

## References

- Abraham, L., Potegal, M., & Miller, S. (1983). Evidence for caudate nucleus involvement in an egocentric spatial task: Return from passive transport. *Physiological Psychology, 11*, 11-17.
- Ackil, J.E., Mellgen, R.L., Halgren, C., & Frommer, G.P. (1969). Effects of CS preexposures on avoidance learning in rats with hippocampal lesions. *Journal of Comparative and Physiological Psychology, 69*, 739-747.
- Amaral, D.G., & Kurz, J. (1985). An analysis of the origins of the cholinergic and noncholinergic septal projections of the hippocampal formation of the rat. *The Journal of Comparative Neurology, 240*, 37-59.
- Arendt, Y., Bigl, V., Tennstedt, A., & Arendt, A. (1985). Neuronal loss in different parts of the nucleus basalis is related to neuritic plaque formation in cortical target areas in Alzheimer's disease. *Neuroscience, 14*, 1-14.
- Bailey, E.L., Overstreet, D.H., & Crocker, A.D. (1986). Effects of intrahippocampal injections of the cholinergic neurotoxin on open-field activity and avoidance learning in the rat. *Behavioral and Neural Biology, 45*, 263-274.
- Bartus, R.T., Dean, R.L., Beer, B., & Lippa, A.S. (1982). The cholinergic hypothesis of geriatric memory function. *Science, 217*, 408-417.
- Becker, J.T., Walker, J.A., & Olton, D.S. (1980). Neuroanatomical bases of spatial memory. *Brain Research, 200*, 307-320.

- Butters, N., & Rosvold, H.E. (1968). Effect of caudate and septal lesions on resistance to extinction in delayed alternation. *Physiological Psychology*, 65, 397-403.
- Carr, G.D., & White, N.M. (1984). The relationship between stereotypy and memory improvement produced by amphetamine. *Psychopharmacology*, 82, 203-209.
- Chappell, J., McMahan, R., Chiba, A., & Gallagher, M. (1998). A re-examination of the role of basal forebrain cholinergic neurons in spatial working memory. *Neuropharmacology*, 37, 481-487.
- Chorover, S.G., & Gross, C.G. (1963). Caudate nucleus lesions: Behavioral effects in rats. *Science*, 141, 825-826.
- Chrobak, J.J., Hanin, I., Schmeichel, D.E., & Walsh, T.J. (1988). AF64A-induced working memory impairment: behavioral, neurochemical and histological correlates. *Brain Research*, 463, 107-117.
- Cogan, D.C., & Reeves, J.L. (1979). Passive avoidance learning in hippocampectomized rats under different shock and interval conditions. *Physiology and Behavior*, 22, 1115-1121.
- Colombo, P.J., Davis, H.P., & Volpe, B.T. (1989). Allocentric spatial and tactile memory impairments in rats with dorsal caudate lesions are affected by preoperative behavioral training. *Behavioral Neuroscience*, 103, 1242-1250.
- Consolo, S., Girotti, M., Zambelli, M., Russi, G., Benzi, M., & Bertoelli, R.

- (1993). D<sub>1</sub> and D<sub>2</sub> dopamine receptors and the regulation of striatal acetylcholine release in vivo. In Cuello A.C. (Ed.), *Progress in Brain Research* (pp. 201-207).
- Cook, D., & Kesner, R.P. (1988). Caudate nucleus and memory for egocentric localization, *Behavioral and Neural Biology*, 49, 332-343.
- Cooper, J.R., Bloom, F.E., & Roth, R.H. (1996). *The Biochemical Basis of Neuroparmacology*, 7th ed., Oxford University Press: New York and Oxford.
- Costa, E., Panula, P., Thompson, H.K. & Cheney, D.L. (1983). The transsynaptic regulation of the septal hippocampal cholinergic neurons. *Life Sciences*, 32, 165-179.
- Coyle, J.T., Price, D.L., & DeLong, M.R. (1983). Alzheimer's disease: A disorder of cortical cholinergic innervation. *Science*, 219, 1184-1190.
- Dawson, V.L., Dawson, Y.M., Filloux, F.M., & Wamsley, J.K. (1988). Evidence for dopamine D-2 receptors on cholinergic interneurons in the rat caudate putamen. *Life Sciences*, 42, 1933-1939.
- Dekker, J.A.M., Connor, D.J., & Thal, L.J. (1991). The role of cholinergic projections from the nucleus basalis in memory. *Neuroscience and Biobehavioral Review*, 15, 299-317.
- Dekker, M.W., & McGaugh, J.L. (1991). The role of interactions between the cholinergic system and other neuromodulatory systems in learning and memory. *Synapse*, 7, 151-168.

