

CURRICULUM VITAE

John P. Walsh

Associate Professor
Davis School of Gerontology
Andrus Gerontology Center
University of Southern California
Los Angeles, CA 90089-0191
(213) 740-4909

Appointments:

Fellow, Center for Excellence in Teaching (CET) – May 2007 (permanent appointment)
University of Southern California
http://www.usc.edu/programs/cet/faculty_fellows/

Director of the Leonard Davis School of Gerontology – June 2004-June 2006

Associate Professor – July 1996 - Present
Davis School of Gerontology
University of Southern California
Los Angeles, CA 90089-0191

Assistant Professor - January, 1990 - June, 1996
Primary Appointment: Davis School of Gerontology
Affiliate Appointment: Program in Neurosciences
University of Southern California
Los Angeles, CA 90080-0191

Asst. Research Physiologist - November, 1987 - December, 1989
Mental Retardation Research Center
University of California - Los Angeles
Los Angeles, CA 90024

Education and Training:

Postdoctoral Trainee - November, 1985 - November, 1987
Mental Retardation Research Center
University of California - Los Angeles
760 Westwood Plaza
Los Angeles, CA 90024

Ph.D. degree - December 13, 1985
Graduate School of Biomedical Sciences

University of Texas Health Science Center at Houston
Houston, Texas 77025

Neurobiology of Behavior Course, Summer, 1984
Cold Spring Harbor Laboratories
Cold Spring Harbor, New York 11724

B.S. degree (Biology) - 1979
University of California at Irvine
Irvine, California 92717

Teaching Experiences:

USC: Biology of Development and Aging (13 semesters), Neurobiology of Aging (13 semesters), Physiology of aging (4 semesters), The Science of Adult Development (an Introduction to the field of Gerontology)(18 semesters). All USC courses were 4 unit courses (1990-2008).

Mind Matters Seminars and Cortext, Inc: CED credit courses “*Aging and Longevity*” and “*Aging brain: Aging mind*”. 8 Hour course marketed by a private company. Courses were worth 8 CED units for health-related careers (1993-2000).

UCLA: Medical Physiology Lab (one semester,1987)

Univ. Texas School of Medicine: Neuroanatomy labs (2 semesters, 1984-1985)

Woods Hole Marine Biology Laboratories: (3 summer courses, 1984-1986)

Administrative Experiences:

Director, Leonard Davis School of Gerontology – 2004-2006

USC Provost Committee on Academic Programs and Teaching (CAPT) 2005-2008

Committee on Learner-Centered Education (05-06)

Committee on Assessment of Teaching and Learning (06-07)

Committee on Residential Living (07-08)

USC Deans of Faculty Council (2004-2006)

USC Provost Committee on Academic Programs (2004-2006)

USC Undergraduate Curriculum Committee (2003-2004)

USC Faculty Senate (2002-2003)

USC College of Letters, Arts and Sciences Pre-Med Advisement Committee (1996-1999, 2002)

USC Neuroscience Program Admissions Committee (1993, 1995, 1998)

USC Neuroscience Program Graduate Advisement Committee (1994, 1996-1998, 2002-present)

USC Andrus Gerontology Center Faculty Council (1999-2008)

USC Andrus Gerontology Center Personnel Committee (1997-2006)

USC Andrus Center Health Sciences Track Undergraduate Advisor (2001-present)

Membership in Professional and Scientific Society

1982 - Present Society for Neuroscience

Awards Granted:

Neurophysiological analysis of neurons transplanted into autosomal recessive Han-Wistar rats.
Neuropsychiatric Institute Biomedical Research Support Grant.

11/1/86 - 10/31/87 \$5,000

Dopaminergic modulation of dye coupling in the neostriatum.
Neuropsychiatric Institute Biomedical Research Support grant.

11/1/87 - 10/31/88 \$5,000

Neuronal transplantation and the formation of functional synaptic connections.
Bank of America - Giannini Foundation Fellowships in Medical Research

07/1/88 - 6/30/89 \$20,000

Alteration of dopaminergic modulation of neostriatal physiology associated with aging.
USC - Faculty Research Innovation Fund

07/1/90 - 06/30/91 \$15,000

Sensitivity of young and aged substantia nigra neurons to anoxia and excitotoxicity.
Sandoz Foundation for Gerontological Research

10/1/90 - 9/30/91 \$20,000

Electrophysiology of aging in the nigrostriatal system
In: NIA program project grant headed by Dr. Franz Hefti - "Dopaminergic and basal ganglia
plasticity in aging"

6-01-91 to 5-31-96 \$417,056/5yr

Age-dependence of the electrophysiological response to excitotoxicity in the basal forebrain.
American Federation For Aging Research (AFAR), Inc.

