

CURRICULUM VITAE

Name: **Shanta Menon Messerli, PhD.**
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Education:
1994 B. S. Wellesley College
2001 Ph.D. Purdue University (Neuroscience)

Research and Professional Experience:

2008-present Research Assistant Scientist, Marine Biological Laboratory, Woods Hole, MA
2007 Research Associate, Marine Biological Laboratory, Woods Hole, MA
2005- 2007 Post Doctoral Research Scientist, Marine Biological Laboratory, Woods Hole, MA
2001- 2004 Research Fellow (Neurology), Massachusetts General Hospital East, Harvard Medical School, Charlestown, MA
1996-2001 Predoctoral Fellow (GAAN), Purdue University, West Lafayette, IN
1996-2000 Teaching Assistant, Department of Biological Sciences, Purdue University, West Lafayette, IN
Summer, 2000 Teaching Assistant, Neurobiology and Development of the Leech, Marine Biological Laboratory, Woods Hole, MA
1996 Research Assistant, Case Western Reserve School of Medicine, Cleveland, OH
1994-1995 Research Assistant, Children's Hospital, Harvard School of Medicine, Boston, MA
1993-1994 Undergraduate Research, Wellesley College, Wellesley, MA
1993 Intern, NIAID and Food & Drug Administration, Bethesda, MD
1992 Research Assistant, Case Western Reserve School of Medicine, Cleveland, OH

Membership in Scientific Societies:

American Association for Cancer Research
Society for Neuroscience
American Association for the Advancement of Science

Awards:

Zimmermann Grant, Wellesley College, 1993
National Dean's List, 1998-9
Bibliography published in *Who's Who In America*, 2000-2001
GAAN fellowship, Purdue University, 1999-2001
MGH Fund for Medical Discovery, MGH, Harvard Medical School, 2002-3
Texas Neurofibromatosis Foundation, 2003-4
NF CURE Japan Award, 2007-8

Publications:

Lipton, S. A., Kim, W. K., Choi, Y. B., **Kumar[†], S.**, D'Emilia, DM., Rayudu, M.V., Arnelle, D. R., & Stamler, J. S. (1997). Neurotoxicity associated with dual actions of homocysteine at the N-methyl-D-aspartate receptor. *Proc. Natl. Acad. Sci. USA*, **94**(11): 5923-8.

Shafer, O. T., Chen, A., **Kumar[†], S. M.**, Muller, K. J., & Sahley, C. L. (1998). Injury-induced expression of endothelial nitric oxide synthase by glial and microglial cells in the leech central nervous system within minutes after injury. *Proc. R. Soc. Lond. B*, **265** (1411): 2171-2175.

Chen, A.*, **Kumar[†], S. M.***, Sahley, C. L., & Muller, K. J. (2000). Nitric oxide influences injury- induced microglial migration and accumulation in the leech CNS, *The Journal of Neuroscience*, **20** (3): 1036-1043. (* designates co-first authors)

Kumar[†], S. M., Porterfield, D. M., Muller, K. J., Smith, P. E., & Sahley, C. L. (2001). Nerve Injury induces a rapid efflux of nitric oxide (NO) detected with a novel NO microsensor. *The Journal of Neuroscience*, **21**(1):215-220.

Messerli, S. M., Tang, Y., Giovannini, M., Bronson, R. T., Weissleder, R. & Breakefield, X. O. (2002). Detection of spontaneous schwannomas by MRI in a transgenic murine model of neurofibromatosis type 2. *Neoplasia*, **4** (6): 501-509.

Tang, Y., Shah, K., **Messerli, S. M.**, Snyder, E., Breakefield, X. O., & Weissleder, R. (2003). *In vivo* tracking of neural progenitor cell migration to glioblastomas. *Human Gene Therapy*, **14** (13):1247-54.

Messerli, S. M., Prabhakar, S., Tang, Y., Shah, K., Cortes, M. L., Murthy, V., Weissleder, R., Breakefield, X. O., & Tung, C. (2004). A novel method for apoptosis imaging an ICE (caspase-1)-near infrared fluorescent imaging probe. *Neoplasia*, **6** (2): 1-11.

Stemmer-Rachamimov, A., Louis, D. N., Nielsen, G. P., Antonescu, C., Borowsky, A., Bronson, R., Burns, D.K., Cervera, P., McLaughlin, M., Reifenberger, G., Schmale, M., MacCollin, M., Chao, R., Cichowski, K., Kalamarides, M., **Messerli, S. M.**, McClatchey, A., Niwa-Kawakita, M., Ratner, N., Reilly, K., Zhu, Y. & Giovannini, M. (2004). Comparative pathology of nerve sheath tumors in mouse models and humans. *Cancer Research*, **64** (10), 3718-3724.