Divac, I., Rosvold, H.E., & Szwarcbart, M.K. (1967). Behavioral effects of selective ablation of the caudate nucleus. *Journal of Physiological Psychology*, 63, 184-190.

Döbrössy, M.D., Svendsen C.N., & Dunnett S.B. (1985). The effects of bilateral striatal lesions on the acquisition of an operant test of short term memory. *Neuroreport*, 6, 2049-2053.

Dornan, W.A., McCampbell, A.R., Tinkler, G.P., Hickman, L.J., Bannon, A.W., Decker, M.W., & Gunther, K.L. (1997). Comparison of site specific injections into the basal forebrain on water maze and radial arm maze performance in the male rat after immunolesioning with 192 IgG-saporin. *Behavioral Brain Research*, 86, 181-189.

Douglas, R.J., & Isaacson, R.L. (1964). Hippocampal lesions and activity. *Psychonomic Science*, 1, 187-188.

Dunbar, G.L., Rylett R.J., Schmidt B.M., Sinclair R.C., Williams L.R. (1993). Hippocampal choline acetyltransferase activity correlates with spatial learning in aged rats. *Brain Research*, 604, 266-272

Duncan, P.M., & Duncan, N.C. (1971). Free-operant and T-maze avoidance performance by septal and hippocampal-damaged rats. *Physiology and Behavior*, 7, 687-693.

Dunnett, S.B., & Fibiger, H.C. (1993). Role of forebrain cholinergic systems in learning and memory: relevance to the cognitive deficits of aging and Alzheimer's dementia. *Progress in Brain Research*, 98, 413-422.

Eva, C., Fabrazzo, M., & Costa, E. (1987). Changes of cholinergic, noradrenergic and serotonergic synaptic transmission indices elicited by ethylcholine aziridinium ion (AF64A) infused intraventricularly. *Journal of pharmacology and Experimental Therapeutics*, 222, 203-213.

Fisher, A., Mantione, C.R., Abraham, D.J., & Hanin, I. (1982). Long-term cholinergic hypofunction induced in mice by ethylcholine mustard aziridinium ion (AF64A) in vivo. *Journal of Pharmacology and Experimental Therapeutics*, 222, 140-145.

Fisher, W., Chen, K.S., Gage, F.H., Bjorklund, A. (1992). Progressive decline in spatial learning and integrity of forebrain cholinergic neurons in rats during aging. *Neurobiology of Aging*, 13, 9-23.

Gammon, W., & Thomas, R. (1980). Interactive effects of light / dark cycle, escs, physostigmine, and scopolamine on one way avoidance in rats. *Physiological Psychology*, 8, 72-76.

Gower, A.J., Rousseau, D., Jamsin, P., Gobert, J., Hanin, I., & Wulfert, E. (1989). Behavioral and histological effects of low concentrations of intraventricular AF64A. *European Journal of Pharmacology*, 166, 271-281.

Gross, C.G., Chorover, S.L., & Cohen, S.M. (1965). Caudate, cortical hippocampal, and dorsal thalamic lesions in rats: Alternation and Hebb-Williams performance. *Neuropsychologia*, 3, 53-68.

Hanin, I. (1990). The AF64A-induced cholinergic hypofunction. *Progress in Brain Research*, 84, 289-229.

Hanin, I. (1996). The AF64A model of cholinergic hypofunction: An update. *Life Sciences*, 58, 1955-1964.

Hannon, R., & Bader, A. (1974). A comparison of frontal pole, anterior median and caudate nucleus lesions in the rat. *Physiology and Behavior*, 13, 513-321.

Hasselmo, M.E. (1995). Neuromodulation and cortical function: Modeling the physiological basis of behavior. *Behavioral Brain Research*, 67, 1-27.

