

CURRICULUM VITA

Nancy J. Woolf, Ph.D.

PERSONAL INFORMATION:

Married with two children: Lawson, age 19; Ashley, age 18

CONTACT INFORMATION:

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University of California
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EDUCATION:

1978--B.S. in Psychobiology, University of California, Los Angeles, CA
1983--Ph.D. in Neuroscience, University of California School of Medicine, Los Angeles, CA
2002 (Sept. 16 – Dec. 13)--Mathematics in Nanoscale Science and Engineering Program at the
Institute of Pure and Applied Mathematics, UCLA

POSITIONS HELD:

1979-1983: Graduate Assistant in Research, University of California, Los Angeles, CA
1980-1982--ARCS Scholar
1983--Mental Health Training Program Trainee
1984-1992: Assistant Research Neuroscientist, University of California, Los Angeles, CA
1992-1994: Associate Research Neuroscientist, University of California, Los Angeles, CA
1992-2003: Adjunct Associate Professor, University of California, Los Angeles, CA
2003-present: Adjunct Professor, University of California, Los Angeles, CA

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS:

American Association for the Advancement of Science
American Association of University Professors
Association of Academic Women
Association for the Scientific Study of Consciousness
Association for Women in Science
New York Academy of Sciences
Sigma Kappa Foundation; Philanthropy Committee
Society for Neuroscience

AWARDS AND HONORS:

1976--Woman of Distinction, College of the Desert, Palm Desert, California

1983--Graduate Women of the Year, Association of Academic Women, University of California, Los Angeles

1990--Colby Prize, Sigma Kappa Foundation, Awarded for achievements in scientific research in Alzheimer's disease

2002—Academic Advancement Program Faculty Recognition Award

ISI Science Citation rate: 3,501 total number of times all articles cited as tabulated on 10/20/2006.

REVIEWER SERVICES:

Editorial Board: Science and Consciousness Review

Manuscript Reviewer: Behavioral and Brain Sciences; Brain Research; Brain Research Bulletin; Developmental Brain Research; European Journal of Neuroscience; Experimental Brain Research; Experimental Neurology; Journal of Chemical Neuroanatomy; Journal of Comparative Neurology; Journal of Neuroscience; Molecular Therapy; Neurobiology of Aging; Neurobiology of Learning and Memory; Neuropsychopharmacology; Neuroscience; Neuroscience Letters; Pharmacology, Biochemistry and Behavior

Reviewer for textbook publishers: Pearson; Thomson; Oxford Press; Allyn & Bacon

External Reviewer of Grants: National Science Foundation; NIH/ADAMHA Consultant File; Alzheimer's Association

RESEARCH PROJECTS (most recent):

Cytoskeletal Transport and Learning

- *Background:* Microtubules transport proteins and mRNA to synapses in neurons providing a mechanism with which to alter synaptic function and actions.
- We recently found kinesin-mediated transport of NMDA receptor subunits is increased with learning.
- Future projects will evaluate the time course, distribution and other features of these changes.

Neural Plasticity in the Adult Cerebral Cortex and Its Relation to Disease

- *Background:* The genetic expression of microtubule-associated protein-2 (MAP2) is down regulated in aging and in Alzheimer's disease (AD).
- My laboratory was first to show MAP2 plays a role in learning, and several laboratories have confirmed this.
- Future studies will investigate mechanisms of MAP2 mRNA transport in dendrites and how this might play a role in the neurodegenerative process in AD.

Neuropharmacology of the Cytoskeletal Response

- The signal transduction cascades initiated by neurotransmitters (such as glutamate and acetylcholine) affect the cytoskeleton and regulate transport to synapses.
- Future studies include applying receptor agonists and antagonists to cells grown in culture and measuring effects on microtubule function.

Biophysical Modeling of Microtubule Actions

- I participate in an on-going collaborative effort with an international group of biophysicists working on this topic.