Messerli, S. M., Prabhakar, S., Tang, Y., Maymood, U., Giovannini, M., Weissleder, R., Bronson, R., Martuza, R., Rabkin, S., & Breakefield, X. O. (2006). Treatment of schwannomas with an oncolytic HSV recombinant virus in murine models of neurofibromatosis type 2. *Human Gene Therapy*, **17**: 1-11.

Messerli, S. M. and Greenberg, R. M. (2006). Cnidarian toxins and voltage-gated ion channels. *Marine Drugs*, **4**:70-81.

Messerli, S. M., Morgan, W, Birkeland, S. R., McArthur, A. G., & Greenberg, R. M. (2006). NO-dependent changes in *Schistosoma mansoni* gene expression identified by SAGE. *Molecular and Biochemical Parasitology*, **150**: 367-70.

Prabhakar, S., **Messerli, S. M.**, Stemmer-Rachmimov, A., Liu, T., Samuel Rabkin, S., Martuza, R., and Breakefield, X. O. (2007). Treatment of implantable NF2 schwannoma tumor models with oncolytic herpes simplex virus G47Δ. *Cancer Gene Therapy*, 1-8.

Demestre, M., **Messerli, S. M.**, Celli, N., Shahhossini, M., Kluwe, L., Mautner, V., & Maruta, H. (2009). CAPE (Caffeic Acid Phenethyl Ester)-based propolis extract (Bio-30) suppresses the growth of human neurofibromatosis (NF) tumor xenografts in mice. *Phytotherapy Research*, Feb; **23**(2): 226-30.

Messerli, S. M., Ahn, M-R., Kunimasa, K., Yanagihara, M., Tatefuji, T., Hashimoto, K., Mautner, V., Uto, Y., Hori, H., Kumazawa, S., Kaji, K., Ohta, T., & Maruta, H. (2009). Artepillin C (ARC) in Brazilian Green Propolis selectively blocks the oncogenic PAK1 signaling and suppresses the growth of NF tumors in mice. *Phytotherapy Research*, Mar; **23**(3): 423-7.

Messerli, S. M., Kasinathan, R. S., Morgan, W., Spranger, S., and Greenberg, R. M. (2009). *Schistosoma mansoni* P-glycoprotein levels increase in response to praziquantel exposure and correlate with reduced praziquantel susceptibility. *Mol Biochem Parasitol*. Apr 27 [Epub ahead of print].

Prabhakar, S., Brenner, G. J, **Messerli, S. M.**, Sena-Esteves, M., Tannous, B., and Breakefield, X.O. (2009). Imaging and therapy of experimental schwannomas using HSV amplicon vector encoding apoptotic protein under Schwann cell promoter. *Cancer Gene Therapy*, in press.

Note: † indicates a name change from Kumar to Messerli

Abstracts:

Lipton, S. A., Kim, W. K., Choi, Y.B., **Kumar†, S.**, Rayudu, P. V., Arnelle, D. R., & Stamler, J. S. (1996). Dual actions of homocysteine at the N-methyl-D-aspartate receptor. *Neurology*, **46**: (2): 3132-3132.

Kim, W. K., Rayudu, P. V., Choi, Y. B., **Kumar†, S.**, Stamler, J. S., & Lipton, S. A. (1995). Homocysteine: An NMDA agonist and glycine site partial antagonist that induces cortical neurotoxicity. *Soc. Neurosci. Abst.*, **21** (1), 521.

Shafer, O. T., Scott, D. Y., **Kumar†, S. M.**, Chen, A., Muller, K. J., & Sahley, C. L. (1997). Regulation and roles of nitric oxide synthase in the injured leech CNS. *Soc. Neurosci. Abst.*, **23**(1), 388.4.

Kumar†, S. M., Furmanski, O., Muller, K.J., & C. L. Sahley (1998). Injury-induced NOS activity and microglial accumulation in the leech CNS depend on calmodulin. *Soc. Neurosci. Abst.*, **24**(1) 67, 32.18.

Furmanski, O., **Kumar[†], S. M.**, Chen, A., Einhorn, B., Sahley, C.L. & Muller, K.J. (1999) CNS injury rapidly induces eNOS immunoreactivity coincident with DAF-2A staining in *Hirudo medicinalis*. Soc. Neurosci. Abst., **25**, 1266.

Kumar[†], S. M., Porterfield, D.M., Muller, K.J., Sahley, C.L. & Smith, P.J.S. (1999) *In situ* measurement of injury-induced nitric oxide (NO). Soc. Neurosci. Abst., **25**, 313.

Kumar[†], S. M., Muller, K. J., Carrasco, R. A., Furmanski, O., & Sahley, C. L. (2000). Nitric oxide induced at nerve lesions stops migrating microglia by activating soluble guanylate cyclase in the leech CNS. Soc. Neurosci. Abst., **26**(2), 506.11.