Hiraga, Y., & Iwasaki, T. (1984). Effects of cholinergic and monoaminergic antagonists and tranquilizers upon spatial memory in rats. *Pharmacology, Biochemistry and Behavior*, 20, 205-207.

Hoover, D.B., Muth, E.A., Jacobowitz, D.M. (1978). A mapping of the distribution of acetylcholine, choline acetyltransferase and acetylcholinesterase in discrete areas of rat brain. *Brain Research*, 153, 295-306.

Hortnagl, H., Potter, P.E., & Hanin, I. (1987). Effect of cholinergic deficit induced by ethylcholine aziridinium on serotonergic parameters in rat brain. *Neuroscience*, 22, 203-213.

Hortnagl, H., Potter, P.E., & Hanin, I. (1987). Effect of cholinergic deficit induced by ethylcholine aziridinium (AF64A) on noradrenergic and dopaminergic parameters in rat brain. *Brain Research*, 421, 75-84.

Ikegami, S., Shumiya, S., & Kawamura, H. (1992). Age-related changes in radial-arm maze learning and basal forebrain cholinergic systems in

- senescence accelerated mice (SAM). *Behavioral Brain Research*, 51, 15-22.
- Isaacson, R.L. (1982). The hippocampal formation and its regulation of attention and behavior. In Grastyán, E., & Molnar, P. (Eds.), *Sensory Functions: Advances in Physiological Sciences* (Vol. 16). New York: Pergamon Press.
- Isaacson, R.L., & Wickelgren, W.O. (1962). Hippocampal ablation and passive avoidance. *Science*, 138, 1104-1106.
- Jackson, F.B., & Gergen, J.A. (1970). Acquisition of operant schedules by squirrel monkeys lesioned in the hippocampal area. *Physiology and Behavior*, 5, 543-547.
- Janis, L.S., Glasier, M.M., Fulop, Z., & Stein, D.G. (1998). Intraseptal injections of 192 IgG saporin produce deficits for strategy selection in spatial memory tasks. *Behavioral Brain Research*, 90, 23-34.
- Jarrard, L.E. (1968). Behavior of hippocampal lesioned rats in home cages and novel situations. *Physiology and Behavior*, 3, 65-70.
- Jarrard, L.E. (1973). The hippocampus and motivation. *Psychological Bulletin*, 79, 1-12.
- Jarrard, L.E. (1976). Anatomical and behavioral analysis of hippocampal cell fields in rats. *Journal of Comparative and Physiological Psychology*, 90, 1035-1050.

Jarrard, L.E. (1980). Selective hippocampal lesions and behavior. *Physiological Psychology*, 8, 198-206.

Jarrard, L.E., & Becker, J.T. (1977). The effects of selective hippocampal lesions on DRL behavior in rats. *Behavioral Biology*, 21, 393-404.

Jarrard, L.E., Kant, G.J., Meyerhoff, J.L., & Levy, A. (1984). Behavioral and neurochemical effects of intraventricular AF64A administration in rats. *Pharmacology, Biochemistry and Behavior*, 21, 273-280.

Kesner, R.P., & DiMattia, B. V. (1987). Neurobiology of attribute model of memory. *Progress in Psychobiology and Physiology*, 12, 207-277.

Kilts, C.D., Breese, G.R., & Mailman, R.B. (1981). Simultaneous quantification of dopamine, 5-hydroxytryptamine and four metabolically related compounds by reversed-phase high -performance liquid chromatography with electrochemical detection. *Journal of Chromatography*, 225, 347-357.

Kimura, D. (1958). Effects of selective hippocampal damage on avoidance behavior in the rat. *Canadian Journal of Psychology*, 12, 213-218.

Kirkby, R.J. (1969). Caudate nucleus lesions impair spontaneous alternation. *Perception of Motor Skills*, 29, 550.

Kirkby, R.J., & Kimble, D.P. (1968). Avoidance and escape behavior following striatal lesions in the rat. *Experimental Neurology*, 20, 215-227.

Kozlowski, M.R., & Arbogast, R.E. (1986). Specific toxic effects of

ethylcholine nitrogen mustard on cholinergic neurons of the nucleus basalis of Meynert. *Brain Research*, 372, 45-54.

