BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors in the order listed on Form Page 2.
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NAME	POSITION TITLE
Paul B. Manis	Professor, Otolaryngology/Head and Neck Surgery Cell and Molecular Physiology
eRA COMMONS USER NAME pmanis	

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
California Institute of Technology, Pasadena, CA	B.S.	1976	Biology
Univ. of Florida College of Med., Gainesville FL	Ph.D.	1981	Neuroscience
Univ. of Florida College of Med., Gainesville FL	Postdoc	1981-1982	Neuroscience
Vanderbilt University, Nashville TN	Postdoc	1982-1985	Neurophysiology

NOTE: The Biographical Sketch may not exceed four pages. Items A and B (together) may not exceed two of the four-page limit. Follow the formats and instructions on the attached sample.

A. Positions and Honors. List in chronological order previous positions, concluding with your present position. List any honors. Include present membership on any Federal Government public advisory committee.

Positions and Employment

1985-1991 Assistant Professor Otolaryngology-Head and Neck Surgery and Neuroscience, Johns Hopkins University, Baltimore, MD.
1989-1991 Assistant Professor Biomedical Engineering, Johns Hopkins University, Baltimore, MD.
1991-1999 Associate Professor Otolaryngology-Head and Neck Surgery, Biomedical Engineering and Neuroscience, Johns Hopkins University, Baltimore, MD.
1999 Professor (Visiting), Division of Otolaryngology/Head and Neck Surgery, Dept. of Surgery, The University of North Carolina at Chapel Hill, Chapel Hill, NC.
1999- Professor, Dept. of Otolaryngology/Head and Neck Surgery, The University of North Carolina at Chapel Hill, Chapel Hill, NC.
2002-2006 Director, Curriculum in Neurobiology, The University of North Carolina at Chapel Hill, Chapel Hill, NC
2002- Professor, Cell and Molecular Physiology (Joint Appt.), The University of North Carolina at Chapel Hill, Chapel Hill, NC.

Other Experience and Professional Memberships

1992,1993,2000,2001 Ad Hoc Reviewer, Hearing Research Study Section (IFCN-6), NIH
1993-1997 Member, Hearing Research Study Section, NIH
1995-1997 Chair, Hearing Research Study Section, NIH
1996-1997 Division of Research Grants Advisory Council, NIH
Chair, SEP1 Study Section, NIH (F31, F32, F33 Fellowship grants)
1997 Ad-hoc reviewer, Communicative Disorders Review Committee, NIDCD.
1998 IFCN Working Group (Center for Scientific Review, NIH).
2002, 2003, 2004 Ad-hoc reviewer, IFCN-4, IFCN6, NIH
2004 Chair, SRB-R Study Section, NIDCD (R03 Review Committee)
2005-present Member, Scientific Review Committee, National Organization for Hearing Research Foundation
1981-present Member, Sigma Xi
2006-present Associate Editor, Journal of the Association for Research in Otolaryngology (JARO)

Honors:

Research Career Development Award, NIDCD, (1990-1995)

B. Selected peer-reviewed publications (in chronological order). Do not include publications submitted or in preparation.

Myerson, J.M., Manis, P.B., Miezin, F.M., and Allman, J.M., Magnification in striate cortex and retinal ganglion cell layer of owl monkey: A Quantitative Comparison. Science, 198: 855-857, 1977.

Brownell, W.E., Manis, P.B., and Ritz, L.A., Ipsilateral inhibitory responses in the cat lateral superior olive. Brain Research, 177: 189-193, 1979.

Manis, P.B., and Brownell, W.E., Synaptic organization of eighth nerve afferents to the cat dorsal cochlear nucleus. Journal of Neurophysiology 50: 1156-1181, 1983.

Brownell, W.E., Manis, P.B., Zidanic, M., and Spirou, G.A., Acoustically evoked radial current densities in scala tympani. Journal of the Acoustical Society of America 74: 792-800, 1983.

Freeman, J.A., Manis, P.B., Snipes, G.J., Mayes, B.N., Samson, P.C., Wikswo, J.P., and Freeman, D.B., Steady growth cone currents revealed by a novel circularly vibrating probe: A possible mechanism underlying neurite growth. Journal of Neuroscience Research 13: 257-283, 1985.

Manis, P.B., and Freeman, J.A., Fluorescence recordings of neural activity in goldfish optic tectum slices in vitro. Journal of Neuroscience, 8: 383-394, 1988.

Manis, P.B. Responses to parallel fiber stimulation in the guinea pig dorsal cochlear nucleus in vitro. Journal of Neurophysiology 61: 149-161, 1989.