TEACHING EXPERIENCE:

1982-1989: Guest Lecturer in Chemical Neuroanatomy for Neuroscience 206, Neuroanatomy, Department of Anatomy, School of Medicine, University of California, Los Angeles

1983-present: Psychology 119 (formerly Psychology 118), Behavioral Pharmacology, Department of Psychology, University of California, Los Angeles

1983-present: Psychology 15, Introductory Physiological Psychology, Department of Psychology, University of California, Los Angeles

1988: Graduate Current Topics in Psychology, Cognitive Models and Their Relevance to Brain Function, University of California, Los Angeles

1989-1990: Guest Lecturer to Psychiatric residents on Chemical Neuroanatomy: Implications for Cognition, Department of Neurology, University of California, Los Angeles

1989-present: Psychology 115, Physiological Psychology, Department of Psychology, University of California, Los Angeles

1993: Psychology 197, Undergraduate Current Topics in Psychology, Neurotransmitter Systems and Learning in the Mammalian Brain, University of California, Los Angeles

1993: Graduate Current Topics in Psychology, Neurotransmitter Systems and Learning in the Mammalian Brain, University of California, Los Angeles

1994-present: Psychology 10, Introductory Psychology, University of California, Los Angeles

2001-present: Psychology 119P, Neuropharmacology: Mapping the Molecules of Mind, University of California, Los Angeles (**responsible for developing the course**).

2005-present: Gerontology 120: Sex and Aging, University of California, Los Angeles (**responsible for developing the course**).

INVITED SYMPOSIA AND OTHER PRESENTATIONS (selected):

- "The fundamental organization of cholinergic basal forebrain projections" presented at the Regional Meeting of the International Union of Physiological Sciences on July 2, 1991 in Prague, Czechoslovakia.
- "Hierarchical and network systems: a neurotransmitter approach" presented in 1991 at the Ray Rothman Cognitive Science Program Seminar, at UCLA, Los Angeles, CA.
- "Neural correlates of Pavlovian conditioning" presented in 1992 at Grand Rounds in the Department of Neurology, UCLA, Los Angeles, CA.
- "Cholinergic neurons as global systems" presented in 1992 at the Behavioral Neuroscience Seminar, in the Department of Psychology, UCLA, Los Angeles, CA.
- "Changes in cholinceptive neurons following Pavlovian conditioning" presented in 1993 at the Learning and Behavior Seminar, in the Department of Psychology, UCLA, Los Angeles, CA.
- "The neurochemical correlates of learning" presented at the French Foundation for Alzheimer's Disease Research Conference, on October 15, 1993 in Redondo Beach, CA.
- "Cholinergic neurons and Pavlovian conditioning" presented for the Alzheimer's Disease Center External Advisory Board Meeting on March 18, 1994 at the U.C.L.A. Faculty Center, Los Angeles, CA.
- "Cholinoceptive cortical cells: targets for Alzheimer's disease degeneration" presented at the National Council on the Aging 44th Annual Conference, on April 28, 1994 in Washington, D.C.
- "Increased MAP-2 immunohistochemistry following Pavlovian conditioning in auditory cortex is correlated with increased MAP-2 kinase and protein kinase C immunohistochemistry by levels of MAP-2 mRNA are unchanged" presentation November 15, 1994 at the 20th Annual Meeting of the Society for Neuroscience in Miami, FL.
- "A quantum approach to visual consciousness" presented at the University of Arizona, Tucson, August 30, 2000.
- "Dendritic correlates of memory" presented to the Psychology Department at University of Arizona, Tucson, September 1, 2000.
- "Quantum memory" presented at Tucson 2002, April 7, 2002.
- "The horizontal cortical syncytium" presented at Tucson 2002, April 12, 2002.

“Quantum computing and neural networks” presented at the Conference on Alternative Computing at the Institute of Pure and Applied Mathematics, UCLA, October 3, 2002.

“Is the brain a quantum computer?” presented at the Dept. of Physics, University of Alberta, Edmonton, Canada, October 21, 2002.