9-1-91 to 8-30-92 \$21,728

Calcium and synaptic homeostasis in septal aging
NIA Pilot Project - Part of grant for ADRC of Southern California

4-1-95 to 3-31-96 \$19,994

Leadership and Excellence in Alzheimer's Disease (LEAD)
Junior Investigator (AG07904)

2-1-95 to 12-31-95	\$57,867
Neurotrophin modulation of nigral calcium currents Andrus Associates Award	
6-1-95 to 5-30-96	\$6,000
Senescence and striatal synaptic plasticity 1R29 AG12679-1A1 (NIA R29)	
8-1-95 to 7-31-00	\$350,000/5yr
Electrophysiology of aging in the nigrostriatal system In: NIA program project grant headed by Dr. Tom McNeill - "Dopaminergic and basal ganglia plasticity in aging"	
6-01-96 to 5-31-01	\$450,000/5yr
Striatal neuron visualization and whole cell patch clamp technology USC James H. Zumberge Fund	
7-1-97 to 6-30-98	\$21,783/1 yr
Characterization of antioxidant effects produced by vitamins and minerals in a live cell assay system modeled for Alzheimer's Disease. John Douglass French Foundation	
1-01-00 to 6-30-00	\$35,000
Dopamine-radicals cause aging of corticostriatal synapses Pilot Project – Multidisciplinary Approaches in Biogerontology (NIA/NIH 5 K07 AG00729)	
9-01-01 to 8-31-02	\$15,000
Mitochondrial inhibition mimics corticostriatal aging 1 RO1 AG021937-01 A1 (NIH/NIA RO1)	
8/01/04 – 7/31/08	\$175,000/year (4 years)
Exercise Induced Electrophysiological Changes in the Basal Ganglia of the MPTP-lesioned Mouse Model of Dopamine Dysfunction JAMES H. ZUMBERGE RESEARCH AND INNOVATION FUND (USC) Collaborative grant with Dr. Michael Jakowec (USC Neurology)	
7/01/05 – 6/30/06	\$50,000

GERO 414—Multimedia Learning Tool (MLT) to Create Learner-Centered Instruction for Gerontology 414: Neurobiology of Aging.
Fund for Innovative Undergraduate Teaching
USC Center for Excellence in Teaching

7/01/05 – 6/30/06

\$14,250

Minority Access to Research Careers Award

P.I.: Cynthia Crawford, Ph.D., CSU San Bernardino

Role on Project (Walsh): External Advisor & Serve as a mentor for students interested in learning how to use electrophysiology in biomedical investigations.

Period: 4/1/07 to 3/30/12

Source: NIH

Multi-disciplinary investigation into pathological mechanism of hypoxia and Parkinson's disease

P.I.: John P. Walsh, Ph.D.

Role on project: Serve as mentor for undergraduate research in my laboratory

Period: 7/01/07 to 6/30/08

\$10,000

Source: USC Undergraduate Research Program

Proposal to develop a learner-centered on-line education tool for studying diseases of the brain

P.I.: John P. Walsh, Ph.D.

Source: USC Provost Seed Grants for Teaching with Technology

Role on project: To supervise content and format to be used in on-line teaching tool

Period: 7/01/07 to 6/30/08

\$50,000

Pending Grant applications:

Title: Pramipexole modulation of stroke-induced changes in dopamine and glutamate physiology

Role on project: co-P.I (with Michael Jakowec)

Period: 7/1/08 to 6/30/10 \$250,000 over 2 years

Source: R21 - NINDS

The goal of this study is the incorporation and synaptic integration of stem cells into areas of the hippocampus damaged in an in vitro slice model of stroke

Title: Stroke: Functional integration of adult and embryonic stem cell-derived neurons

Role on project: co-P.I (with Carol Miller)

Period: 7/1/08 to 6/30/10 \$250,000 over 2 years

Source: R21 - NINDS

The goal of this study is the incorporation and synaptic integration of stem cells into areas of the hippocampus damaged in an in vitro slice model of stroke

Title: Exercise-induced repair of the injured brain

Role on project: Co-PI (Jakowec and Walsh)

Period: May 2007-April 2011 Direct Costs: \$600,000 over 4 years.