Kumar[†], S. M., Tang, Y., Giovannini, M., Bronson, R., Weissleder, R., & Breakefield, X. O. (2002). Detection of spontaneous schwannomas by MRI in a transgenic murine model of Neurofibromatosis type 2, American Society for Gene Therapy abstract, 5th annual meeting for American Society of Gene Therapy, 299.

Kumar[†], S. M., Tang, Y., Shah, K., Giovannini, M., Weissleder, R., & Breakefield, X. O. (2002). Gene delivery to schwannomas in a transgenic murine model of Neurofibromatosis Type 2. *Molecular Imaging*, **1** (3), 284.

Messerli, S. M., Tang, Y., Giovannini, M., Bronson, R. T., Weissleder, R., & Breakefield, X. O. (2002). Detection of spontaneous schwannomas by MRI in a transgenic murine model of Neurofibromatosis Type 2 (NF2). *Molecular Therapy*. **5**(5), Part 2 of 2, S99.

Messerli, S. M., Tang, Y., Giovannini, M., Prabhakar, S., Murthy, V., Todo, T., Rabkin, S., Marutza, R., Bronson, R., Stemmer-Rachamimov, A., Weissleder, R., & Breakefield, X. O. (2003). Treatment of schwannomas with an oncolytic HSV replication conditional vector in a NF2 transgenic model XXVII MGH Research Symposium and poster session (SAC), 70.

Messerli, S. M., Tang, Y., Giovannini, M., Prabhakar, S., Murthy, V., Schuback, D., Sena-Esteves, M., Todo, T., Rabkin, S., Martuza, R., Tung, C., Weissleder, R., & Breakefield, X. O. (2003). Treatment of schwannomas in a transgenic murine model of Neurofibromatosis Type 2 (NF2) using both HSV recombinant and amplicon vectors. *Molecular Therapy*, **7**(5), Part 2 of 2, S91.

Messerli, S. M., Prabhakar, S., Tang, Y., Weissleder, R., Giovannini, M., Bronson, R., Todo, T., Rabkin, S., Martuza, R., & Breakefield, X. O. (2004). Treatment of schwannomas with an oncolytic HSV recombinant virus in a transgenic murine model of Neurofibromatosis Type 2. Program in Neuroscience Poster Session, Harvard Medical School, Boston, MA.

Messerli, S. M., Prabhakar, S., Tang, Y., Mahmood, U., Swart, E., Weissleder, R., Giovannini, M., Bronson, R., MacCollin, M., Rabkin, S., Martuza, R., and Breakefield, X. O. (2004). Treatment of schwannomas with an oncolytic HSV-1 recombinant virus in murine models of neurofibromatosis type 2 (NF2). *NNFF International Consortium For The Molecular Biology of NF1 and NF2*, Aspen, Colorado.

Messerli, S. M., Birkeland, S. R., Bernier, J., Cipriano, M. J., McArthur, A. G., & Greenberg, R. M. (2005). NO-dependent changes in *Schistosoma mansoni* gene expression identified by SAGE. *American Society of Tropical Medicine and Hygiene*, Washington, D. C, 957.

Prabhakar, S., **Messerli, S. M.**, Rabkin, S., Martuza, R.M., and Breakefield, X. O. (2006). Treatment of experimental schwannomas with HSV recombinant and amplicon vectors. *Molecular Therapy*, 13, S59.

Messerli, S. M., Birkeland, S.R., Morgan, W., Bernier, J., Cipriano, M. J., McArthur, A.G., Greenberg, R.M. (2006). NO-induced upregulation of extracellular superoxide dismutase in *Schistosoma mansoni*, Soc. Neurosci. Abst, Atlanta, Georgia.

Demestre, M., **Messerli, S.M.**, Shahhossini, M., Kluwe, L., Mautner, V. and Maruta, H. (2007). Signal Therapy of NF (Neurofibromatosis) by natural PAK1 blockers. NF Conference, Park City, Utah.

Messerli, S.M., Morgan, W., Spranger, S., & Greenberg, R. M. (2007). Characterization of a P-glycoprotein homolog in *Schistosoma mansoni*. *American Society of Tropical Medicine and Hygiene*, Philadelphia, Pennsylvania.

Menachery, A., **Messerli, S. M.**, Pethig, R., Smith, P. J. (2008), Dielectrophoresis as a method of isolating cells for the purpose of establishing a stably transfected cell line, Gordon Research Conference, Bioelectrochemistry, University of New England Biddeford, ME.

Messerli, S. M., Menachery, A., Collis, L., Pethig, R., Zhao, J., Basu, A., and Smith, P. J. (2008), Measuring extracellular ion gradients in pseudo-tissues assembled via dielectrophoretic techniques, Gordon Research Conference, Bioelectrochemistry, University of New England Biddeford, ME.