“Neuroplasticity and memory: the crossroads of anatomy and function” Medical College of Georgia Pharmacology and Toxicology Seminar, December 12, 2003

“Microtubules in PC12 cells” Quantum Mind 2 Conference, 2003 (**also served as an organizer of the conference.**)

“Microtubules in consciousness and cognition: could transport of mRNA and receptors be involved?” Tucson 2004, April 7, 2004

“Acetylcholine, cognition, and consciousness” XII International Symposium on Cholinergic Mechanisms Alicante Spain, October 3, 2005 (**also served on the International Advisor Board for the conference.**)

“The subcellular machinery of consciousness” Tucson 2006, April 4, 2006.

“Neuro-Nanotechnology to Cure Criminality and Mental Illness” 2nd Annual Workshop on Geothetical Nanotechnology, July 20, 2006.

PUBLICATIONS (selected):

1981

1. Woolf, N.J. and Butcher, L.L. Cholinergic neurons in the caudate-putamen complex proper are intrinsically-organized: a combined Evans Blue and acetylcholinesterase analysis. **Brain Research Bulletin**, 1981, **7**, 487-507.

1982

2. Bigl, V., Woolf, N.J., and Butcher, L.L. Cholinergic projections from the basal forebrain to frontal, parietal, temporal, occipital, and cingulate cortices: a combined fluorescent tracer and acetylcholinesterase analysis. **Brain Research Bulletin**, 1982, **8**, 727-749.
3. Butcher, L.L. and Woolf, N.J. Cholinergic and serotonergic systems in the brain and spinal cord: anatomic organization, role in intercellular communication processes, and interactive mechanisms. **Progress in Brain Research**, 1982, **55**, 3-40.
4. Butcher, L.L. and Woolf, N.J. Monoaminergic-cholinergic relationships and the chemical communication matrix of the neostriatum and substantia nigra. **Brain Research Bulletin**, 1982, **9**, 475-492.

5. Woolf, N.J. and Butcher, L.L. Cholinergic projections to the basolateral amygdala: a combined Evans Blue and acetylcholinesterase analysis. **Brain Research Bulletin**, 1982, **8**, 751-763.

1983

6. Woolf, N.J., Eckenstein, F. and Butcher, L.L. Cholinergic projections from the basal forebrain to the frontal cortex: A combined fluorescent tracer and immunohistochemical analysis. **Neuroscience Letters**, 1983, **40**, 93-98.

1984

7. Butcher, L.L. and Woolf, N.J. Histochemical distribution of acetylcholinesterase in the central nervous system: Clues to the localization of cholinergic neurons. In: **Handbook of Chemical Neuroanatomy, Volume 3: Classical Transmitters and Transmitter Receptors in the CNS, Part II**. (Eds.: A. Björklund, T. Hökfelt, and M.J. Kuhar). Amsterdam: Elsevier Biomedical Press, 1984, pp. 1-50.
8. Woolf, N.J. Eckenstein, F., and Butcher, L.L. Cholinergic systems in the rat brain: I. Projections to the limbic telencephalon. **Brain Research Bulletin**, 1984, **13**, 751-784.

1985

9. Woolf, N.J. and Butcher, L.L. Cholinergic systems in the rat brain: II. Projections to the interpeduncular nucleus. **Brain Research Bulletin**, 1985, **14**, 63-83.

1986

10. Butcher, L.L. and Woolf, N.J. Central cholinergic systems: synopsis of anatomy and overview of physiology and pathology. In: **The Biological Substrates of Alzheimer's Disease** (Eds.: A.B. Scheibel and A.F. Wechsler) New York: Academic Press, 1986, pp. 73-86.
11. Butcher, L.L. and Woolf, N.J. Cholinergic systems in the brain and spinal cord: anatomic organization and overview of functions. In: **Alzheimer's and Parkinson's Disease: Strategies for Research and Development** (Eds.: A. Fisher, I. Hanin and C. Lachman) New York: Plenum Press, 1986, pp. 5-16.
12. Butcher, L.L. and Woolf, N.J. Cholinergic systems in the central nervous system: retrospection, anatomic distribution, and functions. In: **Dynamics of Cholinergic Function** (Ed.: I. Hanin). New York: Plenum Press, 1986, pp. 1-10.
13. Woolf, N.J. and Butcher, L.L. Cholinergic systems in the rat brain: III. Projections from the pontomesencephalic tegmentum to the thalamus, tectum, basal ganglia, and basal forebrain. **Brain Research Bulletin**, 1986, **16**, 603-637.