Source: US Army TBI PT075162

The goal of this study is to examine the impact exercise has on the recovery of dopamine and

glutamate innervation in a mouse model for Parkinson disease.

Online multimedia teaching tool for neurobiology.

P.I.: John P. Walsh, Ph.D.

Source: National Science Foundation (NSF)

Course, Curriculum, Laboratory Improvement (CCLI) Program

Role on project: To supervise the development of the online multimedia teaching tool.

Period: 1/01/09 to 12/31/11 \$145,571

Dopamine-glutamate plasticity in nigrostriatal injury.

Role on project: co-P.I.

Period: 3/1/08 to 4/30/13 \$293,400/year (\$1,467,000 total)

Source: NIA

The goal of this study is to examine the impact exercise has on the recovery of dopamine and glutamate innervation in a mouse model for Parkinson disease.

UDALL Center for Parkinson's Disease – Exercise enhanced neuroplasticity in Parkinson's disease and the MPTP mouse model.

PI: Giselle Petzinger, M.D.

Submitted November 2007 1 P50 NS059999-01 \$7,500,000 Direct

Resubmission May 25, 2008

Role on project: Project PI

Project title: Dopamine and glutamate plasticity with exercise in the MPTP lesioned mouse.

Period: 1/1/09 to 12/30/14 Project direct cost: \$293,400/year (\$1,467,000 total)

Source: NIH - NINDS

The goal of this program is to integrate basic science and clinical studies using exercise as intervention for Parkinson's disease.

Invited Lectures:

Nov. 25, 1985 Analysis of serotonergic modulation of neurons involved in two defensive behaviors in *Aplysia californica*.

Dept. of Physiology and Cell Biology
University of Texas Medical School at Houston,
Houston, Texas 77025

May 16, 1986 Serotonin modulation of motor and sensory neurons in *Aplysia californica*.
Neuropsychiatric Institute, UCLA - Los Angeles,
California 90024-1759

Oct. 18, 1986 Electrophysiological analysis of transplanted neostriatal neurons.
UCLA Mental Retardation Research Center
Annual Conference at Lake Arrowhead, California

Oct. 17, 1987 The Han-Wistar rat: A genetic model for an extrapyramidal brain disorder.

UCLA Mental Retardation Research Center
Annual Conference at Lake Arrowhead, California

- Feb. 26, 1988 Neuronal transplantation and the formation of functional synaptic connections.
Bank of America - Giannini Foundation
Pebble Beach, California
- Aug. 24, 1988 Neurophysiological development of transplanted striatal neurons *in vitro*.
8th I.A.S.S.M.D. Congress, Trinity College,
Dublin, Ireland
- Oct. 15, 1988 Cholinergic modulation of neocortical neurons.
UCLA Mental Retardation Research Center
Annual Conference at Lake Arrowhead, California
- June 11, 1989 Neurophysiological development of feline substantia nigra neurons *in vitro*.
IIIrd International Basal Ganglia Society Meeting
Cagliari, Italy
- Aug. 3, 1989 Development and grafting in the basal ganglia.
Ethel Percy Andrus Gerontology Center
University of Southern California
Los Angeles, CA 90089
- Mar 6, 1990 Cholinergic modulation of neurons recorded in neostriatal slices from Patients
with intractable epilepsy
Ethel Percy Andrus Gerontology Center
University of Southern California
Los Angeles, CA 90089
- March 28, 1990 Neuromodulation in the neostriatum
Department of Biology
University of Southern California
Los Angeles, CA 90089
- March 9, 1991 Physiology of aging made simple
Update on Geriatric Medicine
Antelope Valley Hospital Medical Center
1600 West Avenue J, Lancaster, CA 93534
- Feb 1-2, 1992 Transplantation as a tool for understanding the neurobiology of Huntington's
Disease
Hereditary Disease Foundation
Mary Jenifer Selznick Workshop Program
Santa Monica, CA 90401

