CURRICULUM VITAE

Name:
Peter R. Rapp, Ph.D.

Contact information:
251 Bayview Blvd., Suite 100
Baltimore, MD 21224
410-558-8195 fax 410-558-8302
rappp@mail.nih.gov

Education:

1979, B.A. Psychology, University of Vermont

1986, Ph.D. Biological Psychology, Neurobiology, University of North Carolina at Chapel Hill

1986 – 1989, post-doctoral Fellow, Developmental Neurobiology, Salk Institute for Biological Studies

Professional Appointments:

2008 – present, Senior Investigator
Chief, Laboratory of Experimental Gerontology
NIA Intramural Research Program

2008 – present, Adjunct Professor
Fishberg Department of Neuroscience
Mount Sinai School of Medicine

2008 – present, Adjunct Professor
Department of Psychological and Brain Sciences
Johns Hopkins University

2006 – 2008, Interim Chair
Fishberg Department of Neuroscience
Mount Sinai School of Medicine

2007-2008, Mount Sinai Professor of Neuroscience Endowed Chair
Fishberg Department of Neuroscience
Mount Sinai School of Medicine

1997 (tenured, 2002), Associate Professor
Fishberg Department of Neuroscience
Kastor Neurobiology of Aging Laboratories
Department of Geriatrics and Adult Development
Mount Sinai School of Medicine

2001-2008, Co-Director
Graduate Training Program in Neuroscience
Mount Sinai School of Medicine

1997-2001, Adjunct Associate Professor:
Department of Neurobiology and Behavior
State University of New York at Stony Brook

1996-1997, Interim Director:
Center for Behavioral Neuroscience
State University of New York at Stony Brook

1993-1997, Assistant Professor:
Center for Behavioral Neuroscience
Member, Program in Neurobiology and Behavior
Assistant Professor, Department of Psychology
State University of New York at Stony Brook

1990-1993, Staff Scientist:
Laboratory of Neuronal Structure and Function
The Salk Institute for Biological Studies

1991-1993, Assistant Adjunct Professor:
Department of Neurosciences
University of California, San Diego
School of Medicine

1991-present, Affiliate Scientist:
California Regional Primate Research Center
University of California, Davis

1989-1990, Research Associate:
Laboratory of Neuronal Structure and Function
The Salk Institute for Biological Studies

1986-1989, Postdoctoral Fellow:
Developmental Neurobiology Laboratory
The Salk Institute for Biological Studies

1983-1984, Biomedical Research Fellow:
University of North Carolina at Chapel Hill

Selected Lectures:

Finnish Society for Neuroscience, Kupio, Finland, Invited symposium speaker
Taniguchi International Symposium on Brain Science, Kona, Hawaii, Invited symposium speaker.
Human Frontiers Program Symposium, Functions of the Rhinal Cortex, Vrije University, Amsterdam. Invited speaker.
Psychology Department Seminar, McGill University, Montreal, Canada

Cold Spring Harbor course, "Mouse Behavior Analysis". Invited lecturer on prefrontal cortical function and stereology.
University of California, Davis, Distinguished Lecturer Series, invited speaker.
American Association for Geriatric Psychiatry, San Diego, CA. Invited symposium speaker
Graylyn Conference on Women's Cognitive Health, Wake Forest University School of Medicine, Winston-Salem, NC. Invited symposium speaker.
Society for Behavioral Neuroendocrinology, Lisbon, Portugal. Invited symposium speaker.
Psychology Department Seminar, Oxford University, Oxford, UK.
Adler Foundation Conference on Aging, Salk Institute, San Diego, CA. Invited speaker.
National Institute on Aging, "Bench to Beside" conference, Bethesda, MD. Invited participant and speaker.
National Institute on Aging/McKnight Foundation sponsored Cognitive Summit, Washington, D.C. Invited speaker and panelist.
Mechanisms of Aging and Dementia Program, Annual Keynote Address, Northwestern University

Selected Service Activities:

2001-2008, Co-Director, Graduate Training Program in Neuroscience, Mount Sinai
2001-2003, Neurobiology Representative, Graduate Admissions Committee, Mount Sinai
1993-1996, Neurobiology Graduate Program Committee, SUNY Stony Brook
2003-present, Neuroscience Canada, International Science Advisory Council
2003-2011, Faculty of 1,000, Contributing faculty, Behavioral Neuroscience section
1995-present, National Scientific Advisory Council, AFAR
NIH extramural, Special Emphasis Review Panels, NIA, NINDS, IFCN-7
National Science Foundation, Ad hoc Referee
Alzheimer's disease and Related Disorder Association, Ad hoc Referee
Regular reviewer for various journals including Behavioral Brain Research, Experimental Neurology, Journal of Neuroscience, Learning and Memory, Neuron, Neuroscience, Neuroscience Letters, and Proceedings of the National Academy of Sciences.
Michael J Fox Foundation, Ad hoc Referee

Editorial Activities:

1994, Seminars in the Neurosciences: Guest Editor, Vol. 6(6)
Behavioral Neuroscience, past Editorial Board member
European Journal of Neuroscience, past Deputy Receiving Editor, Behavioral and Cognitive Neuroscience
Hippocampus, current Editorial Board member
Neurobiology of Aging, Section Editor

Funding Activity

NOTE: Research in my laboratory was continuously funded by multiple R01 and P01 grants for approximately 20 years prior to my joining the intramural research program of the National Institute on Aging in 2008. While retaining a role as an unpaid co-Investigator, Principal Investigator assignments on the following grants were transferred to long-standing collaborators, Michela Gallagher (Johns Hopkins University) and John Morrison (Mount Sinai School of Medicine) coincident with my relocation to the NIA.

1 PO1 AG09973 (Gallagher)
NIH/NIA
Neuroanatomy of the Aged Hippocampal Formation
The aim of this component project is to identify the neurobiological alterations in hippocampal structure and function that contribute to age-related cognitive decline in rats.
Role: Project Leader

2 R37 AG10606 (Rapp)
NIH/NIA
Cognitive Function in the Aged Monkey
This aim of research supported by this M.E.R.I.T Award is to examine the cognitive consequences of aging in monkeys in relation to naturally occurring endocrine decline and in vivo neuroimaging data.
Role: PI

1 PO1 AG16765 (Morrison)
NIH/NIA
Estrogen Influences on Cognitive Aging in the Monkey
This component project examines the cognitive effects of surgical menopause and various hormone therapy treatments in aged monkey.
Role: Project Leader

Publications:

1. Gallagher, M., Kapp, B.S., Frysinger, R.C. and Rapp, P.R. Beta-adrenergic manipulation in amygdala central n. alters rabbit heart rate conditioning. Pharm., Biochem. and Behav., 12: 419-426,1980.

2. Gallagher, M., Kapp, B.S., Pascoe, J.P. and Rapp, P.R. A neuropharmacology of amygdala systems involved in learning and memory processes. In Y. Ben-Ari (Ed.) The Amygdaloid Complex. Amsterdam: Elsevier/North Holland Biomedical Press, 1981.

3. Schwaber, J.S., Kapp, B.S., Higgins, G.A. and Rapp, P.R. Amygdala and basal forebrain connections with the nucleus of the solitary tract and the dorsal motor nucleus. J. Neurosci., 2:1424-1438, 1982.

4. Gallagher, M., Rapp, P.R. and Fanelli, R.F. Opiate antagonist facilitation of time dependent memory processes: dependence on intact norepinephrine function. Brain Res.,347: 284-291, 1985.

5. Rapp, P.R., Rosenberg, R.A. and Gallagher, M. An evaluation of spatial information processing in aged rats. Behav. Neurosci., 101: 2-13, 1987.

6. Rapp, P.R., Fanelli, R.F., McGuire, M., Rosenberg, R.A. and Gallagher, M. Alterations in [^{3}H]-desmethylimipramine binding in the aged rat brain: An in vitro autoradiographic demonstration. Neurosci. Lett., 79: 17-22, 1987.

7. Rapp, P.R. and Amaral, D.G. The time of origin of somatostatin-immunoreactive neurons in the hippocampal formation of the rat. Dev. Brain Res., 41: 231-239, 1988.

8. Rapp, P.R. Toward a nonhuman primate model of age-dependent cognitive dysfunction. Neurobiol. Aging, 9: 503-505, 1988.

9. Rapp, P.R. and Amaral, D.G. Evidence for task-dependent memory dysfunction in the aged monkey. J. Neurosci., 9: 3568-3576, 1989.

