

CURRICULUM VITAE

Karen Diane Parfitt, Ph.D.
Professor of Neuroscience
Affiliate Member of Molecular Biology
September 12, 2019

EDUCATION

Ph.D. in Pharmacology, University of Colorado Health Sciences Center, Denver	1989
B.S. in Biological Sciences, Cornell University	1983

EMPLOYMENT

Professor of Neuroscience, Pomona College	2017-present
Associate Professor of Neuroscience, Pomona College	2011-2017
Visiting Associate Professor, University of Otago, Dunedin NZ	2012-2013
Observed that secreted APP α (sAPP α) has metaplastic effects in the rodent hippocampus and reverses synaptic plasticity deficits produced by β -amyloid, in the laboratory of Dr. Cliff Abraham.	
Visiting Researcher, Cornell University	2006
Studied the role of neuronal SNAP24 and SNAP25 in neurotransmitter release, in the laboratory of Dr. David Deitcher	
Visiting Researcher, California Institute of Technology	2002
Studied the activation of hippocampal dendritic protein synthesis by dopamine, in the laboratory of Dr. Erin Schuman	
Associate Professor of Biology, Pomona College	2000-2011
Visiting Researcher, University of Colorado Health Sciences Center	Fall 1997
Studied the modulation of synaptic plasticity by β -adrenergic receptors or ethanol in the laboratory of Dr. Michael Browning	
Assistant Professor of Biology, Pomona College	1994-2000
Postdoctoral Scholar, Stanford University	1992-1994
Investigated the role of synaptotagmin and syntaxin in neurotransmitter release at the <i>Drosophila</i> neuromuscular junction, in the laboratory of Dr. Thomas Schwarz.	
Postdoctoral Scholar, Stanford University	1989-1992
Studied synaptic plasticity in rat hippocampus, particularly the role of presynaptic calcium channels and protein kinase C in synaptic plasticity, in the laboratory of Dr. Daniel Madison	
House manager for a psychiatric residential facility, H.O.M.E.S. Inc., Ithaca NY	1983-1984
Managed two halfway houses for young adults with psychiatric disabilities, with the goal of adjustment to community living; mentored by Ronald Mack, PhD, Psychology Department, Cornell University	

FELLOWSHIPS AND GRANTS

Pomona College Faculty Grant	2019-2020
Professional Development Network grant (\$2500)	2017-2018
Faculty for Undergraduate Neuroscience Equipment Loan Grant (\$10,000)	2016-2017
Hirsch Initiation Grant (\$10,000)	2009-2010
Mellon Partnership Grant (\$2000)	2009-2010
Hirsch Initiation Grant (\$10,000)	2003-2004
Academic Research Enhancement Award, National Institute of Aging (\$75,000)	1998-2001
American Federation for Aging Research (AFAR) Research Grant (\$40,000)	1995-1997
NSF Instrumentation and Laboratory Improvement (ILI) Grant (\$112,000)	1995
National Research Service Award, National Institute of Mental Health	1991

HONORS AND AWARDS

Faculty for Undergraduate Neuroscience (FUN) Service Award	2011
Walter Nicolai Award for Research in Aging (from the American Aging Association)	1988

PUBLICATIONS

Peer-reviewed articles

Mockett, B.G., Guévremont, D., Elder, M., Parfitt, K.D., Peppercorn, K., Morrissey, J., Singh, A., Hintz, T.J., Kochen, L., Tom Dieck, S., Schuman, E.M., Tate, W.P., Williams, J.M., and Abraham, W.C. (2019) Glutamate receptor trafficking and protein synthesis mediate the facilitation of LTP by secreted amyloid precursor protein–alpha; *Journal of Neuroscience*, 39: 3188-3203.

Wiertelak, E.P., Hardwick, J., Kerchner, M., Parfitt, K.D., & Ramirez, J.J. The New Blueprints: Undergraduate Neuroscience Education in the Twenty-First Century (2018) *Journal of Undergraduate Neuroscience Education*, 16(3):A244-A251.