Krnjevic, K. (1993). Central cholinergic mechanisms and function. *Progress in Brain Research*, 98, 285-292.

Lavoie, A.M., & Mizumori, S.J.Y. (1994). Spatial, movement- and reward-sensitive discharge by medial ventral striatum neurons of rats. *Brain Research*, 638, 157-168

Leansa, G., MartinezSerrano, A., & Bjorklund, A. (1998). Amelioration of spatial navigation and short-term memory deficits by grafts of foetal basal forebrain tissue placed into the hippocampus and cortex of rats with selective cholinergic lesions. *European Journal of Neuroscience*, 10, 2353-2370.

Levin, E. D., & Rose, J. E. (1992). Cognitive effects of D<sub>1</sub> and D<sub>2</sub> interactions with nicotinic and muscarinic systems. In Levin, E. D., Decker, M. W., & Butcher, L. L. (Eds.), *Neurotransmitter Interactions and Cognitive Function* (pp. 144-158). Boston: Berkhäuser.

Levin, E.D., Torry, D., Christopher, N.H., Yu, X., Einstein, G., & Schwartz-Bloom, R.D., (1997). Is binding to nicotinic acetylcholine and dopamine receptors related to working memory in rats? *Brain Research Bulletin*, 43, 295-304.

Levy, A., Kant, G.J., Meherhoff, J.L., & Jarrard, L.E. (1984). Non-cholinergic neurotoxic effects of AF64A in the substantia nigra. *Brain Research*,

- search*, 305, 169-172.
- Lindvall, O., & Stenevi, U. (1978). Dopamine and noradrenaline neurons projecting to the septal area in the rat. *Cell Tissue Research*, 190, 383-405.
- Luine, V., & Hearn, M. (1990). Spatial memory deficits in aged rats: Contributions of the cholinergic system assessed by ChAT. *Brain Research*, 523, 321-324.
- Mantione, C.R., Zigmond, M.J., Fisher, A., & Hanin, I. (1983). Selective presynaptic cholinergic neurotoxicity following intrahippocampal AF64A injection in rats. *Journal of Neurochemistry*, 41, 251-255.
- Masuda, Y., & Iwasaki, T. (1984). Effects of caudate lesions on radial arm maze behavior in rats. *Japanese Psychological Research*, 26, 42-49.
- McDonald, R.J., & White, N.M. (1994). Parallel information processing in the water maze: Evidence for independent memory systems involving dorsal striatum and hippocampus. *Behavioral and Neural Biology*, 61, 260-270.
- McDonald, R.J., & White, N.M. (1995). Hippocampal and nonhippocampal contributions to place learning in rats. *Behavioral Neuroscience*, 109, 579-593.
- McGurk, S.R., Hartgraves, S.L., Kelly, P.H., Gordon, M.N., & Buchter, L.L. (1987). Is ethylcholine mustard aziridinium ion a specific cholinergic neurotoxin? *Neuroscience*, 22, 215-224.

Meana, J.J., Johansson, B., Herrera-Marschitz, M., O'Connor, W.T., Goiny, M., Parkinson, F.E., Fredholm, B.B., & Ungerstedt, U. (1992). Effect of the neurotoxin AF64A of intrinsic and extrinsic neural systems of rat neostriatum measured by in vivo microdialysis. *Brain Research*, 596, 65-72.

Mesulam, M.M., Mufson, E.J., Wainer, B.H., & Levey, A.I. (1983). Central cholinergic pathway in the rat: an overview based on an alternative nomenclature (Ch 1-Ch 6). *Neuroscience*, 10, 1185-1201.

Meyers, B., & Domino, E.F. (1964). The effect of cholinergic blocking drugs on spontaneous alternation in rats. *Archives Internationales de Pharmacodynamie et de Therapi*, 150, 525-529.

Michalek, H., Fortuna, S., & Pintor, A. (1989). Age-related differences in brain choline acetyltransferase, cholinesterases and muscarinic receptor sites in two strains of rats. *Neurobiology and Aging*, 10, 143-148.

