

Principal Investigator/Program Director (Last, first, middle):

BIOGRAPHICAL SKETCH

Provide the following information for the key personnel in the order listed for Form Page 2.
Follow the sample format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME		POSITION TITLE	
Mark P. Mattson, Ph.D.		Chief, Laboratory of Neurosciences, NIA, NIH	
EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)			
INSTITUTION AND LOCATION	DEGREE (if applicable)	YEAR(s)	FIELD OF STUDY
Iowa State University	BS	1975-1979	Zoology
North Texas State University	MS	1980-1982	Biology
University of Iowa	PhD	1982-1986	Biology
Colorado State University	postdoc	1986-1989	Neuroscience

A. Personal Statement

Dr. Mattson is considered a leader in the area of cellular and molecular mechanisms underlying neuronal plasticity and neurodegenerative disorders, and has made major contributions to understanding the pathogenesis of Alzheimer's disease, Parkinson's disease, amyotrophic lateral sclerosis and stroke, and to their prevention and treatment. He has published more than 400 original research articles and numerous review articles in leading journals and books, and has edited 11 books in the areas of neuronal signal transduction, neurodegenerative disorders and mechanisms of aging. Dr. Mattson is the most highly cited neuroscientist in the world according to the ISI information database. He is Editor-in-Chief of *NeuroMolecular Medicine* and *Ageing Research Reviews*, and has been/is a Managing or Associate Editor of the *Journal of Neuroscience*, *Trends in Neurosciences*, the *Journal of Neurochemistry*, the *Neurobiology of Aging*, and the *Journal of Neuroscience Research*. Dr. Mattson has served on several NIH study sections and on scientific advisory boards for many research foundations. He has trained more than 70 postdoctoral and predoctoral scientists, and has made major contributions to the education of undergraduate, graduate and medical students.

B. Positions and Honors

Positions

Postdoctoral Fellow, Program in Neuronal Growth & Development, Colorado State University, 1986-1987.

Research Fellow, French Foundation for Alzheimer's Disease. 1988-1990.

Assistant Professor of Anatomy & Neurobiology, University of Kentucky, 1989-1993.

Associate of the Sanders-Brown Research Center on Aging, University of Kentucky, 1989- .

Director, Confocal Laser Scanning Microscope Facility, University of Kentucky, 1992-1999.

Associate Professor of Anatomy & Neurobiology, University of Kentucky, 1993-1997.

Assistant Director of Basic Neuroscience Research, University of Kentucky, 1995-1999.

Associate of the Center of Membrane Sciences, University of Kentucky, 1996-1999.

Professor of Anatomy & Neurobiology, University of Kentucky, 1997- .

Chief, Laboratory of Neurosciences, National Institute on Aging, 2000- .

Adjunct Professor, Department of Neuroscience, Johns Hopkins University School of Medicine, 2000-2003.

Professor, Department of Neuroscience, Johns Hopkins University School of Medicine, 2003- .

Honors

NIH, NRSA (NINCDS) Research Fellowship Award (NS08054) 1986-1988.

French Foundation for Alzheimer's Research, Research Fellowship, 1988-1990.

Alzheimer's Association, Faculty Scholar Award (FSA-89-016) 1989-1992.

Physicians Service Plan Award, University of Kentucky Research Foundation, 1989-1991.

International Life Sciences Institute Young Investigator Award. 1990-1993.

Metropolitan Life Foundation Medical Research Award, 1992.

Charles Judson Herrick Award, American Association of Anatomists, 1993.

College of Medicine Faculty Research Award, University of Kentucky, 1993.

NIH Research Career Development Award (K04NS01640) 1993-1998.

Grass Lectureship, Indiana University, 1994.

Zenith Award, Alzheimer's Association, 1994-1996.

Grass Lectureships: SUNY Albany, 1996; University of Texas Medical Branch, 1999; Southern Illinois University, 2002; University of Illinois at Urbana-Champaign, 2005.

Jordi Folch-Pi Memorial Award, American Society for Neurochemistry, 1996.

Santiago Grisolia Chair Prize, Valencia, Spain, 2002.

Elected, AAAS Fellow, 2011.

C. Selected Peer-reviewed Publications (Selected from 460 peer-reviewed publications)

Mattson MP, Murrain M, Guthrie PB, Kater SB (1989) Fibroblast growth factor and glutamate: Opposing actions in the generation and degeneration of hippocampal neuroarchitecture. *J. Neurosci.* 9:3728-3740.

Mattson MP (1990) Antigenic changes similar to those seen in neurofibrillary tangles are elicited by glutamate and calcium influx in cultured hippocampal neurons. *Neuron* 4:105-117.

Mattson MP, Rychlik B, Chu C, Christakos S (1991) Evidence for calcium-reducing and excitoprotective roles for the calcium binding protein (calbindin-D28k) in cultured hippocampal neurons. *Neuron* 6:41-51.

