

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 Gouaux, James Eric	POSITION TITLE Senior scientist		
eRA COMMONS USER NAME GOUAUX			
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)</i>			
INSTITUTION AND LOCATION	D E G R E E (i f a p p l i c a b l e)	YEAR(s)	FIELD OF STUDY
Harvard College, Cambridge MA	A B	1984	Chemistry
Harvard University, Cambridge MA	P h D	1989	Physical chemistry
Harvard University, Cambridge MA	P o s t d o c	1989-90	Crystallography
Massachusetts Institute of Technology, Cambridge MA	P o s t d o c	1990-1992	Membrane proteins

A. Personal Statement

Eric Gouaux has extensive experience with the expression, characterization, crystallization and structure determination of soluble and membrane-bound proteins.

B. Position and Honors

1993-1996	Assistant professor, Dept. Biochem. Mol. Biol., Univ. Chicago, Chicago IL
1996-2000	Assistant professor, Dept. Biochem. Mol. Biophys., Columbia Univ., New York NY
2000-2001	Associate professor, Dept. Biochem. Mol. Biophys., Columbia Univ., New York, NY
2000- Present	Investigator, Howard Hughes Medical Institute
2001-2005	Professor, Dept. Biochem. Mol. Biophys., Columbia Univ., New York NY
2005-Present	Senior scientist, Vollum Institute, Oregon Health and Science Univ, Portland OR
1994	Searle Scholar
1995	National Science Foundation Young Investigator
1997	Alfred P. Sloan Research Fellow
1998	Klingenstein Research Fellow
2000	P&S Doctor Harold & Golden Lampport Award for Excellence in Basic Science Research, Columbia University
2003	P&S Dean's Distinguished Award in the Basic Sciences, Columbia University
2008	NINDS Javits Investigator Award
2009	NIHMH MERIT Award
2009	Medical Research Foundation Discovery Award, Oregon Health & Science University
2010	National Academy of Sciences Member
2010	Distinguished Faculty Awards Winner for Outstanding Research

C. Selected Publications (Selected from 84 peer-reviewed publications)

1. Armstrong N, Sun Y, Chen GQ, Gouaux E. Structure of a glutamate-receptor ligand-binding core in complex with kainate. *Nature* 395, 913-17(1998).
 2. Sun Y, Olson R, Horning M, Armstrong N, Mayer M, Gouaux E. Mechanism of glutamate receptor desensitization. *Nature* 417, 245-53 (2002).
 3. Yernool D, Boudker O, Jin Y, Gouaux E. Structure of a glutamate transporter homologue from *Pyrococcus horikoshii*. *Nature* 431, 811-18 (2004).
 4. Yamashita A, Singh SK, Kawate T, Jin Y, Gouaux E. Crystal structure of a bacterial homologue of Na⁺/Cl⁻-dependent neurotransmitter transporters. *Nature* 437, 215-23 (2005).
 5. Furukawa H, Singh SK, Manucusso R, Gouaux E. Subunit arrangement and function in NMDA receptors. *Nature* 438, 185-92 (2005).
 6. Armstrong, N., Jasti, J., Beich-Frandsen, M., Gouaux, E. Measurement of conformational changes accompanying desensitization in an ionotropic glutamate receptor. *Cell* 127, 85-97 (2006).
 7. Boudker, O, Ryan, RM, Yernool, D, Shimamoto, K, Gouaux, E. Coupling substrate and ion binding to extracellular gate of a sodium-dependent aspartate transporter. *Nature* 445, 387-393 (2007).
 8. Jasti, J., Furukawa, H., Gonzales, EB, Gouaux, E. Structure of acid-sensing ion channel 1 at 1.9 Å resolution. *Nature* 449, 316-323 (2007).
 9. Singh, SK, Piscitelli, C L, Yamashita, A, Gouaux, E. A competitive inhibitor traps LeuT in an open-to-out conformation. *Science* 322, 1655-1661 (2008). PMID: PMC2832577.
 10. Gonzales EB, Kawate T, Gouaux E. Pore architecture and ion sites in acid-sensing ion channels and P2X receptors. *Nature* 460, 599-604 (2009). PMID: PMC2845979
 11. Kawate T, Michel JC, Birdsong WT, Gouaux E. Crystal structure of the ATP-gated P2X(4) ion channel in the closed state. *Nature* 460, 592-8 (2009). PMID: PMC2720809
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12. Shaffer PL, Goehring A, Shankaranarayanan A, Gouaux E. Structure and Mechanism of a Na⁺ Independent Amino Acid Transporter. *Science* 325, 1010-1014 (2009). PMID: PMC2851542.
13. Sobolevsky AI, Rosconi MP, Gouaux E. X-ray structure, symmetry and mechanism of an AMPA-subtype glutamate receptor. *Nature* 462, 745-756 (2009). PMID: PMC2861655
14. Piscitelli CL, Krishnamurthy H, Gouaux E. Neurotransmitter/sodium symporter orthologues LeuT has a single high-affinity substrate site. *Nature* 468:1129-32 (2010). PMID: PMC3079577.
15. Hibbs RE, Gouaux E. Principles of activation and permeation in an anion-selective Cys-loop receptor. *Nature* 474:54-60 (2011). PMID: PMC3160419