Manis, P.B., and Bertrand, D. A fast, high precision and inexpensive analog to digital board for PC-AT or compatible. Journal of Neuroscience Methods 30: 41-54, 1989.

Manis, P.B. Membrane properties and discharge characteristics of guinea pig dorsal cochlear nucleus neurons studied in vitro. Journal of Neuroscience 10: 2338-2351, 1990.

Manis, P.B., and Marx, S.O. Outward currents in isolated ventral cochlear nucleus neurons. Journal of Neuroscience 11: 2865-2880, 1991.

White, J.A., Manis, P.B., and Young, E.D. The parameter identification problem for the somatic shunt model. Biological Cybernetics 66: 307-318, 1992.

Rothman, J.S., Young, E.D., and Manis, P.B. Convergence of auditory nerve fibers onto bushy cells in the ventral cochlear nucleus: Implications of a computational model. Journal of Neurophysiology 70: 2562-2583, 1993.

White, J.A., Young, E.D., and Manis, P.B. The electronic structure of regular-spiking neurons in the ventral cochlear nucleus may determine their response properties. Journal of Neurophysiology 71: 1774-1786, 1994.

Manis, P.B., Spirou, G.A., Wright, D.D., Paydar, S., and Ryugo, D.K. Physiology and morphology of complex spiking neurons in the guinea pig dorsal cochlear nucleus. Journal of Comparative Neurology 348: 261-276, 1994.

Harty, T.P. and Manis, P.B. Glycine evoked currents in isolated ventral cochlear nucleus neurons. Journal of Neurophysiology 75: 2300-2311, 1996.

Manis, P.B. and Molitor, S.C. N-methyl-D-aspartate receptors at parallel fiber synapses in the dorsal cochlear nucleus. Journal of Neurophysiology 76:1639-1656, 1996.

Molitor, S.C. and Manis, P.B. Evidence for functional metabotropic glutamate receptors in the dorsal cochlear nucleus. Journal of Neurophysiology 77: 1889-1905, 1997.

Yueh, B., Manis, P.B. and Niparko, J.K. Implantation of the lateral cochlear wall for auditory nerve stimulation. Laryngoscope 107: 1037-1042,1997.

Fitzakerley, J.L., Schaefer, K.L., Kitko, R.A., and Manis, P.B. Properties of cochlear nucleus neurons in primary culture. Hearing Research 114: 148-168, 1997.

Harty, T.P. and Manis P.B. Kinetic analysis of glycine receptor currents in ventral cochlear nucleus. Journal of Neurophysiology 79: 1891-1901, 1998

Aizenman, C.D., Manis, P.B., and Linden, D.J. Polarity of long-term synaptic plasticity is determined by postsynaptic spike firing at a cerebellar inhibitory synapse. Neuron 21: 827-835 1998.

Molitor, S.C., and Manis, P.B., Voltage-gated Ca^{2+} conductances in acutely isolated guinea pig dorsal cochlear nucleus neurons. Journal of Neurophysiology 81: 985-998, 1999.

Kanold, P.O., and Manis, P.B. Transient potassium currents regulate the discharge patterns of dorsal cochlear nucleus pyramidal cells. Journal of Neuroscience 19: 2195-2208, 1999.