14. Woolf, N.J., Hernit, M.C., and Butcher, L.L. Cholinergic and non-cholinergic projections from the rat basal forebrain revealed by combined choline acetyltransferase and Phaseolus vulgaris immunohistochemistry. **Neuroscience Letters**, 1986, **66**, 281-286.

1987

15. Butcher, L.L. and Woolf, N.J. Cholinergic neuronal regeneration can be modified by growth factor. In: **Cellular and Molecular Basis of Cholinergic Function** (Eds.: M.J. Dowdall and J.N. Hawthorne) Chichester, U.K.: Ellis Horwood, 1987, pp. 395-402.

1988

16. Harrison, J.B., Buchwald, J.S., Kaga, K., Woolf, N.J., and Butcher, L.L. Cat "P300" disappears after septal lesions. **EEG and Clinical Neurophysiology**, 1988, **69**, 55-64.
17. Talbot, K., Woolf, N.J., and Butcher, L.L. The feline islands of Calleja complex I. Cytoarchitectural organization and comparative anatomy. **Journal of Comparative Neurology**, 1988, **275**, 553-579.
18. Talbot, K., Woolf, N.J., and Butcher, L.L. The feline islands of Calleja complex II. Cholinergic and cholinesterasic features. **Journal of Comparative Neurology**, 1988, **275**, 580-560.

1989

19. Butcher, L.L. and Woolf, N.J. Dysdifferentiation initiates and growth processes exacerbate the pathologic cascade in Alzheimer's disease. **Neurobiology of Aging**, 1989, **10**, 557-570.
20. Butcher, L.L. and Woolf, N.J. Authors' response to commentaries. **Neurobiology of Aging**, 1989, **10**, 588-590.
21. Gould, E., Woolf, N.J., and Butcher, L.L. Cholinergic projections to the substantia nigra from the pedunculo-pontine and laterodorsal tegmental nuclei. **Neuroscience**, 1989, **28**: 611-623.
22. Woolf, N.J. and Butcher, L.L. Cholinergic systems in the rat brain IV. Descending projections from the pontomesencephalon. **Brain Research Bulletin**, 1989, **23**, 519-540.
23. Woolf, N.J., Gould, E., and Butcher, L.L. Nerve growth factor receptor is associated with cholinergic neurons of the basal forebrain but not the pontomesencephalon. **Neuroscience**, 1989, **30**, 143-152.
24. Woolf, N.J., Jacobs, R.W., and Butcher, L.L. The pontomesencephalotegmental cholinergic system does not degenerate in Alzheimer's disease. **Neuroscience Letters**, 1989, **96**, 277-282.

1990

25. Harrison, J., Woolf, N.J., and Buchwald, J. Cholinergic neurons of the pontomesencephalon: I. Role in the generation of the cat "P1". **Brain Research**, 1990, **520**, 43-54.
26. Woolf, N.J. and Butcher, L.L. Dysdifferentiation of structurally plastic neurons initiates the pathologic cascade of Alzheimer's disease: toward a unifying hypothesis. In: **Cholinergic Systems** (Eds.: M. Steriade and D. Biesold). New York: Oxford University Press, 1990, pp. 387-438).
27. Woolf, N.J., Harrison, J., and Buchwald, J. Cholinergic neurons of the pontomesencephalon: II. Ascending anatomical connections. **Brain Research**, 1990, **520**, 55-72.