Cheng B, Mattson MP (1991) NGF and bFGF protect rat and human central neurons against hypoglycemic damage by stabilizing calcium homeostasis. *Neuron* 7:1031-1041.

Mattson MP, Cheng B, Davis D, Bryant K, Lieberburg I, Rydel RE (1992) β -amyloid peptides destabilize calcium homeostasis and render human cortical neurons vulnerable to excitotoxicity. *J. Neurosci.* 12:376-389.

Mattson MP, Cheng B, Culwell A, Esch F, Lieberburg I, Rydel RE (1993) Evidence for excitoprotective and intraneuronal calcium-regulating roles for secreted forms of β -amyloid precursor protein. *Neuron* 10:243-254.

Cheng B, Christakos S, Mattson MP (1994) TNFs protect neurons against excitotoxic/metabolic insults and promote maintenance of calcium homeostasis. *Neuron* 12:139-153.

Furukawa K, Barger SW, Blalock E, Mattson MP (1996) Activation of K^+ channels and suppression of neuronal activity by secreted β -amyloid precursor protein. *Nature* 379: 74-78.

- Kelly J, Furukawa K, Barger SW, Mark RJ, Rengen MR, Blanc EM, Roth GS, Mattson MP (1996) Amyloid β -peptide disrupts carbachol-induced muscarinic cholinergic signal transduction in cortical neurons. *PNAS* 93: 6753-6758.
- Bruce AJ, Boling W, Kindy MS, Peschon J, Kraemer PJ, Carpenter MK, Holtzman FW, Mattson MP (1996) Altered neuronal and microglial responses to brain injury in mice lacking TNF receptors. *Nature Medicine* 2: 788-794.
- Mark RJ, Pang Z, Geddes JW, Uchida K, Mattson MP (1997) Amyloid β -peptide impairs glucose uptake in hippocampal and cortical neurons: involvement of membrane lipid peroxidation. *J. Neurosci.* 17: 1046-1054.
- Keller JN, Kindy MS, Holtzman FW, St Clair D, Yen HC, Germeyer A, Steiner SM, Bruce-Keller AJ, Hutchins JB, Mattson MP (1998) Mitochondrial MnSOD prevents neural apoptosis and reduces ischemic brain injury: suppression of peroxynitrite production, lipid peroxidation and mitochondrial dysfunction. *J. Neurosci.* 18: 687-697.
- Guo Q, Fu W, Xie J, Luo H, Sells SF, Geddes JW, Bondada V, Rangnekar V, Mattson MP (1998) Par-4 is a novel mediator of neuronal degeneration associated with the pathogenesis of Alzheimer's disease. *Nature Medicine* 4: 957-962.
- Guo Q, Fu W, Sopher BL, Miller MW, Ware CB, Martin GM, Mattson MP (1999) Increased vulnerability of hippocampal neurons to excitotoxic necrosis in presenilin-1 mutant knockin mice. *Nature Medicine* 5: 101-107.
- Guo Q, Sebastian L, Sopher BL, Miller MW, Glazner GW, Ware CB, Martin GM, Mattson MP (1999) Neurotrophic factors interrupt excitotoxic neurodegenerative cascades promoted by a presenilin-1 mutation. *PNAS* 96: 4125-4130.
- Glazner GW, Chan SL, Lu C, Mattson MP (2000) Caspase-mediated degradation of AMPA receptor subunits: a mechanism for preventing excitotoxic necrosis and ensuring apoptosis. *J. Neurosci.* 20: 3641-3649.
- Duan W, Guo Z, Jiang H, Ware M, Li XJ, Mattson MP (2003) Dietary restriction normalizes glucose metabolism and BDNF levels, slows disease progression, and increases survival in huntingtin mutant mice. *PNAS* 100: 2911-2916.
- Anson RM, Guo Z, de Cabo R, Iyun T, Rios M, Hagepanos A, Ingram DK, Lane MA, Mattson MP (2003) Intermittent fasting dissociates beneficial effects of dietary restriction on glucose metabolism and neuronal resistance to injury from calorie intake. *PNAS*. 100: 6216-6220.
- Oddo S, Caccamo A, Shepherd JD, Murphy MP, Golde TE, Kaye R, Metherate R, Mattson MP, Akbari Y, LaFerla FM (2003) Triple-transgenic model of Alzheimer's disease with plaques and tangles: intracellular A β and synaptic dysfunction. *Neuron* 39:409-421.
- Cutler RG, Kelly J, Pedersen WA, Tammara A, Hatanpaa K, Troncoso JC, Mattson MP (2004) Involvement of oxidative stress-induced abnormalities in ceramide and cholesterol metabolism in brain aging and Alzheimer's disease. *PNAS* 101: 2070-2075.
- Kruman II, Wersto RP, Cardozo-Pelaez F, Smilenov L, Chan SL, Chrest FJ, Emokpae R, Gorospe M, Mattson MP (2004) Cell cycle activation linked to neuronal cell death initiated by DNA damage. *Neuron* 41:549-561.
- Wang Y, Chan SL, Miele L, Yao PJ, Mackes J, Ingram DK, Mattson MP, Furukawa K (2004) Involvement of Notch signaling in hippocampal synaptic plasticity. *PNAS* 101: 9458-9462.
- Mattson MP (2004) Pathways towards and away from Alzheimer's disease. *Nature* 430:631-639.
- Maswood N, Young J, Tilmont E, Zhang Z, Gash DM, Gerhardt GA, Grondin R, Roth GS, Mattson J, Lane MA, Carson RE, Cohen RM, Mouton PR, Quigley C, Mattson MP, Ingram DK (2004) Caloric

