachidonic acid ω-1 hydroxylase abundant in brain. *J. Biol. Chem.* **276**, 25467-25479.

Eddins, D., Lyford, L.K., Desai, S.A., and Rosenberg , R.L. (2002) Permeant but not impermeant divalent cations enhance the activation of non-desensitizing α7 nicotinic receptors *Am. J. Physiol. (Cell Physiol.)* **282**: C796-C804.

Lyford, L.K., Lee J.W., and Rosenberg, R.L. (2002) Low affinity $Ca^{2+}$ and $Ba^{2+}$ binding sites in the pore of α7 nicotinic acetylcholine receptors. *Biochim. Biophys. Acta* **1559**, 69-78.

Eddins, D., Sproul, A.D., Lyford, L.K., McLaughlin, J.T., and Rosenberg, R.L. (2002) Glutamate 172, essential for modulation of $L^{247}T$ α7 ACh receptors by $Ca^{2+}$, lines the extracellular vestibule. *Am. J. Physiol. (Cell Physiol.)* **283**, C1454-C1460.

Lyford, L.K., Sproul A.D., Eddins, D., McLaughlin, J.T., and Rosenberg, R.L. (2003). Agonist-dependent conformational changes in the extracellular domain of α7 nicotinic ACh receptors. *Mol. Pharmacol.* **64**, 650-658.

Olesky, M., Zhao, S., Rosenberg, R.L., and Nicholas, R.A. (2006) Porin-mediated antibiotic resistance in *Neisseria gonorrhoeae*: Ion, solute, and antibiotic permeation through PIB proteins with penB mutations. *J. Bacteriol*. **188**, 2300-2308.

McLaughlin, J.T., Fu, J., Sproul, A.D., and Rosenberg, R.L. (2006) Role of the outer β sheet in divalent cation modulation of α7 nicotinic receptors. *Mol. Pharmacol.* **70**, 16-22.

## C. Research Support

**Ongoing:**

05/04 – 03/09 **NIH** (1 R01 DA017882) "Agonist-driven conformational changes in nicotinic AChRs" (Robert L. Rosenberg, P.I.). The major goals of this project are to: (1) test the hypothesis that agonist binding causes a contraction of the ligand-binding pocket; (2) test the hypothesis that the β9-β10 hairpin structure, connecting the ligand-binding pocket to the transmembrane pore domain, undergoes conformational changes following the binding of agonists; and (3) determine whether lateral movement of the β9-β10 hairpin and/or rotational movements of subunits participate in agonist-driven activation conformational changes.

**Pending:**

None

**Completed in the last 3 years:**

04/98 – 02/04 **NIH** (1 R01 NS37317) "Reconstitution of Neuronal Nicotinic ACh Receptors" (Robert L. Rosenberg, P.I.). The major goals of this project were (1) to characterize the permeation of calcium ions through neuronal nicotinic acetylcholine receptors, (2) determine how intracellular $Ca^{2+}$ regulates the activity of neuronal nicotinic ACh receptors, and (3) evaluate how mutations of the pore-lining amino acids change ion permeation, receptor desensitization, and pharmacological properties.

09/00 – 02/03 **NIH** (1 R01 NS37317-03S1) "Reconstitution of Neuronal Nicotinic ACh Receptors" (Robert L. Rosenberg, P.I.). This award was a supplement to NS 37317 to support the research efforts of an underrepresented minority graduate student (Mr. Donnie Eddins). The goals of this project were the same as the parent grant.