1991

28. Gould, E., Woolf, N.J., and Butcher, L.L. The postnatal development of cholinergic systems in the rat I. Forebrain. **Brain Research Bulletin**, 1991, **27**, 767-789.
29. Oh, J.D., Butcher, L.L., and Woolf N.J. Thyroid hormone modulates the development of cholinergic terminal fields in the rat forebrain. **Developmental Brain Research**, 1991, **59**, 133-142.
30. Woolf, N.J. Cholinergic systems in mammalian brain and spinal cord. **Progress in Neurobiology**, 1991, **37**, 475-524.
31. Woolf, N.J. and Butcher, L.L. The cholinergic basal forebrain as a cognitive machine. In: **Functions of the Basal Forebrain Cholinergic System** (Ed.: R.T. Richardson), 1991, pp. 347-380.

1992

32. Butcher, L.L., Oh, J.D., Woolf, N.J., Edwards, R.H., and Roghani, A. Organization of central cholinergic neurons revealed by *in situ* hybridization histochemistry and choline-o-acetyltransferase immunocytochemistry. **Neurochemistry International**, 1992, **21**, 429-445.
33. Kaga, K., Harrison, J., Butcher, L.L., Woolf, N.J., and Buchwald, J. Cat "P300" and cholinergic septo-hippocampal neurons: Depth recordings, lesions, and choline acetyltransferase immunohistochemistry. **Neuroscience Research**, 1992, **13**, 53-71.
34. Oh, J.D., Woolf, N.J., Roghani, A., Edwards, R.H., and Butcher, L.L. Cholinergic neurons in the rat central nervous system demonstrated by *in situ* hybridization of choline acetyltransferase mRNA, **Neuroscience**, 1992, **47**, 807-822.

1993

35. Butcher, L.L., Oh, J.D., Woolf, N.J. Cholinergic neurons identified by *in situ* hybridization histochemistry. **Progress in Brain Research**, 1993, **98**, 1-8.
36. Farris, T.W., Woolf, N.J., Oh, J.D., and Butcher, L.L. Reestablishment of laminar patterns of cortical acetylcholinesterase activity following axotomy of the medial cholinergic pathway in the adult rat. **Experimental Neurology**, 1993, **121**, 77-92.
37. Woolf, N.J. Cholinoceptive cells in rat cerebral cortex: somatodendritic immunoreactivity for muscarinic receptor and cytoskeletal proteins. **Journal of Chemical Neuroanatomy**, 1993, **6**, 375-390.

1994

38. Woolf, N.J., Young, S.L., Johnson, G.V.W. & Fanselow, M.S. Pavlovian fear conditioning alters microtubule-associated protein-2. **NeuroReport**, 1994, **5**, 1045-1048.

1995

39. Farris, T.W., Oh, J.D., Butcher, L.L. and Woolf, N.J. Trophic-factor modulation of cortical acetylcholinesterase reappearance following transection of the medial cholinergic pathway in adult rat. **Experimental Neurology**, 1995, **131**, 180-192.

1996

40. Oh, J.D., Edwards, R.H. and Woolf, N.J. Choline acetyltransferase mRNA plasticity with Pavlovian conditioning to tone. **Experimental Neurology**, 1996, **140**, 95-99.
41. Woolf, N.J. Book Review: Journey to the Centers of the Mind: Toward a Science of Consciousness, by Susan A. Greenfield. **Neuroscience**, 1996, **72**, 1156.
42. Woolf, N.J. Global and serial neurons form a hierarchically-arranged interface proposed to underlie learning and cognition. **Neuroscience**, 1996, **74**, 625-651.
43. Woolf, N.J. The critical role of cholinergic basal forebrain neurons in morphological change and memory encoding: a hypothesis. **Neurobiology of Learning and Memory**, 1996, **66**, 258-266.

1997

44. Woolf, N.J. and Oh, J.D. Thyroid hormone effects on the postnatal development of microtubule-associated protein-2 (MAP-2): comparisons with MAP-1 and MAP-5. In: **Advances in Neuroendocrinology - Thyroid Hormone and Brain Maturation**. (Ed. C.E. Henrich), 1997, pp. 31-38.