Tan, V.T.Y., Mockett, B.G., Ohline, S., Parfitt, K.D., Wickie, H.E., Peppercorn, K., Schoderboeck, L., Yahaya, M.F., Tate, W.P., Hughes, S.M. and Abraham, W.C. Lentivirus-mediated expression of human secreted amyloid precursor protein-alpha prevents development of memory and plasticity deficits in a mouse model of Alzheimer's Disease (2018) *Molecular Brain* 11:7.

Aby, E.S.'11, Gumps, K. #, Roth, A.J.'11, Sigmon, S.#, Kim, J.J. '08, Kramer, N.J.'11, Parfitt, K.D., and Korey, C.A. (2013) Mutations in palmitoyl-protein thioesterase 1 alter exocytosis and endocytosis at synapses in *Drosophila* larvae. *Fly*, 7(4):267-279. (#College of Charleston undergraduate).

Krans, J.L., Parfitt, K. D., Rivlin, P. K., Deitcher, D. L. and Hoy, R. R. (2010) The resting membrane potential of *Drosophila melanogaster* larval muscle depends strongly on the calcium gradient. **J. Insect Biology**, 56(3): 304-13.

Johnson, K.G., Tenney, A.P., Duckworth, A., Parfitt, K.D., Marcu, O., Heslip, T.R., Marsh, J.L., Flanagan, J.G., and van Vactor, D. (2006) The HSPGs Syndecan and Dallylike bind the receptor phosphatase LAR and exert distinct effects on synaptic development. **Neuron**, 49:517-531.

Bisel, B.E. '05., Henkins, K.'06 and Parfitt, K.D. (2007) The Alzheimer amyloid β -peptide A β ₂₅₋₃₅ blocks adenylate cyclase-mediated forms of hippocampal long term potentiation (LTP). **Annals of the NY Academy of Sciences**, 1097: 58-63.

Gerald F. Reis'97, Michael B. Lee'97, Alex S. Huang'99 and Karen D. Parfitt (2005) Adenylate cyclase-mediated forms of synaptic potentiation in hippocampal area CA1 are reduced with aging. **J. Neurophysiology**, 93: 3381-3389.

Parfitt, K.D. and Madison, D.V. (1993) Phorbol esters enhance synaptic transmission in the hippocampus by a presynaptic, calcium-dependent mechanism. **Journal of Physiology**, 471:245-268.

DiAntonio, A., Parfitt, K.D. and Schwarz, T.L. (1993) Synaptic transmission persists in *synaptotagmin* mutants in *Drosophila*. **Cell**, 73:1281-1290.

Parfitt, K.D., Doze, V.A., Madison, D.V., and Browning, M.D. (1992) Isoproterenol increases the phosphorylation of the synapsins and increases synaptic transmission in dentate gyrus, but not in area CA1, of the hippocampus. **Hippocampus**, 2(1):59-64.

Parfitt, K.D., Hoffer, B.J. and Browning, M.D. (1991) Direct evidence that norepinephrine increases the phosphorylation of synapsin I and synapsin II in dentate slices of young but not aged Fischer 344 rats. **Proc. Natl. Acad. Sci.**, 88:2361-2365.

Parfitt, K.D., Bickford-Wimer, P.C. and Hoffer, B.J. (1990) Potentiation of GABA_A receptor-mediated inhibitions by isoproterenol in the cerebellar cortex. **Neuropharmacology**, 29:909-916.

Parfitt, K.D. and Freedman, R. (1990) Age-related subsensitivity of cerebellar Purkinje neurons to locally applied beta₁-selective agonist. **Neurobiology of Aging**, 11:591-596.

Parfitt, K.D., Gratton, A. and Bickford-Wimer, P.C. (1990) Electrophysiological effects of D₁ and D₂ dopamine receptor agonists in the medial prefrontal cortex of young and aged Fischer 344 rats. **J. Pharmacology and Experimental Therapeutics**, 254:539-545.

Parfitt, K.D. (1988) Age-related electrophysiological changes in cerebellar noradrenergic receptors. **Age** 11:120-127.