10. Rapp, P.R. Visual discrimination and reversal learning in the aged monkey (M. mulatta).Behav. Neurosci., 104: 876-884, 1990.

11. Rapp, P.R. and Amaral, D.G. Recognition memory deficits in a subpopulation of aged monkeys resemble the effects of medial temporal lobe damage. Neurobiol. Aging, 12: 481-486, 1991.

12. Stroessner-Johnson, H.M., Rapp, P.R. and Amaral, D.G. Cholinergic cell loss and hypertrophy in the medial septal nucleus of the behaviorally characterized aged rhesus monkey. J. Neurosci., 12: 1936-1944, 1992.

13. Rapp, P.R. and Amaral, D.G. Individual differences in the cognitive and neurobiological consequences of normal aging. TINS, 15: 340-345,1992.

14. Rapp, P.R. Behavioral and neuroanatomical consequences of aging in the monkey. Neurosci. Facts, 4: 27-28, 1993.

15. Rapp, P.R. Neuropsychological analysis of learning and memory in the aged nonhuman primate. Neurobiol. Aging, 14: 627-629,1993.

16. Rapp, P.R. Functional components of the hippocampal memory system: Implications for future learning and memory research in nonhuman primates. Brain and Behav. Sci., 17: 491-492, 1994.

17. Rapp, P.R. and Heindel, W.C. Memory systems in normal and pathological aging. Curr. Opinion in Neurol., 7: 294-298, 1994.

18. Rapp, P.R (ed.): Cognitive and Neurobiological Consequences of Aging. Sem. In Neurosci., 6: 1994.

19. Rapp, P.R., Kansky, M.T., Roberts, J.A. and Eichenbaum, H. New directions for studying cognitive decline in old monkeys. Sem. in Neurosci., 6: 369-377, 1994.

20. Rapp, P.R. Cognitive neuroscience perspectives on aging in nonhuman primates. In Emotion, Memory and Behavior, T. Nakajima and T. Ono (eds.), 197-211, 1995.

21. Rapp, P.R., Burwell, R.D. and West, M.J. Commentary: Individual differences in aging: Implications for stereological studies of neuron loss. Neurobiol. Aging, 17: 495-496, 1996.

22. Rapp, P.R. and Gallagher, M. Preserved neuron number in the hippocampus of aged rats with spatial learning deficits. PNAS, 93: 9926-9930, 1996.

23. Rapp, P.R., Kansky, M.T. and Eichenbaum, H. Learning and memory for hierarchical relationships in the monkey: Effects of aging. Behav. Neurosci., 110: 887-897, 1996.

24. Gallagher, M., Landfield, P.W., McEwen, B., Meaney, M.J., Rapp, P.R., Sapolsky, R. and West, M.J. Hippocampal neurodegeneration in aging [Letter]. Science, 274: 484-485, 1996.

25. Gallagher, M. and Rapp, P.R. The use of animal models to study the effects of aging on cognition. Ann. Rev. Psychol., 48: 339-370, 1997.

26. Eberling, J.L., Roberts, J.A., Rapp, P.R., Tuszynski, M.H. and Jagust, W.J. Cerebral glucose metabolism and memory in aged rhesus macaques. Neurobiol. Aging, 18: 437-443, 1997.

27. Rapp, P.R., Kansky, M.T. and Roberts, J.A. Impaired spatial information processing in aged monkeys with preserved recognition memory. NeuroReport, 8: 1923-1928, 1997.

28. Roberts, J.A., Gilardi, K.V.K., Lasley, B.L. and Rapp, P.R. Reproductive senescence predicts cognitive decline in aged female monkeys. NeuroReport, 8: 2047-2051, 1997.

29. Rapp, P.R. and Gallagher, M. Toward a cognitive neuroscience of normal aging. Adv. Cell Aging and Gerontol., 2: 1-21,1997.

30. Rapp, P.R. Representational organization in the aged hippocampus. Hippocampus, 8: 432-435,1998.

31. Rapp, P.R. Quantitative morphometry in the study of normal cognitive aging. In Quantitative Neuroanatomy: A Picture is Worth a Thousand Words, but a Number is Worth a Thousand Pictures. J. Morrison and P. Hof (eds.), Washington, D.C.: Society for Neuroscience, 56-65, 1998.