- March 14, 1992 Sensory deprivation / Changes in the elderly
 Update on Geriatric Medicine
 Antelope Valley Hospital Medical Center
 1600 West Avenue J, Lancaster, CA 93534
- Nov. 12, 1992 Physiological Correlates of aging and altered motor performance
 Multidisciplinary Research Colloquium Series on Aging
 Ethel Percy Andrus Gerontology Center
 University of Southern California
 Los Angeles, CA 90089
- March 18, 1993 Electrophysiological correlates of aging in the striatum
 Dept. of Cell and Molecular Biology
 Tulane University
 New Orleans, LA
- Sept. 30, 1993 Age-related alterations in calcium homeostasis in the striatum
 Dept. of Biokinesiology and Physical Therapy
 University of Southern California
 Los Angeles, CA 90033
- March 6, 1994 Alteration in calcium homeostasis in the aged brain.
 25th Annual Meeting, American Society of Neurochemistry
 Colloquium - Neural Plasticity in the aged brain
 Albuquerque, NM
- Nov. 23, 1994 Neuroplasticity and aging in the basal ganglia
 Dept. of Cell and Molecular Biology
 Tulane University
 New Orleans, LA
- Feb. 28, 1995 Neuroplasticity and aging in the basal ganglia
 Dept. of Biomedical Engineering
 University of Southern California
 Los Angeles, CA 90089-0191
- Sept. 27, 1995 Senescence of corticostriatal synapses
 3rd Annual Neuroscience Symposium
 The Synapse
 Dept. Biological Sciences
 University of Southern California
 Los Angeles, CA 90089-0191
- Oct. 11, 1995 Expectations for successful aging
 Edward R. Roybal Institute for Applied Gerontology
 California State University, Los Angeles

Los Angeles, CA 90032

- Nov. 15, 1996 Neurophysiological correlates of aging
Department of Psychology
Gettysburg College
Gettysburg, PA 17325-1486
- Oct. 20, 1997 Pre- and postsynaptic contributions to synaptic plasticity in the striatum
5th Annual Neuroscience Symposium
The Basal Ganglia
Dept. Biological Sciences & USC Program in Neurosciences
University of Southern California
Los Angeles, CA 90089-0191
- Feb 19, 2004 Age-Related Loss of Facilitating Corticostriatal Synapses (may be) Related to an
Interaction Between Striatal Dopamine and Reactive Oxygen Species
Workshop on Plasticity and Repair in Neurodegenerative Disorders
UCLA Conference Center
Lake Arrowhead, California
- Nov 4, 2005 Acute and long-term consequences of chemical hypoxia in the brain
Grand Rounds
USC Department of Neurology
Los Angeles, CA
- Sept 7, 2007 What can mitochondrial inhibition tell us about striatal disease and aging?
USC Neuroscience Program Annual Retreat
Aliso Creek Resort
Laguna Beach, California

Publications:

Walsh, J.P. and Byrne, J.H. Analysis of decreased conductance serotonergic response in *Aplysia* ink motor neurons. J. Neurophys. 53: 590-602, 1985.

Walsh, J.P. and Byrne, J.H. Forskolin mimics and blocks a serotonin-sensitive decreased K^+ conductance in tail sensory neurons of *Aplysia*. Neurosci. Letters 52: 7-11, 1984.

Walsh, J.P., Zhou, F.C., Hull, C.D., Fisher, R.S., Levine, M.S. and Buchwald N.A. Physiological and morphological characterization of striatal neurons transplanted into the striatum of adult rats. Synapse, 2: 37-44, 1988.

Walsh, J.P. and Byrne, J.H. Modulation of a steady-state Ca^{2+} activated K^+ current in tail sensory neurons of *Aplysia*: Role of serotonin and cAMP. J. Neurophys., 61: 32-44, 1989.

Walsh, J.P., Hull, C.D., Levine, M.S. and Buchwald, N.A. Kynurenic acid antagonizes the excitatory post-synaptic potential elicited in neostriatal neurons in the *in vitro* slice of the rat. Brain Res., 480: 290-293, 1989.

Cepeda, C., Walsh, J.P., Hull, C.D. and Buchwald, N.A., Intracellular neurophysiological analysis reveals alterations in excitation in striatal neurons in aged rats. Brain Res., 494: 215-226, 1989.

Walsh, J.P., Cepeda, C., Hull, C.D., Fisher, R.S., Levine, M.S. and Buchwald, N.A. Dye-coupling in the neostriatum of the rat: II. Decreased coupling between neurons during development. Synapse 4:238-247, 1989.

Cepeda, C., Walsh, J.P., Hull, C.D., Howard, S.G., Buchwald, N.A. and Levine, M.S. Dye-coupling in the neostriatum of the rat: I. Modulation by dopamine depleting lesions. Synapse. 4:229-237, 1989.