Parfitt, K.D., Freedman, R. and Bickford-Wimer, P.C. (1988) Electrophysiological effects of locally-applied noradrenergic agents at cerebellar Purkinje neurons: Receptor specificity. *Brain Research* 462:242-251.

Bickford-Wimer, P.C., Parfitt, K.D., Hoffer, B.J. and Freedman R. (1987) Desipramine and noradrenergic neurotransmission in aging: failure to respond in aged laboratory animals. *Neuropharmacology* 6:597-605.

Non-peer-reviewed articles

Johnson, B.R., Wiertelak, E.P., Ramirez, J.J., Parfitt, K.D. (2012) *Introduction to Volume 11, Issue 1 and Proceedings of the Faculty for Undergraduate Neuroscience Workshops at Pomona College, Claremont, CA, July 28 to July 31, 2011; Journal of Undergraduate Neuroscience Education, 11: E1-E2.*

Bickford, P., Lin, A.M.-Y., Parfitt, K.D., and Palmer, M.R. (1995) The effects of aging on the interaction of ethanol with chemical neurotransmission in the brain. In *Alcohol and Aging*, T. Beresford and E.S.L Gombert, eds., Oxford University Press, Oxford, pp. 150-165.

Hoffer, B.J., Rose, G., Parfitt, K.D., Freedman, R. and Bickford-Wimer, P.C. (1988) Age-related changes in cerebellar noradrenergic function. *Ann. NY Acad. Sci.* 515:269-286.

Reviews

Parfitt, K.D., Reist, N., Li, J., Burgess, R., Deitcher, D., DiAntonio, A. and Schwarz, T.L. (1995) *Drosophila* genetics and the functions of synaptic proteins. *Cold Spring Harbor Symposia in Quantitative Biology*, 60: 371-377.

Meffert, M.K., Parfitt, K.D., Cohen, G.A., Doze, V.A. and Madison, D.V. (1991) Protein kinases and LTP. *Ann. NY Acad. Sci.*, 627:2-9.

Media review

Parfitt, K.D. (2002) Media Review: *Crawdad: A CD-ROM Lab Manual for Neurophysiology. Journal of Undergraduate Neuroscience Education*, 1: R5-R6.

Posters and Abstracts

Parfitt, K.D., Phan, J.M., Yi, J., Foote, J.H.A., Olson, S.K. and Garland, T. Jr. Hippocampal long-term potentiation is modulated by exercise-induced alterations in dopaminergic neurotransmission in mice selectively bred for high voluntary wheel running. Program No. 287.09, 2019 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2019. Online. **NOTE: Jessica Phan '19 received a Faculty for undergraduate Neuroscience (FUN) Travel Award for this abstract.**

Bigus, E.R., Casper, C.I., Lanker, K.C., Phan, J.M., Rose, E.P. and Parfitt, K.D. The dopamine D-1 receptor agonist, SKF-38393, has selective effects on hippocampal long-term potentiation in high-running mice, but no effects in non-selected control mice. Faculty for Undergraduate Neuroscience Poster session, San Diego CA Nov. 2018.

Lanker, K.C., Phan, J.M., Rose, E.P., Bigus, E.R., Casper, C.I., and Parfitt, K.D. Secreted APP α comparably facilitates LTP in mice and rat hippocampal slices regardless of stereoisomeric form. Faculty for Undergraduate Neuroscience Poster session, San Diego CA Nov. 2018.

Parfitt, K.D., Wake, S.F., Necarsulmer, J.C., Srinivasan, V., Solomon, I., Crawford, S.A., Knox, K.M., O'Leary, D.J. and Abraham, W.C. The acylated tripeptide Arg-Glu-Arg enhances hippocampal LTP and can reverse LTP deficits produced by A β ₂₅₋₃₅. Program No. 447.15, 2017 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2017. Online.
NOTE: Sean Wake '17 received a Faculty for undergraduate Neuroscience (FUN) Travel Award for this abstract.