45. Woolf, N.J. A possible role for cholinergic neurons of the basal forebrain and pontomesencephalon in consciousness. **Consciousness and Cognition**, 1997, **6**, 574-596.

1998

46. Woolf, N.J. A structural basis for memory storage in mammals. **Progress in Neurobiology**, 1998, **55**, 59-77.

1999

47. Woolf, N.J., Zinnerman, M.D. and Johnson G.V.W. Hippocampal microtubule-associated protein-2 alterations with contextual memory. **Brain Research**, 1999, **821**: 241-249.
48. Woolf, N.J. Cholinergic correlates of consciousness: from mind to molecules. **Trends in Neurosciences**, 1999, **22**: 540-541.
49. Woolf, N.J. Dendritic encoding: An alternative to temporal synaptic coding of conscious experience. **Consciousness and Cognition**, 1999, **8**: 574-596.

2000

50. Woolf, N.J. Review: An Anatomy of Thought: The Origin and Machinery of Mind, by Ian Glynn. **American Scientist**, Sept.-Oct., 2000, p. 459.

2001

51. Woolf, N.J., Milov, A., Schweitzer, E.S. and Roghani, A. Elevation of nerve growth factor and antisense knockdown of TrkA receptor during contextual memory consolidation. **Journal of Neuroscience**, 2001, **21**:1047-1055.
52. Woolf, N.J. and Hameroff, S. A quantum approach to visual consciousness. **Trends in Cognitive Sciences**, 2001, **5**, 472-478.

2002

53. Woolf, N.J. Cholinergic anatomy and consciousness: potential for a novel type of signal transduction. In: **The Neurochemistry of Consciousness: Neurotransmitter in Mind**. (Eds. E. Perry, H. Ashton & A. Young), 2002, pp. 25-40.

2003

54. Hameroff, S.R. and Woolf, N.J. Quantum consciousness: a cortical neural circuit. In **Neural Basis of Consciousness** (Ed. N. Osaka), 2003, 167-200.

2004

55. Butcher, L.L., Woolf, N.J. Cholinergic neurons and networks revisited. In: **The Rat Central Nervous System**. (Ed. G.W. Paxinos), 2004, 1257-1268.
56. Woolf, N.J. Review of Consciousness: Creeping up on the hard problem, by Jeffrey Gray, **Science and Consciousness Review**, 2004, January 24 [<http://www.sci-con.org/reviews/20050102.html>].

2005

57. Priel, A. Tuszynski, J.A., Woolf, N.J. Transitions in microtubule C-termini conformations as a possible dendritic signaling phenomenon, **Eur. Biophys. J.**, 2005, 35:40-52.
58. Woolf, N.J. The molecular basis of nicotine addiction: Are we one step closer to the substrate of consciousness? **Science and Consciousness Review**, 2005, December 14 [http://www.sci-con.org/tiki-read_article.php?articleId=169].

2006

59. Woolf, N.J. Acetylcholine, cognition, and consciousness. **J. Mol. Neurosci.**, 2006.
60. Woolf, N.J. Microtubules in the cerebral cortex: role in memory and consciousness. In Tuszynski, J.A. (ed.) **The Emerging Physics of Consciousness**, 2006, Springer Verlag.
61. Tuszynski, J.A. and Woolf, N.J. The path ahead. In Tuszynski, J.A. (ed.) **The Emerging Physics of Consciousness**, 2006, Springer Verlag.
62. Instructor's Manual for Pinel's Basics in Biopsychology, 2006

ABSTRACTS:

1979

1. Woolf, N.J. and Butcher, L.L. Acetylcholinesterase neurons in the rat caudate-putamen complex: Characterization of somata types and statistical relationships to one another and to the total population of striatal cell bodies. **Society for Neuroscience Abstracts**, 1979, **5**, 82.

1980

2. Woolf, N.J., Fass, B., and Butcher, L.L. Do striato-nigral efferents contain acetylcholinesterase (AChE, EC 3.1.1.7)? **Society for Neuroscience Abstracts**, 1980, **6**, 350.