Waurin, J.-P., Kim, Y.I., Cepeda, C., Tasker, J.G., Walsh, J.P., Peacock, W.J., Buchwald, N.A. and Dudek, F.E. Synaptic transmission in human neocortex removed for treatment of intractable pediatric epilepsy. Annals Neurol., 28:503-511, 1990.

Walsh, J.P., Cepeda, C., Buchwald, N.A., Levine, M.S. Neurophysiological maturation of cat substantia nigra neurons: Evidence from in vitro studies, Synapse 7: 291-300, 1991.

Cepeda, C., Walsh, J.P., Levine, M.S. and Buchwald, N.A. Neurophysiological maturation of cat caudate neurons: Evidence from in vitro studies, Synapse 7: 278-290, 1991.

Levine, M.S., Cepeda, C., D'Angio, M.B., Walsh, J.P., and Buchwald, N.A. Dopaminergic modulation of neostriatal neurons: in vitro intracellular recordings, Posters in Neurosci. 1: 43-47, 1992.

Cepeda, C., Walsh, J.P., Peacock, W., Buchwald, N.A., and Levine, M.S., Dye-coupling in human neocortical tissue resected from children with intractable epilepsy, Cerebral Cortex, 3: 95-107, 1993.

Walsh, J.P. Depression of excitatory synaptic input in rat striatal neurons, Brain Res., 608: 123-128, 1993.

Siviy, S.M., Walsh, J.P., Radisavljevic, Z., Cohen, R.W., Buchwald, N. and Levine, M.S. Evidence for enhanced synaptic excitation in transplanted neostriatal neurons. Exp. Neurol., 123: 222-234, 1993.

Walsh, J.P. and Dunia, R. Synaptic activation of NMDA receptors induces short-term potentiation of excitatory synapses in the striatum of the rat, Neurosci., 57: 241-248, 1993.

Cepeda, C., Walsh, J.P., Peacock, W., Buchwald, N.A., and Levine, M.S. Neurophysiological, pharmacological and morphological properties of human caudate neurons recorded *in vitro*,

Neurosci., 59: 89-103, 1994.

Walsh, J.P. and Ou, X. Loss of paired-pulse facilitation at the corticostriatal synapse of the aged rat, Synapse, 17: 36-42, 1994..

Walsh, J.P., Ou, X., Villar, F. Alteration in calcium homeostasis in the aged brain. J. Neurochem. 62:s26,1994.

DeFazio, T. and Walsh, J.P. "Intact" dopaminergic midbrain neurons of the rat display unclamped dendritic Ca²⁺ currents. Neurosci. Let., 208:29-32, 1996.

Dunia, R., Buckwalter, G., DeFazio, T., Villar, F.A.S, McNeill, T.H. and Walsh, J.P. Decreased duration of calcium potentials in striatal neurons from aged rats, J. Neurophysiol., 76:2353-2363, 1996.

Ou, X. and Walsh. J.P. Aging decreases rebound excitation produced by removal of NMDA receptor block in the striatum. Exp. Brain Res., 114:590-594, 1997.

Ou, X., Buckwalter, G., McNeill, T.H. and Walsh, J. P. Age-related changes in short-term synaptic plasticity intrinsic to excitatory striatal synapses of the rat. Synapse, 27:57-68, 1997.

Bottjer, S.W., Brady, J.D. and Walsh, J.P. Intrinsic and synaptic properties of neurons in the vocal-control nucleus IMAN from in vitro slice preparations of juvenile and adult Zebra Finches. J. Neurobiol., 37:642-658, 1998.

Villar, F.A.S. and Walsh, J.P. Modulation of long-term synaptic plasticity at corticostriatal synapses. Neurosci., 90 (3): 1031-1041, 1999.

DeFazio, RA., Pong, K., Knusel, B. and Walsh, J.P. Neurotrophin 4/5 promotes dendritic outgrowth and calcium currents in cultured mesencephalic dopamine neurons. Neurosci.,99(2):297-304, 2000.

Akopian, G., Musleh, W., Smith, R. and Walsh, J.P. Functional state of presynaptic terminals influences the expression of short- and long-term plasticity at corticostriatal synapses. Synapse,38(3):271-80, 2000.

Jiang D-M, Akopian G, Ho Y-S, Walsh JP and Andersen JK. Increased thiol oxidation of the NMDA receptor NR1 subunit renders glutathione peroxidase knockout mice resistant to kainic acid. Exp. Neurol.,164(2):257-68, 2000.