Parfitt, K.D.; The value of discussing a retracted paper in an undergraduate neuroscience course. Program No. 23.12SA, 2016 Neuroscience Meeting Planner. Washington DC: Society for Neuroscience, 2016.

Parfitt, K.D., Hintz, T.J.,# Mockett, B.G., Peppercorn, K., Tate, W.P. and Abraham, W.C. Secreted amyloid precursor protein-alpha enhances long-term potentiation via protein synthesis- and protein trafficking-dependent mechanisms. Poster No. 10773, Alzheimer's Association International Conference, Toronto Canada, 2016. (#: *undergraduate at the University of Otago*)

Parfitt, K.D., A.R.K. Ayabe, A.R.K. '15, Guan, K. '15, Thompson, Z. and Garland, T. Jr.; Exercise reverses deficits in hippocampal long term potentiation in mice selected for high voluntary wheel running. Program No. 671.20, 2015 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2015.

Parfitt, K.D., Mockett, B. G. , D. Guévremont, D. Bourne, K., Tate, W., Williams, J.M., and Abraham, W.C. Secreted amyloid precursor protein-alpha (sAPP α) modulates long-term potentiation, induces metaplasticity and regulates glutamate receptor localization in rat hippocampus. Program No. 405.05, 2014 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2014.

Yahaya, M. F., Parfitt, K.D., B. G. Mockett, B.G., L. Schöderbock, L., Peacocks, H.E., Bourne, K., Tate, W.P., Hughes, S. M. and Abraham. W.C. Secreted amyloid precursor protein- α overexpression *in vivo* rescues the long-term potentiation deficit in a mouse model of Alzheimer's disease. Program No. 405.06, 2014 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2014.

Parfitt, K.D., Bourne, K., Hintz, T.J.*, Tate, W. P. and Abraham, W.C. Secreted APP α rescues LTP deficits in APP^{swe}/PS1 transgenic mice. Program No. 429.10, 2013 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2013.

Parfitt, K.D., Aby, E.'11, Roth, A.'11, Gumps, K.#, Sigmond, S.# and Korey, C.A. Mutations in Palmitoyl Protein-Thioesterase 1 alter exocytosis and endocytosis at synapses in *Drosophila* larvae. Australasian Winter Conference on Brain Research, Queenstown, NZ, August 2012.

Gumps., K., # Aby, E.'11, Roth, A.'11, Parfitt, K., and Korey C.A. Mutations in Palmitoyl Protein-Thioesterase 1 alter exocytosis and endocytosis at synapses in *Drosophila* larvae. Program No. 445.21, 2011 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2011.

Aby, L.S.,'11 Roth, A.J.,'11 and Parfitt, K.D. A mutation in the active site of palmitoyl protein thioesterase in *Drosophila melanogaster* alters synaptic transmission. Faculty for Undergraduate Neuroscience poster session, San Diego, CA, November 2010.

Parfitt, K.D., Kim, J.J.'08, and Korey, C.A. A point mutation in the substrate binding site of *Drosophila* palmitoyl-protein thioesterase 1 (Ppt1) alters the calcium sensitivity of neurotransmitter release. Program No. 37.14. 2009 Abstract Viewer/Itinerary Planner. Washington, DC: Society for Neuroscience, 2009.

Parfitt, K.D., Jenkins, S.E.'08, Kim, J.J.'08, and Korey, C.A. Synaptic transmission is altered in palmitoyl-protein thioesterase 1 (PPT-1) *Drosophila* mutants. 12th International Congress on Neuronal Ceroid Lipofuscinoses, June 2009, Hamburg Germany.

Parfitt, K.D., Jenkins, S.E.'08, Kim, J.J.'08, and Korey, C.A. Synaptic transmission is altered in palmitoyl-protein thioesterase 1 (PPT-1) *Drosophila* mutants. Program No. 344.21. 2008 Abstract Viewer/Itinerary Planner. Washington, DC: Society for Neuroscience, 2008.