Miculus, W.L. (1966). Effects of lights at the choice point on spatial alternation and position learning by normal rats and rats with bilateral lesions of the caudate nucleus. *Psychonomic Science*, 5, 275-276.

Miculus, W.L., & Isaacson, R. (1965). Impairment and perseveration in delayed tasks due to bilateral lesions of caudate nucleus. *Psychonomic Science*, 3, 485-486.

Mitchell, J.A., & Hall ,G. (1988). Learning in rats with caudate-putamen lesions: Unimpaired classical conditioning and beneficial effects of

redundant stimulus cues on instrumental and spatial learning deficits. *Behavioral Neuroscience*, 102, 504-514.

Moore, R.Y., & Bloom, F.E. (1978). Central catecholamine neuron systems: anatomy and physiology of dopamine systems. *Annual Review of Neuroscience*, 1, 129-169.

Morris, R.G.M., Garrud, P., Rawlins, J.N.P., & O'Keefe, J. (1982). Place navigation impaired in rats with hippocampus lesions. *Nature*, 297, 681-683.

Myhrer, T. (1975). Locomotor and avoidance behavior in rats with partial or total hippocampal perforant paths sections. *Physiology and Behavior*, 15, 217-224.

Mummy D.G., Astur, R.S., Weisend, M.P., & Sutherland, R.J. (1999). Retrograde amnesia and selective damage to the hippocampal formation: memory for places and object discriminations. *Behavioral Brain Research*, 106, 97-107.

Nabeshima, T. (1993). Behavioral aspects of cholinergic transmission: role of basal forebrain cholinergic system in learning and memory, *Progress in Brain Research*, 98, 405-411.

Nadel, L. (1968). Dorsal and ventral hippocampal lesions and behavior. *Physiology and Behavior*, 3, 891-900.

Neill, D.B., Boggan, W.O., & Grossman, S.P. (1974). Behavioral effects of amphetamine in rats with lesions in the corpus striatum. *Journal of*

*Comparative and Physiological Psychology*, 86, 1019-1030.

Nilsson, O.G., Leanza, G., & Björklund, A. (1992). Acetylcholine release in the hippocampus: regulation by monoaminergic afferents as measured by in vivo microdialysis. *Brain Research*, 584, 132-140.

Nonneman, A.J., & Isaacson, R.L. (1973). Task dependent recovery after early brain damage. *Behavioral Biology*, 8, 143-172.

O'Keefe, J. (1976). Place units in the hippocampus of the freely moving rat. *Experimental Neurology*, 51, 78-109.

O'Keefe, J., & Nadel, L. (1978). *The hippocampus as a cognitive map*. Oxford: Clarendon Press.

Oberg, R. G., E., & Divac, I. (1979). "Cognitive" functions of the neostriatum. In Divac I., & Oberg, R.,G.,E. (Eds.), *The neostriatum* (pp. 291-313). New York: Pergamon Press.

Ogden, J.A., & Corkin, S. (1991). Memories of H.M. In Abraham, W.C., Corballis, M.C., & White, K.G. (Eds.), *Memory Mechanisms* (pp. 195-215). Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Olton, D.S. (1973). Shock-motivated avoidance and the analysis of behavior. *Psychological Bulletin*, 79, 243-251.

Olton, D.S. (1978). Characteristics of spatial memory. In Hulse, S.H., Fowler, H.F., & Honig, W.K. (Eds.), *Cognitive Aspects of Animal Behavior*, Hillsdale, N.J.: Erlbaum.