Fitzpatrick, JS, Akopian G, and Walsh JP. Short-term plasticity at inhibitory synapses in rat striatum and its effects on striatal output. J. Neurophysiol.,85: 2088-2099, 2001.

Smith, R., Musleh, W., Akopian, W., Buckwalter, G. and Walsh, J.P. Regional differences in the expression of corticostriatal synaptic plasticity, Neurosci., 106(1):95-101, 2001.

Akopian, G. and Walsh, J.P. Paired-pulse potentiation produced by voltage-dependent activation of NMDA receptors and L-type Ca^{2+} channels at corticostriatal synapses. J. Neurophysiol., 87: 157-165, 2002.

Boonplueang R, Akopian GK; Fang F. Stevenson; John F. Kuhlenkamp; Lu, SC, Walsh JP, Andersen J. Increased Susceptibility of Glutathione Peroxidase-1 Transgenic Mice to Kainic Acid-Related Seizure Activity and Hippocampal Neuronal Cell Death Due to Direct Activation of the NMDA Receptor by GSSG, Exp. Neurol., 192: 203-214, 2005.

Akopian G and Walsh JP. Reduced expression of short- and long-term facilitation at aged corticostriatal synapses. Synapse, 60: 223-238, 2006.

Akopian G, Walsh JP. Reliable long-lasting depression interacts with variable short-term facilitation to determine corticostriatal paired-pulse plasticity. J Physiol, 580:225-240, 2007.

Petzinger GM, Walsh JP, Akopian G, Hogg E, Abernathy A, Arevalo P, Turnquist P, Fisher BE, Togasaki D, Jakowec ME. Effects of Treadmill Exercise on Dopaminergic Transmission in the 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine-(MPTP)-Lesioned Mouse Model of Basal Ganglia Injury. J Neuroscience, 27: 5291-5300, 2007.

Petzinger GM, Walsh JP, Akopian G, Hogg E, Abernathy A, Arevalo P, Turnquist P, Fisher BE, Togasaki D, Jakowec ME. Enhancing neuroplasticity in the basal ganglia: The role of exercise in Parkinson's disease. Movement Disorders, in press.

G Akopian, C Crawford, MF Beal, M Cappelletti, MW Jakowec, G Petzinger, SL Gheorghe, R Chow, JP Walsh. Decreased striatal dopamine release underlies increased expression of long-term synaptic potentiation at corticostriatal synapses 24 hours after 3-nitropropionic acid induced chemical hypoxia. J Neurosci, submitted.

Misiaszek G, Maria Henke M, Walsh JP. Online Multimedia Teaching Tool for Parkinson's Disease. Journal of Undergraduate Neuroscience Education (JUNE), submitted.

VanLeeuwen, J., G. M. Petzinger, M. Vuckovic, G. Akopian, M. Ramirez, J. P. Walsh, and M. W. Jakowec (2008) Altered AMPA-Receptor Expression with Treadmill Exercise in the 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine-Lesioned Mouse Model of Basal Ganglia Injury. Neurobiology of Aging, submitted.

Book Chapters:

Byrne, J.H., Ocorr, K.A., Walsh, J.P. and Walters, E.T. Analysis of associative and nonassociative neuronal modifications in *Aplysia* sensory neurons. In: Neural Mechanisms of Conditioning, D.L. Alkon and C.D. Woody (Eds.), Plenum Publishing Corp., N.Y., p. 55-73, 1985.

Cepeda, C., Walsh, J.P, Hull, CD., Buchwald, N.A. and Levine, M.S. Dye-coupling in the neostriatum. Adv. Behav. Biol. 39: Basal Ganglia III, Eds. G. Bernardi, M.B. Carpenter, Di

Chiara, G., Morelli, M. & Stanzione, P. pp. 213-220, 1991.

Walsh, J.P., Hull, C.D., Cepeda, C.D., Levine, M.S. and Buchwald, N.A. Neurophysiological development of fetal neostriatal neurons transplanted into adult neostriatum. Adv. Behav. Biol. 39: Basal Ganglia III, Eds. G. Bernardi, M.B. Carpenter, Di Chiara, G., Morelli, M. & Stanzione, P. pp. 551-560, 1991.

Walsh, J.P. Vascular Aging. In: Vascular Disease in the Elderly, Eds. W.S. Aronow, E.S. Stemmer, S.E. Wilson, Futura Publishing, Armonk, N.Y., 1997.