1981

3. Woolf, N.J. and Butcher, L.L. Acetylcholinesterase-containing projection from the basal forebrain to the substantia nigra in the rat. **Society for Neuroscience Abstracts**, 1981, **7**, 850.

1982

4. Garcia, C., Woolf, N.J., and Butcher, L.L. Sex-dependent alterations in central nervous system (CNS) choline-O-acetylcholinesterase (ChAT, EC 2.3.1.6) during aging. **Society for Neuroscience Abstracts**, 1982, **8**, 441.
5. Woolf, N.J., McGurk, S.R., and Butcher, L.L. Comparison between neurons demonstrating somatostatin-like immunoreactivity and those containing acetylcholinesterase in the rat forebrain. **Society for Neuroscience Abstracts**, 1982, **8**, 112.

1983

6. Woolf, N.J., Eckenstein, F., and Butcher, L.L. Cholinergic projections revealed by choline acetylcholinesterase immunohistochemistry and fluorescent tracer histology performed on the same tissue section. **Society for Neuroscience Abstracts**, 1983, **9**, 967.

1984

7. Butcher, L.L., Woolf, N.J., and Eckenstein, F. Cholinergic pathways II: Basal forebrain and pontine tegmentum innervate the interpeduncular nucleus in the rat. **Society for Neuroscience Abstracts**, 1984, **10**, 1182.
8. McGurk, S.R., Woolf, N.J. Eckenstein, F., and Butcher, L.L. Cholinergic pathways III: Projections from the cholinergic pontine tegmentum to the thalamus, tectum, basal forebrain, and basal ganglia of the rat. **Society for Neuroscience Abstracts**, 1984, **10**, 1182.
9. Woolf, N.J., Eckenstein, F., and Butcher, L.L. Cholinergic pathways I: Projections from the basal forebrain to the limbic telencephalon in the rat. **Society for Neuroscience Abstracts**, 1984, **10**, 1182.

1985

10. Butcher, L.L., Gould, E., and Woolf, N.J. Morphologic characteristics of central cholinergic neurons in the rat. **Society for Neuroscience Abstracts**, 1985, **11**, 1238.
11. Gould, E., Woolf, N.J., and Butcher, L.L. Choline acetyltransferase neurons and their acetylcholinesterase staining patterns. **Society for Neuroscience Abstracts**, 1985, **11**, 371.

12. Harrison, J., Buchwald, J., Woolf, N.J., and Butcher, L.L. Cat model of aging: Effects of septal lesion on P300 and hippocampal acetylcholinesterase. **Age**, 1985, **2**, 235.
13. Harrison, J., Buchwald, J., Kaga, K., Woolf, N., and Butcher, L. Cat "P300": Effects of septal lesions. **Society for Neuroscience Abstracts**, 1985, **11**, 1234.
14. Talbot, K., Woolf, N.J., and Butcher, L.L. Basic organization and cholinergic features of the feline islands of Calleja complex. **Society for Neuroscience Abstracts**, 1985, **11**, 1223.
15. Woolf, N.J., Hernit, M.C., and Butcher, L.L. Projections from the basal forebrain to the cortex demonstrated by anterograde transport of phaseolus vulgaris leucoagglutinin (PHA-L). **Society for Neuroscience Abstracts**, 1985, **11**, 677.

1986

16. Butcher, L.L., Gould, E., and Woolf, N.J. Anterograde and retrograde evidence for a cholinergic projection to the substantia nigra in the rat. **Society for Neuroscience Abstracts**, 1986, **12**, 904.
17. Gould, E., Woolf, N.J., Williams J.L., Bruce, G., Hersh, L.B., and Butcher, L.L. Cholinergic and somatostatinergic neurites are associated with senile plaques in the substantia innominata of Alzheimer's disease patients. **Society for Neuroscience Abstracts**, 1986, **12**, 1245.
18. Jacobs, R.W., Woolf, N.J., Hernit, M.C., and Butcher, L.L. Involvement of the cholinergic pontomesencephalic tegmentum in Alzheimer's Disease. **Society for Neuroscience Abstracts**, 1986, **12**, 1245.
19. Talbot, K., Woolf, N.J., Gould, E., and Butcher, L.L. Comparative cholinergic histochemistry of the magnocellular basal forebrain. **Society for Neuroscience Abstracts**, 1986, **12**, 905.
20. Woolf, N.J., Hernit, M.C., and Butcher, L.L. Modulation of cholinergic neuronal regeneration with growth factors. **Society for Neuroscience Abstracts**, 1986, **12**, 1009.