- Olton, D.S., & Papas, B.C. (1979). Spatial memory and hippocampal function. *Neuropsychologia*, 17, 669-682.
- Olton, D.S., & Samuelson, R.J. (1976). Remembrance of places passed: Spatial memory in rats. *Journal of experimental psychology*, 2, 97-116.
- Olton, D.S., & Wertz, M.A. (1978). Hippocampal function and behavior: Spatial memory and response inhibition. *Physiology and Behavior*, 20, 597-605.
- Opello, K.D., Stackman, R.W., Ackerman, S., & Walsh, T.J. (1993). AF64A (ethylcholine mustard aziridinium) impairs acquisition and performance of a spatial, but not a cued water maze task: Relation to cholinergic hypofunction. *Physiology and Behavior*, 54, 1227-1233.
- Orsetti, M., Casamenti, F., & Pepeu, G. (1996). Enhanced acetylcholine release in the hippocampus and cortex during acquisition of an operant behavior. *Brain Research*, 724, 89-96.
- Packard, M.G., Hirsh, R., & White, N.M. (1989). Differential effects of fornix and caudate nucleus lesions on two radial arm maze tasks: Evidence for multiple memory systems. *The Journal of Neuroscience*, 9, 1465-1472.
- Packard, M.G., & McGaugh, J.L. (1992). Double dissociation of fornix and caudate nucleus lesions on acquisition of two water maze tasks: Further evidence for multiple memory systems. *Behavioral Neuroscience*, 106, 439-446.
- Packard, M.G., & White, N.M. (1990). Lesions of the caudate nucleus se-

lectively impair "reference memory" acquisition in the radial maze.  
*Behavioral and Neural Biology*, 53, 39-50.

Packard, M.G., & White, N.M. (1991). Dissociation of hippocampus and caudate nucleus memory systems by post training intracerebral injection of dopamine agonists. *Behavioral Neuroscience*, 105, 295-306.

Packard, M.G., Hirsh, R., & White, N.M. (1989). Differential effects of fornix and caudate nucleus lesions on two radial arm maze tasks: Evidence for multiple memory systems. *Journal of Neuroscience*, 9, 1465-1472.

Pappas, B.A., Davidson, C.M., Fortin, T., Nallathamby, S., Park, G.A.S., Mohr, M., & Wiley, R.G. (1996). 192 IgG-saporin lesion of basal forebrain cholinergic neurons in neonatal rats. *Developmental Brain Research*, 96, 52-61.

Papsdorf, J.D., & Woodruff, M.L. (1970). Effects of bilateral hippocectomy on the rabbit's acquisition of shuttle-box and passive avoidance responses. *Journal of Comparative and Physiological Psychology*, 73, 486-489.

Paxinos, G., & Watson, C. (1986). *The Rat Brain in Stereotaxic Coordinates* (2nd ed.). Academic Press, Orlando.

Pellegrino, L.J., & Clapp, D.F. (1971). Limbic lesions and externally cued DRL performance. *Physiology and Behavior*, 7, 863-868.

Peppeu, G. (1993). Overview and future direction of CNS cholinergic mechanisms. *Progress in Brain Research*, 98, 455-458.

Peppeu, G., & Blandina, P. (1998). The acetylcholine, GABA, glutamate triangle in the rat forebrain. *Journal of Physiology Paris*, 92, 351-355.

Perry, E., Walker, M., Grace, J., & Perry, R. (1999). Acetylcholine in mind: a neurotransmitter correlate of consciousness? *Trends in Neuroscience*, 22, 273-280.

Potegal, M. (1969). Role of the caudate nucleus in spatial orientation of rats. *Journal of Comparative and Physiological Psychology*, 69, 0756-764.

Potegal, M. (1982). Vestibular and neostriatal contributions to spatial orientation. In Potegal, M (Ed.), *Spatial abilities, development and physiological foundation* (pp. 361-387), New York: Academic Press.

Potter, P.E., Tedford, C.E., Kindel, G.H., & Hanin, I. (1987). Inhibition of a high affinity choline transport with A-4 attenuates the effect of ethylcholine mustard aziridinium (AF64A) on both cholinergic and serotonergic parameters. *Society of Neuroscience Abstract*, 1193.

Ranck, J.B., Jr. (1973). Studies on single neurons in dorsal hippocampal formation and septum in unrestrained rats. *Experimental Neurology*, 41, 461-555.

Rasmusson, D.D. (1993). Cholinergic modulation of sensory information, *Progress in Brain Research*, 98, 357-364.

Reading, P.J., Dunnett, S.B., & Robbins, T.W. (1991). Dissociable roles of the ventral, medial and lateral striatum on the acquisition and performance of a complex visual stimulus-response habit. *Behavioral Brain*

*Research*, 45, 147-161.