D. Research Support

Ongoing Research Support

- NIH 2 R37 NS038631-14 Gouaux, James Eric (PI) 03/19/1999-02/28/2013
 3D Structure and Function of Ligand-Gated Ion Channels
 The focus of this work is on determining the atomic structure of ligand-gated ion channels activated glutamate (AMPA receptors) or protons (ASICs) using x-ray diffraction techniques, on developing mechanisms for the activity of these channels, and on testing the mechanisms by a variety of techniques that include electrophysiology and other biochemical and biophysical methods. I am involved in all aspects of these studies, from experimental design to manuscript preparation.
 Role: PI
- NIH 2 R37 MH070039-09 Gouaux, James Eric (PI) 07/01/2004-04/30/2014
 Structure and Function of Neurotransmitter Transporters
 The research supported by this grant is concentrated on determining structures of bacterial homologs of human neurotransmitter transporters by x-ray crystallography and on studying the mechanism of these bacterial proteins using a combination of site-directed mutagenesis, flux assays and other biochemical and biophysical studies, with the aim being to understand the architecture of this important family of proteins and how that architecture relates the function of both prokaryotic and eukaryotic transporters. I am involved in all aspects of these studies, from experimental design to manuscript preparation.
 Role: PI
- NIH 1 U54 GM095315-02 Hendrickson, Wayne A. (PI) 07/01/2010-06/30/2015
 Structural Genomics on Membrane Proteins
 The research supported by these funds is focused on two lines of investigation. The first is the development of methods for screening membrane proteins for their propensity for crystallization. This will involve the optimization and testing of DNA vectors in which the target protein is fused to green fluorescent protein. The second line of investigation relates to the expression, purification, and crystallization of SV2A, a crucial synaptic vesicle protein.
 Role: Co-Investigator
- HHMI (no number) Gouaux, James Eric (PI) 09/01/2010-08/31/2015
 Molecular Studies of Synapses
 The research supported by these funds is focused on developing methods for the expression of complex heteromeric integral membrane proteins, including the development of novel vectors, cellular expression systems and purification tags, and on the crystallization of these heteromeric assemblies. Our group primarily employs x-ray crystallography but is also capable of utilizing electron microscopy and other structural methods. I am involved in all aspects of these studies, from experimental design to manuscript preparation.
 Role: PI

Completed Research Support

AAF 08-0092

Gouaux, James Eric (PI)

07/01/2008-06/30/2011

Structure of the P2X Receptor: Ion Channels Implicated in Asthma and Inflammation

The research supported by this grant will seek to use new technology developed in my laboratory to discover P2X receptors that are suitable for detailed biochemical and structural analysis, to solve high resolution crystal structures by x-ray diffraction, and to use these structures as starting points for development of new therapeutic agents.

Role: PI