32. Albert, M.S., Diamond, A.D., Holly Fitch, R., Neville, H.J., Rapp, P.R. and Tallal, P.A. Cognitive development. In Fundamental Neuroscience, M.J. Zigmond, F.E. Bloom, S.C. Landis, J.L. Roberts and L.R. Squire (eds.), San Diego: Academic Press, Inc., 1313-1338, 1999.

33. Rapp, P.R. Aging, memory and the brain. In The MIT Encyclopedia of the Cognitive Sciences, R.A. Wilson and F.C. Keil (eds.), Cambridge:MIT Press, 7-9, 1999.

34. Rapp, P.R., Stack, E.C. and Gallagher, M. Morphometric studies of the aged hippocampus. I. Volumetric analysis in behaviorally characterized rats. J. Comp. Neurol., 403: 459-470, 1999.

35. O'Donnell, K.A., Rapp, P.R. and Hof, P.R. Preservation of prefrontal cortical volume in behaviorally characterized aged macaque monkeys. Exp. Neurol., 160: 300-310, 1999.

36. Rapp, P.R. Neurobiology of Learning and Memory [Book review]. Quart. Rev. Biol., 74: 495, 1999.

37. Smith, T.D., Calhoun, M.E. and Rapp, P.R. Circuit and morphological specificity of synaptic change in the aged hippocampal formation. [commentary] Neurobiol. Aging, 20: 357 358, 1999.

38. Rapp, P.R. Memory: From Mind to Molecules [Book review]. Quart Rev. Biol., 75: 174, 2000.

39. Smith, T.D., Adams, M.M., Gallagher, M., Morrison, J.H. and Rapp, P.R. Circuit-specific alterations in synaptophysin immunoreactivity predict spatial learning impairment in aged rats. J. Neurosci., 20: 6587-6593, 2000.

40. Adams, M.M., Smith, T.D., Wolfe, B., Gallagher, M, Rapp, P.R. and Morrison, J.H. Hippocampal dependent learning ability correlates with N-methyl-D-aspartate (NMDA) receptor levels in CA3 of young and aged rats. J. Comp. Neurol., 432: 230-243, 2001.

41. Rapp, P.R., Deroche, P.S., Mao, Y. and Burwell, R.D. Neuron number in the parahippocampal region is preserved in aged rats with spatial learning deficits. Cerebral Cortex, 12: 1171-1179, 2002, PMID 12379605

42. Rapp, P.R. and Bachevalier, J. Cognitive development and aging. In: Fundamental Neuroscience, 2nd Edition, L.R. Squire et al., eds., Academic Press: San Diego, 1167-1200, 2003

43. Rapp, P.R. Morrison, J.H. and Roberts, J.A. Cyclic estrogen replacement improves cognitive function in aged ovariectomized rhesus monkeys. J. Neurosci., 23: 5708-5714, 2003. PMID 12843274

44. Hao, J., Janssen, W.G.M., Tang, Y., Roberts, J.A., McKay, H., Lasley, B., Greengard, P., Rapp, P.R., Kordower, J.H., Hof, P.R. and Morrison, J.H. Estrogen increases the number of spinophilin-immunoreactive spines in the hippocampus of young and aged female rhesus monkeys. J. Comp. Neurol., 465: 540-550, 2003. PMID 12975814

45. Shideler, S.E., Gee, N.A., Chen, J., Laughlin, L.S., Rapp, P.R., Morrison, J.H., Roberts, J.A., Moran, F.M. and Lasley, B.L. Contribution of ovarian steroid production to urinary estrone conjugate concentrations in Macaca mulatta. Am. J. Primatol., 61: 111-121, 2003.