1987

21. Gorman, L.K., Farris, T.W., Woolf, N.J., and Butcher, L.L. Golgi staining and choline acetyltransferase immunohistochemistry on the same brain section. **Society for Neuroscience Abstracts**, 1987, **13**, 776.

1988

22. Butcher, L.L., Gould, E., Farris, T.W., and Woolf, N.J. Development of brain cholinergic systems. **Society for Neuroscience Abstracts**, 1988, **14**, 633.

23. Harrison, J., Buchwald, J., Song, S., Woolf, N., and Butcher, L.L. Pontine reticular formation lesions in the cat: effects on P1 potential and behavior. **Society for Neuroscience Abstracts**, 1988, **14**, 771.

1989

24. Mathes, C.W., Woolf, N.J., Lee, C., and Butcher, L.L. Thyroid hormone alters cholinergic expression in adult basal forebrain. **Society for Neuroscience Abstracts**, 1989, **15**, 782.
25. Oh, J.D., Woolf, N.J., and Butcher, L.L. Lesions of the pedunculopontine tegmental nucleus produce loss of basal forebrain choline acetyltransferase: evidence for cholinergic-cholinergic interactions. **Society for Neuroscience Abstracts**, 1989, **15**, 782.
26. Talbot, K., Woolf, N.J., Harrison, J.B., Buchwald, J.S., and Butcher, L.L. Choline acetyltransferase containing projections from the feline pontomesencephalon. **Society for Neuroscience Abstracts**, 1989, **15**, 410.
27. Woolf, N.J., Oh, J.D., and Butcher, L.L. Thyroid hormones alter the postnatal development of the 68kD neurofilament protein in the cerebral cortex: An immunocytochemical analysis. **Society for Neuroscience Abstracts**, 1989, **15**, 1017.

1990

28. Oh, J.D., Woolf, N.J., and Butcher, L.L. Thyroid hormone alters the postnatal development of choline acetyltransferase (ChAT) immunostained cortical fibers. **Society for Neuroscience Abstracts**, 1990, **16**, 1292.
29. Woolf, N.J., Oh, J.D., and Butcher, L.L. Immunostaining for microtubule-associated proteins (MAP-1,-2,-5) is decreased by ibotenic acid lesions of the cholinergic basal forebrain. **Society for Neuroscience Abstracts**, 1990, **16**, 1057.

1991

30. Oh, J.D., Woolf, N.J., Roghani, A., Edwards, R.H., and Butcher, L.L. Localization of ChAT mRNA in the rat brain and spinal cord. **Society for Neuroscience Abstracts**, 1991, **17**, 1298.
31. Woolf, N.J., Young, S.L. Fanselow, M.S., and Butcher, L.L. MAP-2 expression in cholinergic pyramidal cells of rodent cortex and hippocampus is altered by Pavlovian conditioning. **Society for Neuroscience Abstracts**, 1991, **17**, 480.

1992

32. Woolf, N.J. Choline acetyltransferase fibers in the striate cortex of vertical and horizontal stripe-reared kittens preferentially develop orthogonal to the selected visual orientation. **Society for Neuroscience Abstracts**, 1992, **18**, 1315.

1993

33. Woolf, N.J. Ibotenic acid lesions localized to nucleus basalis cells projecting to temporal cortex disrupt conditional pairing of tone and shock. **Society for Neuroscience Abstracts**, 1993, **19**, 914.

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