Messerli, S. M., Graham, D. M., Messerli, M. A., Menachery, A., Pethig, R., & Smith, P. J. (2009), Measurement of hydrogen ion activity in the intercellular space of schwannoma tumors, Biophysical Society, Boston, MA.

Messerli, S. M., Demestre, M., Ahn, M. R. Yanagihara, M., Tatefuji, T., Uto, Y., Hori, H., Mautner, V., Hashimoto, K., Kumazawa, S., Ohta, T., & Maruta, H. (2009). Anti-PAK1 products Bio 30 and Brazillian Green Propolis Extract (GPE) suppress the growth of human NF and glioma xenografts in mice. American Association of Cancer Research (AACR) 100th Annual Meeting, April 18-22, Denver, Colorado.

Selected Presentations:

August, 1998, Neurobiology & Development of the Leech, Woods Hole Leech Meeting, Woods Hole, MA: "Injury Induced Activation of an Endothelial Nitric Oxide Synthase (eNOS)-like protein in the Leech CNS".

October, 1998, Purdue University Neuroscience (PUN) Neuroscience Retreat, West Lafayette, IN: "Injury-induced NOS signaling influences microglial accumulation in the leech CNS".

August, 2000, Neurobiology & Development of the Leech Woods Hole Leech Meeting, Woods Hole, MA: “Nitric oxide induced at nerve lesions stops migrating microglia by activating soluble guanylate cyclase in the leech CNS”.

October, 2000, Purdue University Neuroscience (PUN) Neuroscience Retreat, West Lafayette, IN: “CNS injury rapidly induces eNOS immunoreactivity coincident with DAF-2A staining in *Hirudo medicinalis*”.

May, 2000, 22nd Midwest Neurobiology Meeting, Iowa State University, Ames, Iowa: “*In situ* measurement of injury-induced nitric oxide (NO)”.

December, 2001, Molecular Neurogenetics Unit, Massachusetts General Hospital, Harvard Medical School, Charlestown, MA: “Neurofibromatosis type II: use of gene therapy on mouse models to reduce tumor growth”.

December, 2001, Neurosurgery Research Club, Massachusetts General Hospital, Harvard Medical School, Boston, MA: “Detection of spontaneous schwannomas by MRI in a transgenic murine model of Neurofibromatosis type 2 (NF2)”.

October, 2002, Molecular Neurogenetics Unit, Massachusetts General Hospital, Harvard Medical School, Charlestown, MA: “Treatment of schwannoma and meningiomas in murine models of Neurofibromatosis type 2 (NF2) using gene therapy”.

February, 2003, Mouse Model Meeting, Boston, MA: “Treatment of schwannomas in a transgenic murine model of Neurofibromatosis type 2 (NF2) with HSV gene therapy”.

May, 2003, Neurogenetics External Review for Gene therapy for hereditary tumors in experimental models of TSC and NF2, Massachusetts General Hospital, Harvard Medical School, Charlestown, MA: “ Vector designs and strategies for experimental NF2 therapy”.

October, 2003, Molecular Neurogenetics Unit, Massachusetts General Hospital, Harvard Medical School, Charlestown, MA: “HSV Vector Therapy for NF2 lesions in mouse models”.

August, 2005, Global Infectious Disease, Josephine Bay Paul Center, Marine Biological Laboratory, Woods Hole, MA: “NO-dependent changes in *Schistosoma mansoni* gene expression identified by SAGE”.

November, 2005, Global Infectious Disease, Josephine Bay Paul Center, Marine Biological Laboratory, Woods Hole, MA: “Effect of Cnidarian toxins on voltage-gated calcium channels”.

June, 2006, Global Infectious Disease, Josephine Bay Paul Center, Marine Biological Laboratory, Woods Hole, MA: “ Role of P-glycoprotein (P-gp) in schistosomes”.

Journal Reviewer:

Journal of Gene Medicine

Research Funding Information (2002 and on):

<u>CURRENT</u>	<u>Amount</u>	<u>Agency</u>	<u>Role</u>	<u>Title</u>
2008	\$7000	Neurofibromatosis, Inc.	PI	Effect of Bio30 on the growth of human
2007-08	\$35,000	NF Cure Japan	PI	Neurofibromatosis type 2 (NF2) tumor grafted in mice
2007-09	\$20,000	Peterson Foundation	Co-PI	Development of effective NF therapeutics
2007-08	\$10,000	Yamada Bee Farm	Investigator	<i>In vivo</i> testing of potential NF therapeutics
<u>PAST</u>				
2003-04	\$60,000	Texas Neurofibromatosis Foundation	Fellow	Experimental Gene Therapy for Neurofibromatosis type 2 (NF2)
2002-03	\$43,850	MGH Fund for Medical Discovery	Fellow	Preclinical evaluation of gene therapy for NF2 lesions in mouse models using amplicon vectors and prodrug activation