Parfitt, K.D., Jenkins, S.E.'08, Kim, J.'08, Sinnott, K.'08, Johnson, L.W., and Korey, C.A. Synaptic transmission is altered in palmitoyl-protein thioesterase 1 (PPT-1) *Drosophila* mutants. Symposium on Biological Complexity, Salk Institute, San Diego CA, January 2008.

Kim, J.'10, Jenkins, S.E.'08, Sinnott, K.'08, Johnson, L.W.'08, Korey, C.A. and Parfitt, K.D. Synaptic transmission is altered in palmitoyl-protein thioesterase 1 (PPT-1) *Drosophila* mutants. Faculty for Undergraduate Neuroscience poster session, San Diego CA, November 2007.

Krans, J. L., Parfitt, K. D., Rivlin, P. K., Deitcher, D. L. and Hoy, R. R. The resting membrane potential of *Drosophila melanogaster* larval muscle depends strongly on the calcium gradient. Society for Neuroscience annual meeting; Atlanta GA, October 2006.

Bisel, B.E.'05., Henkins, K.'06 and Parfitt, K.D. The Alzheimer amyloid β -peptide A β ₂₅₋₃₅ blocks adenylate cyclase-mediated forms of hippocampal long term potentiation (LTP). Meeting of the NY Academy of Sciences, "Imaging and the Aging Brain", May 2006, NY NY

Bisel, B.E.'05 and Parfitt, K.D. The Alzheimer Amyloid β -Peptide A β ₂₅₋₃₅ blocks a form of chemically-induced LTP. Program No. 496.10. 2005 Abstract Viewer/Itinerary Planner. Washington, DC: Society for Neuroscience, 2005.

Kuo, S.P.'03# and Parfitt, K.D. CHANGES WITH AGING IN FORSKOLIN-STIMULATED AND BASAL CYCLIC AMP IN THE HIPPOCAMPUS Program No. 905.5. 2004 *Abstract Viewer/Itinerary Planner*. Washington, DC: Society for Neuroscience, 2004. (#= winner, Faculty for Undergraduate Neuroscience Travel Award.

J. S. Raskin'03 and K.D. Parfitt (2002) Changes with Aging in an Adenylate Cyclase-Mediated Form of Long Term Potentiation in Hippocampal Area CA1. Program Number 444.12, 2002 *Abstract Viewer/Itinerary Planner*. Washington DC: Society for Neuroscience, 2002.

Smith, W.B., Parfitt, K. and Schuman, E.M. (2002) The Effects of a Dopamine D1/D5 Agonist on Local Protein Synthesis in Cultured Hippocampal Neurons. Program Number 151.4, 2002 *Abstract Viewer/Itinerary Planner*. Washington DC: Society for Neuroscience, 2002.

Park, C.'01, Raskin, J.'03, Nachtwey, J.'03 and Parfitt, K.D. (2001) Changes with aging in adenylate cyclase-mediated forms of long term potentiation in hippocampal area CA1. Gordon Research Conference on Synaptic Plasticity, Newport RI.

Reis, G.'97, Lee, M.B.'97 and Parfitt, K.D. (1997) Adenylate cyclase-mediated forms of synaptic potentiation in hippocampal area CA1 are attenuated in aged Fisher 344 rats. *Soc. for Neuroscience Abstr.* 23: 660.

Lee, M.B.'97, Reis, G.'97 and Parfitt, K.D. (1996) Isoproterenol and forskolin enhance evoked population spikes in hippocampal area CA1 of young but not aged F344 rats. *International Conference on Catecholamines* (sponsored by the National Institute of Mental Health), Asilomar CA.

Burgess, R.W., Deitcher, D., Parfitt, K.D. and Schwarz, T.L. (1995) Syntaxin in *Drosophila*: cloning, characterization, and mutational analysis. *Soc. for Neurosci. Abstr.* 21: 326.

Parfitt, K.D., DiAntonio, A. and Schwarz, T.L. (1993) Synaptic transmission in mutants of *Drosophila* synaptotagmin (p65), a major synaptic vesicle membrane protein. *Soc. for Neurosci. Abstr.* 19:271.