Salamone, J.D., Beart, P.M., Alpert, J.E., & Iversen, S.D. (1984). Impairment in T-maze reinforced alternation performance following nucleus basalis magnocellularis lesions in rats. *Behavioral Brain Research*, 13, 63-70.

Sanberg, P.R., Hanin, I., Fisher, A., & Coyle, J.T. (1984). Selective cholinergic neurotoxin: AF64A's effects in rat striatum. *Brain Research*, 293, 49-55.

Sanberg, P.R., Lehmann, J., & Fibiger, H.C. (1978). Impaired learning and memory after kainic acid lesions of the striatum: A behavioral model of Huntington's disease. *Brain Research*, 149, 546-551.

Sandberg, K., Sanberg, P.R., & Coyle, J.T. (1984). Effects of intrastriatal injections of cholinergic neurotoxin AF64A on spontaneous nocturnal locomotor behavior in the rat. *Brain Research*, 299, 339-343.

Schwartzbaum, J.S., & Donovick, P.J. (1968). Discrimination reversal and spatial alternation associated with spatial and caudate dysfunction in rats. *Journal of Comparative and Physiological Psychology*, 65, 83-92.

Seki, M., & Zyo, K. (1992). Relationship between the hippocampal formation and the cortical and subcortical regions. *Acta Anatomica Nippon*, 67, 595-605.

Solomon, P.R., & Moore, J.W. (1975). Latent inhibition and stimulus generalization of the classically conditioned nictitating membrane re-

- sponse in rabbits (*Oryctolagus cuniculus*) following dorsal hippocampal ablation. *Journal of Comparative and Physiological Psychology*, 89, 1192-1203.
- Squire, L.R. (1986). Mechanisms of memory. *Science*, 232, 1612-1619.
- Squire, L.R. (1986). Divisions of long-term memory. In Squire, L.R. (Ed.), *Memory and Brain* (pp.151-174). New York, Oxford: Oxford University Press.
- Stwertka, S.A., & Olson, G.L. (1986). Neuropathology and amphetamine-induced turning resulting from AF64A injections into the striatum of rat. *Life Sciences*, 38, 1105-1110.
- Thompson, W.G., Guilford, M.O., & Hicks, L.H. (1980). Effects of caudate and cortical lesions on place and response learning in rats. *Physiological Psychology*, 8, 473-479
- Thompson, R., & Yang, S. (1982). Retention of individual spatial reversal problems in rats with nigral, caudoputamenal, and reticular formation lesions. *Behavioral and Neural Biology*, 34, 98-103.
- Tulving, E., & Schacter, D.L. (1990). Priming and human memory systems. *Science*, 247, 301-306.
- Van der Zee, E.A., & Luiten, P.G.M. (1999). Muscarinic acetylcholine receptors in the hippocampus, neocortex and amygdala: a review of immunocytochemical localization in relation to learning and memory. *Progress in Neurobiology*, 58, 409-471.

- Viaud, M.D., & White, N.M. (1989). Dissociation of visual and olfactory conditioning in the neostriatum of rats. *Behavioral Brain Research*, 32, 31-42.
- Villani, L., Contestabile, A., Migani, P., Poli, A., & Fonnum, F. (1986). Ultrastructural and neurochemical effects of the presumed cholinergic toxic AF64A in the rat interpeduncular nucleus. *Brain Research*, 379, 223-231.
- Vincent, S.R., Satoh, K., Armstrong, D.M., & Fibiger, H.C. (1983). Substance P in the ascending cholinergic reticular system. *Nature*, 306, 688-691.
- Walker, J.A., & Olton, D.S. (1984). Fimbria-fornix lesions impair spatial working memory but not cognitive mapping. *Behavioral Neuroscience*, 98, 226-242.
- Waller, S.B. & London, E.D. (1989). Choline acetyltransferase activity and muscarinic binding in brain regions of aging Fischer-344 rats. *Neurochemistry International*, 14, 483-490.
- Walsh, T.J., Tilson, H.A., Dehaven, D.L., Mailman, R.B., Fisher, A., & Hanin, I. (1984). AF64A, a cholinergic neurotoxin, selectively depletes acetyl-choline in hippocampus and cortex, and produces long term passive avoidance and radial-maze deficits in rat. *Brain Research*, 321, 91-102.
- Watts, J., Stevens, R., & Robinson, C. (1981). Effects of scopolamine on radial maze performance in rats. *Physiology and Behavior*, 26, 845-851.
- White, N.M., & Major, R. (1978). Facilitation of retention by self-stimula-

tion and by experimenter administered stimulation. *Canadian Journal of Psychology*, 32, 116-123.