Cunningham, A.M., Manis, P.B., Reed, R.R., and Ronnett, G.V. Olfactory receptor neurons exist as distinct subclasses of immature and mature cells in primary culture. Neuroscience 93: 1301-1312, 1999.
Francis, H.W. and Manis, P.B. Effects of deafferentation on the electrophysiology of ventral cochlear nucleus neurons. Hearing Research 149: 91-105, 2000.
Kanold, P.O. and Manis, P.B. A physiologically based model of discharge pattern regulation by transient K^+ currents in cochlear nucleus pyramidal cells. Journal of Neurophysiology 85: 523–538, 2001.
Francis, H.W., Scott, J.C. and Manis, P.B. Protein kinase C mediates potentiation of synaptic transmission by phorbol ester at parallel fibers in the dorsal cochlear nucleus. Brain Research 951: 9-22, 2002
Molitor, S.C. and Manis, P.B. Dendritic Ca^{2+} transients evoked by action potentials in rat dorsal cochlear nucleus pyramidal and cartwheel neurons. Journal of Neurophysiology 89: 2225-2237, 2003.
Rothman, J.S. and Manis, P.B. Differential expression of three distinct potassium conductances in the ventral cochlear nucleus. Journal of Neurophysiology 89: 3070-3082, 2003.
Rothman, J.S. and Manis, P.B. Kinetic analyses of three distinct potassium conductances in ventral cochlear nucleus neurons. Journal of Neurophysiology 89: 3083-3096, 2003.
Rothman, J.S. and Manis, P.B. The roles potassium channels play in the electrical activity of ventral cochlear nucleus neurons: a theoretical investigation. Journal of Neurophysiology 89: 3097-3113, 2003.
Manis, P.B., Molitor, S.C., Wu, H. Subthreshold oscillations generated by TTX-sensitive sodium currents in dorsal cochlear nucleus pyramidal cells. Experimental Brain Research 153: 443-451, 2003.
Kanold, P.O, and Manis, P.B. Encoding the timing of inhibitory inputs. Journal of Neurophysiology 93: 2887-97, 2005.
Wang, Y. and Manis, P.B. Synaptic transmission at the cochlear nucleus endbulb synapse during age-related hearing loss in mice. Journal of Neurophysiology, 94: 1814-1824, 2005.
Spirou, G.A., Rager, J. and Manis, P.B. Convergence of auditory nerve fibers onto globular bushy cells. Neuroscience 136: 843-863, 2005.
Bortone, D.S., Mitchell, K., and Manis, P.B. Developmental time course of potassium channel expression in the rat cochlear nucleus. Hearing Research 211: 114-125, 2006.
Wang, Y. and Manis, P.B. Temporal coding by cochlear nucleus bushy cells in DBA/2J mice with early onset hearing loss. JARO 7: 412-424, 2006.
Street, S.E. and Manis, P.B. Action potential timing precision in dorsal cochlear nucleus pyramidal cells, Journal of Neurophysiology 97:4162-4172, 2007.
Spirou, G.A., Chirila, F.V., VonGersdorff, H., and Manis, P.B. Heterogeneous Ca^{2+} influx along the adult calyx of Held: A structural and computational study. Neuroscience 154:171-185, 2008.
Basura, G.J., Abbas, A., O'Donohue, H., Lauder, J.M., Roth, B.L., Walker, P.D., and Manis, P.B. Ontogeny of Serotonin and Serotonin2A Receptors in Rat Auditory Cortex Hearing Research, 2008.
Wang. Y. and Manis. P.B. Short-term synaptic depression and recovery at the mammalian endbulb of Held synapse in mice. J. Neurophysiol., Jul. 16, 2008 (DOI:10.1152/jn.90715.2008)

C. Research Support. List selected ongoing or completed (during the last three years) research projects (federal and non-federal support). Begin with the projects that are most relevant to the research proposed in this application. Briefly indicate the overall goals of the projects and your role (e.g. PI, Co-Investigator, Consultant) in the research project. Do not list award amounts or percent effort in projects.

Ongoing Research Support

2 R01 DC00425-20 Manis, P. (PI) 4/88-11/11
NIH/NIDCD
Physiology of Dorsal Cochlear Nucleus Molecular Layer
The major goals of this project are to study the voltage-dependence of pyramidal discharge patterns of dorsal cochlear nucleus pyramidal cells and the underlying potassium conductances, to investigate the hypothesis that subthreshold oscillations in the membrane during slow depolarization play a role in regulating the first spike latency and first interspike interval, and to determine the mechanisms of these oscillations. Additional aims examine the roles that different conductances operating in the subthreshold range play in the dynamic integration of synaptic inputs, and continue development of single-cell models of pyramidal cells, based on experimental results.
Role: Principal Investigator

2 R01 DC04551-05 Manis, P. (PI) 9/00-3/09
NIH/NIDCD
Cellular Mechanisms of Auditory Information Processing
The major goals of this project are: 1) to study interactions between synaptic integration and ion channels in ventral cochlear nucleus, 2) to study the organization and dynamics of inhibitory connections in the VCN, and 3) to study changes in synaptic function in the VCN in mice with hearing loss.
Role: Principal Investigator

2 R01 DC004825-06 Shore, S. (PI, Univ. of Michigan) 4/01-11/11
NIH/NIDCD
Function of trigeminal pathways to the cochlear nucleus
The long term goal of this research program is to elucidate both the normal role of non-auditory inputs to the cochlear nucleus (CN), and how alterations of these inputs after deafness may lead to a re-organization of bimodal interactions that result in the perception of phantom sounds or tinnitus. A significant finding from this funding period is that stimulating trigeminal neurons can dramatically suppress acoustically driven responses in dorsal CN (DCN) units. This suggests that somatosensory- auditory integration may be involved in the suppression of internally-generated sounds such as self vocalization or respiration. Investigating the mechanisms underlying this bimodal integration will allow us to appreciate the role of the DCN in improving the detection of external, novel stimuli.
Role: Consultant