Walsh, J.P. Ion channels and molecular events in neuronal activity. In: International Encyclopedia of the Social & Behavioral Sciences., Eds., Neil J. Smelser and Paul B. Baltes, pp. 7897-7903, 2002

Petzinger, GM, Daniel M. Togasaki, DM, Akopian G, Walsh, JP, and Jakowec, MW. Experimental Therapeutics and the Nonhuman Primate Models of Parkinson's Disease, In: Parkinson disease: pathogenic and therapeutic insights from toxin and genetic models. Eds. S. Przedborski and R. Nass. Elsevier Inc., San Diego, CA. 2008.

Abstracts:

Walsh, J.P. and Byrne, J.H. Serotonin produces a slow decreased conductance excitatory response in ink motor neurons of *Aplysia*. Soc. Neurosci. Abstr., 8: 989, 1982.

Walsh, J.P. and Byrne, J.H. Comparison of decreased conductance serotonergic responses in ink motor neurons and tail sensory neurons in *Aplysia*. Soc. Neurosci. Abstr., 9: 458, 1983.

Walsh, J.P. and Byrne, J.H. Decreased conductance inward currents produced by the 8-bromo derivatives of cAMP and cGMP in *Aplysia* ink motor neurons and tail sensory neurons. Soc. Neurosci. Abstr., 10: 867, 1984.

Walsh, J.P. and Byrne, J.H. Cyclic AMP and calcium sensitivity of the 5-HT response in tail sensory neurons of *Aplysia*. Soc Neurosci. Abstr., 11: 789, 1985.

Walsh, J.P., Hull, C.D., Levine, M.S., Zhou, F.C. and Buchwald, N.A. Intracellular study of transplanted striatal neurons. Soc. Neurosci. Abstr. 12: 1580, 1986.

Walsh, J.P., Zhou, F.C., Hull, C.D., Fisher, R.S., Levine, M.S. and Buchwald, N.A. Physiological comparison of normally developing striatal neurons and transplanted striatal neurons in rats. Soc. Neurosci. Abstr., 13: 511, 1987.

Cepeda, C., Walsh, J.P., Buchwald, N.A., Hull, C.D., Fisher, R.S. and Levine, M.S. Decreased excitation in striatal neurons in aged rats revealed by intracellular recording. Soc. Neurosci. Abstr., 13: 1566, 1987.

Hiraide, L., Walsh, J.P., Hull, C.D., Zhou, F.C., Fisher, R.S., Buchwald, N.A. and Levine, M.S. Behavioral evaluation of motor dysfunctions in mutant Han-Wistar rats: A model for inherited

disorders of the basal ganglia. Soc. Neurosci. Abstr., 13: 1566, 1987.

Walsh, J.P., Zhou, F.C., Hull, C.D., Fisher, R.S., Levine, M.S. and Buchwald, N.A. Physiological comparison of normally developing striatal neurons and transplanted striatal neurons in rats. Schmitt Neurol. Sci. Symp.: Transplantation into the mammalian CNS, 1987.

Buchwald, N.A., Cepeda, C., Walsh, J.P., Hull, C.D. and Levine, M.S., Neurophysiological development of feline basal ganglia neurons *in vitro*: Caudate Nucleus. Soc. Neurosci. Abst. 14: (34.21), 78, 1988.

Levine, M.S., Walsh, J.P., Buchwald, N.A. and Hull, C.D. Neurophysiological development of feline basal ganglia neurons *in vitro*: Substantia Nigra. Soc. Neurosci. Abst. 14: (34.17), 77, 1988.

Cepeda, C., Walsh, J.P., Buchwald, N.A., Hull, C.D., and Levine, M.S. Dye-coupling between neostriatal neurons: Modulation by dopamine. Soc. Neurosci. Abst. 14: (34.19), 77, 1988.

Walsh, J.P., Cepeda, C., Fisher, R., Hull, C.D., and Levine, M.S. Dye-coupling between neostriatal neurons: Developmental regulation. Soc. Neurosci. Abst. 14: (34.18), 77, 1988.

Lee, N., Walsh, J.P., Hull, C.D. and Levine, M.S. Pharmacological and morphological evidence for the formation of connections between transplanted neostriatal neurons and surrounding host nervous tissue. Soc. Neurosci. Abst. 14: (34.15), 77, 1988.

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