- restriction increases GDNF levels and attenuates neurochemical and behavioral deficits in a primate model of Parkinson's disease. *PNAS* 101:18171-18176.
- Petkova AT, Leapman RD, Guo Z, Yau WM, Mattson MP, Tycko R (2005) Self-propagating, molecular-level polymorphism in Alzheimer's beta-amyloid fibrils. *Science* 307:262-265.
- Arumugam TV, Chan SL, Jo DG, Yilmaz G, Tang SC, Gleichmann M, Cheng A, Okun E, Dixit VD, Chigurupati S, Mughal M, Ouyang X, Miele L, Magnus T, Poosala S, Granger DN, Mattson MP (2006) Gamma secretase-mediated notch signaling worsens brain damage and functional outcome in ischemic stroke. *Nature Medicine* 12:621-623.
- Tang SC, Arumugam TV, Xu X, Cheng A, Mughal MR, Jo DG, Lathia JD, Siler DA, Chigurupati S, Ouyang X, Magnus T, Camandola S, Mattson MP. (2007) Pivotal role for neuronal Toll-like receptors in ischemic brain injury and functional deficits. *PNAS* 104:13798-13803.
- Xu X, Zhan M, Duan W, Prabhu V, Brenneman R, Wood W, Firman J, Li H, Zhang P, Ibe C, Zonderman AB, Longo DL, Poosala S, Becker KG, Mattson MP (2007) Gene expression atlas of the mouse central nervous system: Impact and interactions of age, energy intake and gender. *Genome Biol.* 2007 Nov 7;8(11):R234.
- Arumugam TV, Tang SC, Lathia JD, Cheng A, Mughal MR, Chigurupati S, Magnus T, Chan SL, Jo DG, Ouyang X, Fairlie DP, Granger DN, Vortmeyer A, Basta M, Mattson MP. (2007) Intravenous immunoglobulin (IVIg) protects the brain against experimental stroke by preventing complement-mediated neuronal cell death. *PNAS* 104:14104-14109.
- Stranahan AM, Arumugam TV, Cutler RG, Lee K, Egan JM, Mattson MP (2008) Diabetes impairs hippocampal function via glucocorticoid-mediated effects on new and mature neurons. *Nature Neurosci.* 11:309-317.
- Mattson MP, Gleichmann M, Cheng A (2008) Mitochondria in neuroplasticity and neurological disorders. *Neuron* 60:748-766.
- Zhang P, Pazin MJ, Schwartz CM, Becker KG, Wersto RP, Dilley CM, Mattson MP (2008) Nontelomeric TRF2-REST interaction modulates neuronal gene silencing and fate of tumor and stem cells. *Curr Biol.* 18:1489-1494.
- Martin B, Golden E, Carlson OD, Pistell P, Zhou J, Kim W, Frank BP, Thomas S, Chadwick WA, Greig NH, Bates GP, Sathasivam K, Bernier M, Maudsley S, Mattson MP, Egan JM (2009) Exendin-4 improves glycemic control, ameliorates brain and pancreatic pathologies, and extends survival in a mouse model of Huntington's disease. *Diabetes* 58:318-328.
- Arumugam TV, Phillips TM, Cheng A, Morrell CH, Mattson MP, Wan R (2010) Age and energy intake interact to modify cell stress pathways and stroke outcome. *Ann Neurol.* 67:41-52.
- Martin B, Ji S, Maudsley S, Mattson MP (2010) "Control" laboratory rodents are metabolically morbid: Why it matters. *PNAS* 107: 6127-6133.
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- Okun E, Griffioen K, Barak B, Roberts NJ, Castro K, Pita MA, Cheng A, Mughal MR, Wan R, Ashery U, Mattson MP (2010) Toll-like receptor 3 inhibits memory retention and constrains adult hippocampal neurogenesis. *PNAS* 107:15625-15630.

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