White, N.M. (1988). Effect of nigrostriatal dopamine depletion on the post-training, memory improving action of amphetamine. *Life Sciences*, 43, 7-12.

Whitehouse, J.M. (1964). Effects of atropine on discrimination learning in the rat. *Journal of Comparative and Physiological Psychology*, 57, 13-15.

Winocur, G. (1974). Functional dissociation within the caudate nucleus of rats. *Journal of Comparative and Physiological Psychology*, 86, 432-4389

Winocur, G. (1980). The hippocampus and cue utilization. *Physiological Psychology*, 8, 280-288.

Winocur, G. & Mills, J. (1969). Effects of caudate lesions on avoidance behavior in rats. *Journal of Comparative and Physiological Psychology*, 68, 552-557.

Woodruff, M.L., & Isaacson, R.L. (1972). Discrimination learning in animals with lesions of hippocampus. *Behavioral Biology*, 7, 489-501.

Woody, C.D., and Gruen, E. (1993). Cholinergic and glutamatergic effects on neocortical neurons may support rate as well as development of conditioning. *Progress in Brain Research*, 98, 365-370.

Woolf, N.J. (1991). Cholinergic systems in mammalian brain and spinal cord. *Progress in Neurobiology*, 37, 475-524.

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

Yahr, M.D. (1976). *The Basal Ganglia*. New York: Raven Press.

Yamamoto, Y., Hori, K., Tanaka, J., Iwano, H., & Nomura, N. (1995). Septo-hippocampal cholinergic system under the discrimination learning task in the rat: a microdialysis study with the dual-probe approach. *Brain Research*, 684, 1-7.

Zhou, L., Zhang, S., Connell, T.A., & Weiss, B. (1993). AF64A lesions of mouse striatum result in ipsilateral rotations to D<sub>2</sub> dopamine agonists but contralateral rotations to muscarinic cholinergic agonists. *Journal of Pharmacology and Experimental Therapeutics*, 2, 824-830.

Zis, A.P., Fibiger, H.C., & Philips, A.G. (1974). Reversal by L-dopa of impaired learning due to destruction of the dopaminergic nigrostriatal projection. *Science*, 185, 960-963.

Zoladek, L. & Roberts, A.W. (1978). The sensory basis of spatial memory in rat. *Animal Learning and Behavior*, 6, 77-81.

## Abbreviations

ACh	acetylcholine
AChE	acetylcholinesterase
AF64A	ethylcholine mustard aziridinium ion
AL	allocentric localization
ANOVA	analysis of variance
Ch	choline
ChAT	choline acetyltransferase
CS	conditioned stimulus
CSF	cerebrospinal fluid
DA	dopamine
DOPAC	3,4-dihydroxyphenylacetic acid
DRL	differential reinforcement of low rate
EDTA-2NA	disodium ethylenediamine tetraacetic acid
EHC	ethylhomocholine
EL	egocentric localization
EPSP	excitatory postsynaptic potential
GABA	$\gamma$ -aminobutyric acid
H <sub>2</sub> O <sub>2</sub>	hydrogen peroxide
HACU	high affinity choline uptake
HC-3	hemicholinium-3
Hip	hippocampus
HPLC	high performance liquid chromatography
HVA	homovanillic acid
ISO	isoproterenol
LTP	long-term potentiation
MAB	maleic acid buffer
mRNA	messenger ribonucleic acid
NA	noradrenalin
NBM	nucleus basalis magnocellularis
NGF	nerve growth factor
NMDA	N-methyl-D-aspartate
OT	overtraining
PB	phosphate buffer
PBS	phosphate buffered saline
PCA	perchloric acid
PPN	pedunculopontine
REM	rapid eye movement
Sal	saline
Str	striatum
5-HIAA	5-hydroxyindoleacetic acid
5-HT	5-hydroxytryptamine