46. Tang, Y., Janssen, W.G.M., Hao, J., Roberts, J.A., McKay, H., Lasley, B., Allen, P.B., Greengard, P., Rapp, P.R., Kordower, J.H., Hof, P.R. and Morrison, J.H. Estrogen replacement increases spinophilin-immunoreactive spine number in the prefrontal cortex of female rhesus monkeys. Cerebral Cortex, 14: 215-223, 2004. PMID 14704219

47. Smith, D.E., Rapp, P.R., McKay, H.M., Roberts, J.A. and Tuszynski, M.H. Memory impairment in aged primates is associated with focal death of cortical neurons and atrophy of subcortical neurons. J. Neurosci., 24: 4373-4381, 2004. PMID 15128851

48. Rapp, P.R. Who's the fairest of them all? Role of the human hippocampus in the

relational organization of memory [commentary]. Hippocampus, 14: 141-142, 2004. PMID 15098718

49. Calhoun, M.E., Mao, Y., Roberts, J.A. and Rapp, P.R. Reduction in hippocampal cholinergic innervation is unrelated to recognition memory impairment in aged rhesus monkeys. J. Comp. Neurol., 475: 238-246, 2004. PMID 15211464

50. Small, S.A., Chawla, M.K., Buonocore, M., Rapp, P.R. and Barnes, C.A. Imaging correlates of brain function in monkeys and rats isolates a hippocampal subregion differentially vulnerable to aging. PNAS, 101: 7181-7186, 2004. PMID 15118105

51. Buckmaster, C.A., Amaral, D.G., Eichenbaum, H., Suzuki, W.A. and Rapp, P.R. Entorhinal cortex lesions disrupt the relational organization of memory in monkeys. J. Neurosci., 24: 9811-9825, 2004. PMID 15525766

52. Morrison, J.H., Hof, P.R. and Rapp, P.R. Neuropathology of normal aging in cerebral cortex. In: Neurodegenerative Diseases, M.F. Beal, A.E. Lang and A. Ludolph, eds., Cambridge University Press: New York, 396-406, 2005.

53. Shamy, J.L.T., Buonocore, M.H., Makaron, L.M., Amaral, D.G., Barnes, C.A. and Rapp, P.R. Hippocampal volume is preserved and fails to predict recognition memory impairment in aged rhesus monkeys (Macaca mulatta). Neurobiol Aging, 27: 1405-1415, 2006. PMID 16183171

54. Hao, J., Rapp, P.R., Leffler, A., Leffler, S., Janssen, W.G.M., Lou, W., McKay, H., Roberts, J.A., Wearne, S.L., Hof, P.R. and Morrison, J.H. Estrogen alters spine number and morphology in prefrontal cortex of aged female rhesus monkeys. J. Neurosci., 29: 2571-2578, 2006. PMID 16510735

55. Fletcher, B.R., Calhoun, M.E., Rapp, P.R. and Shapiro, M.L. Fornix lesions decouple the induction of hippocampal Arc transcription from behavior, but not plasticity. J Neurosci., 26: 1507-1515, 2006. PMID 16452674

56. Gallagher, M., Colantuni, C., Eichenbaum, H., Haberman, R.P., Rapp, P.R., Tanila, H. and Wilson, I.A. Individual differences in neurocognitive aging of the medial temporal lobe. AGE, 28: 221-233, 2006.

57. Fletcher, B.F., Baxter, M.B., Guzowski, J.F., Shapiro, M.L. and Rapp, P.R. Selective cholinergic depletion of the hippocampus spares both behaviorally induced Arc transcription and spatial learning and memory. Hippocampus, 17: 227-234, 2007. PMID 17286278

58. Shamy, J.L., Buckmaster, C.A., Amaral, D.G., Calhoun, M. and Rapp, P.R. Reactive plasticity in the dentate gyrus following entorhinal cortex lesions in cynomolgus monkeys. J. Comp. Neurol., 502: 192-201, 2007. PMID 17348008

59. Calhoun, M.E., Fletcher, B.R., Yi, S., Zentko, D.C., Gallagher, M. and Rapp, P.R. Age related spatial learning impairment is unrelated to spinophilin immunoreactive spine number and protein levels in rat hippocampus. Neurobiol. Aging, 29: 1256-1264, 2008. PMID 17353069

60. Hao, J., Rapp, P.R., Janssen, W.G.M., Lou, W.Y.W., Lasley, B.L., Hof, P.R. and Morrison, J.H. Interactive effects of age and estrogen on cognition and pyramidal neurons in monkey prefrontal cortex. PNAS, 104: 11465-11470, 2007. PMID 17592140

61. Rapp, P.R. and Bachevalier, J. Cognitive development and aging. In: Fundamental Neuroscience, 3rd Edition, L.R. Squire et al., eds., Academic Press: San Diego, 1039-1066, 2008.