Parfitt, K.D. and Madison, D.V. (1992) Effects of nifedipine on long term potentiation in area CA1. *Soc. for Neurosci. Abstr.* 18:1495.

Parfitt, K.D. and Madison, D.V. (1991) Phorbol esters increase the frequency of spontaneous excitatory postsynaptic currents in the hippocampus by presynaptic, calcium-dependent mechanism. *Soc. for Neurosci. Abstr.* 17:1487.

Browning, M.D., Parfitt, K.D., Doze, V.A and Madison, D.V. (1990) Beta-adrenergic receptor activation increases phosphorylation of synapsins I and II and increases synaptic transmission in dentate gyrus, but not in area CA1 of the hippocampus. *Soc. Neurosci. Abstr.* 16:653.

Doze, V.A., Cohen, G.A., Parfitt, K.D. and Madison, D.V. (1990) Alpha adrenocaptor activation inhibits the early but not the late IPSP in area CA1 of the rat hippocampus while increasing the

spontaneous release of GABA from presynaptic inhibitory interneuron terminals. *Soc. Neurosci. Abstr.* 16:1014.

Parfitt, K.D. and Madison, D.V. (1990) Phorbol esters enhance synaptic transmission in whole-cell voltage clamp recordings: evidence for a presynaptic action. *Soc. Neurosci. Abstr.* 16:492.

Parfitt, K.D., B.J. Hoffer, and M.D. Browning (1989) Direct evidence that norepinephrine increases the phosphorylation of synapsin I and protein III in dentate slices of young but not aged F344 rats. *Soc. Neurosci. Abstr.* 15:85.

Gratton, A., P. Bickford-Wimer, and K.D. Parfitt (1988) Effects of selective D1 and D2 receptor agonists on the activity of prefrontal cortex cells in Fischer 344 rats. *Soc. Neurosci. Abstr.* 14:1077.

Parfitt, K.D., R. Freedman, and P.C. Bickford-Wimer (1988) Age-related electrophysiological changes in cerebellar noradrenergic receptors. *Soc. Neurosci. Abstr.* 14:1270.

Parfitt, K.D., R. Freedman, and P.C. Bickford-Wimer (1987) Electrophysiological effects of locally-applied adrenergic agonists at cerebellar Purkinje neurons: receptor specificity. *Soc. Neurosci. Abstr.* 13:895.

Bickford, P.C., K.D. Parfitt, B.J. Hoffer, and R. Freedman (1985) Age-related decrease in cerebellar Purkinje neuron response to desipramine in Fischer 344 rats. *Soc. Neurosci. Abstr.* 11:728.

COURSES TAUGHT SINCE 2000

ID 001	Critical Inquiry Seminar: Molecules and the Mind	2013, 2014, 2017
NEUR089A	Drugs and the Brain	2016
BIOL041M (BIOL041C)	Introductory Cell Chemistry & Cell Biology with lab	2002, 2004, 2008, 2010, 2011
BIOL191	Senior Grant Proposal	2000-2006, 2016
BIOL199	Independent Study: Biology	2004
MOBI194A,B	Experimental Sen Thesis	2001, 2003, 2005, 2011, 2012, 2014-2016
NEUR047	Topics in Neuroscience: Intro to the Field	2007
NEUR101	Intro to Neuroscience Lab	2011
NEUR103	Neuropharmacology	2006, 2007, 2009, 2013, 2014, 2016
NEUR178 (BIOL178)	Neurobiology w/ Lab	2001, 2003-2005, 2007-2012, 2014-2016
NEUR 189M	Molecular Mechanisms of Memory, seminar	2018
NEUR189S	Synaptic Transmission	2009
NEUR 189M	Molecular Mechanisms of Memory	2018
NEUR190	Senior Seminar	2004, 2006, 2007, 2018
NEUR191	Senior Library thesis	2000-2016

NEUR194A
NEUR199DR
NEUR199

Senior Experimental Thesis
Neuroscience: Directed Readings
Independent Study: Neuroscience

2000-2016
2011, 2016
2004, 2007-2014, 2016