62. Alexander, G.E., Chen, K., Aschenbrenner, M., Merkley, T.L., Santerre-Lemmon, L.E., Shamy, J.L., Skaggs, W., Buonocore, M.H., Rapp, P.R. and Barnes, C.A. Age-related regional network of MRI gray matter in rhesus macaque, J. Neurosci., 28: 2710-2718, 2008. PMID 18337400.

63. Rapp, P.R. Aging and Memory in Animals. In: Encyclopedia of Neuroscience, L.R. Squire (ed.), volume 1, Academic Press: Oxford, 167-174, 2009.

64. Shamy, J.L., Carpenter, D.M., Fong, S.G., Murray, E.A., Tang, C.Y., Hof, P.R., and Rapp, P.R. Alterations of white matter tracts following neurotoxic hippocampal lesions in macaque monkeys: A diffusion tensor imaging study. Hippocampus, 20: 906-910, 2010. PMID 20095006.

65. Dumitriu, D., Hao, J., Kaufmann, J., Janssen, W.G.M., Lou, W., Rapp, P.R. and Morrison, J.H. Selective changes in thin spine density and morphology in monkey prefrontal cortex correlate with aging-related cognitive impairment. J. Neurosci., 30: 7507-7515, 2010. PMID 20519525.

66. Dumitriu, D., Rapp, P.R., McEwen, B., and Morrison, J.H. Estrogen and the aging brain: an elixir for the weary cortical network? Ann. N.Y. Acad. Sci., 1204: 104-112, 2010. PMID 20738280.

67. Shirvalkar, P., Rapp, P.R., and Shapiro, M.L. Bidirectional changes to hippocampal theta-gamma comodulation predict memory for recent spatial epidsodes. PNAS, 107: 7054-7059, 2010. PMID 20351262.

68. Shamy, J.L., Habeck, C., Hof, P.R., Amaral, D.G., Fong, S.G., Buonocore, M.H., Stern, Y., Barnes, C.A. and Rapp, P.R. Volumetric correlates of spatiotemporal working and recognition memory impairment in aged rhesus monkeys. Cerebral Cortex, 21: 1559-1573, 2011. PMID 21127015.

69. Hara, Y., Park, C.S., Janssen W.G.M., Roberts, M.T., Morrison, J.H. and Rapp, P.R. Synaptic correlates of memory and menopause in the hippocampal dentate gyrus. Neurobiol. Aging, 2010 [Epub ahead of print]. PMID 21030115.

70. Wang, A.C.J., Hara, Y., Janssen, W.G.M., Rapp, P.R. and Morrison, J.H. Synaptic estrogen receptor-alpha levels in prefrontal cortex in female rhesus monkeys and their correlation with cognitive performance. J. Neurosci., 30: 12770-12776, 2010. PMID 20861381.

71. Hara, Y., Park, C.S., Janssen, W.G., Punsoni, M., Rapp, P.R. and Morrison, J.H. Synaptic characteristics of dentate gyrus axonal boutons and their relationships with memory in female rhesus monkeys. J. Neurosci., 21: 7737-7744, 2011. PMID 21613486.

72. Hara, Y., Rapp, P.R. and Morrison, J.H. Neuronal and morphological bases of cognitive decline in aged rhesus monkeys. AGE, in press.

73. Long, J., Lee, G., Kelley-Bell, B., Spangler, E., Perez, E., Longo, D., de Cabo, R., Zou, S. and Rapp, P.R. Preserved learning and memory following 5-fluorouracil and cyclophosphamide treatment in rats. Pharm., Biochem., Behav., in press.

74. Fletcher, B.R. and Rapp, P.R. Normal Neurocognitive Aging, Handbook of Psychology, 2nd Edition, Vol. 3: Biological Psychology and Neuroscience. Invited review, in press.

75. Castellano, J.F., Fletcher, B.F., Kelley-Bell, B., Kim, D.H., Gallagher, M. and Rapp, P.R. Experience-dependent epigenetic regulation in the aged hippocampus. Submitted.

76. Rapp, P.R. and Bachevalier, J. Cognitive development and aging. In: Fundamental Neuroscience, 4th Edition, L.R. Squire et al., eds., Academic Press: San Diego, submitted.