Current projects and Publications

Parminder J.S. Vig, PhD
Professor of Neurology and Biochemistry
Associate Professor of Neurobiology and Anatomical Sciences

Funded Projects:

National Institutes of Health (NINDS): **RO3**
Targeted Delivery of S100B inhibitory peptides to SCA1 Mouse Cerebellum. **(MPI) Principal Investigator, March 2010-April 2013**

Currier Spinocerebellar Research Fund Do glial proteins modulate ataxin-1phosphorylation. **Principal Investigator, Jan 2010-open**

Cure Ataxia.org: Ataxia: Ataxia Research at UMMC. **Principal Investigator, Dec. 2010 –open**

Balance Disorders Inc: Dopamine D2 Receptor Agonist Bromocriptine as a Potential Therapeutic for SCA1.**Principal Investigator, 07/01/2011 – 06/30/2012**

Pending/under preparation:

Intramural Research Support Program, UMMC.Targeting therapeutics to cerebellum using heat sensitive polypeptide carriers. **Principal Investigator**

The Micheal J. Fox Foundation Title: Validation of ASIC1a as a Therapeutic Target for Parkinson's Disease **Principal Investigators: Bidwell and Vig**

National Institutes of Health (NINDS): **R21**, Targeting cerebellum with thermally sensitive therapeutic peptides. (**MPI) Principal Investigator: Vig and Raucher**

National Institutes of Health (NINDS): **R01,** Dopamine against as therapeutics for SCA1.**Principal Investigator: Vig**

Previous:

National Ataxia Foundation: Cytokines in Human Neurodegenerative Disorders**.** Principal Investigator 1993-1994 ($2,045)

National Ataxia Foundation: In vivo effects of insulin-like growth factor-I on cerebellar degeneration in lurcher mouse. Principal Investigator 1994-1995 ($5,000).

Pediatrics Research Support Grant: Glial cell responses in the spinal cord during motor neuron degeneration produced by B-iminodipropiononitrile in rats. Co-Investigator 1994-1995 ($ 10,000).

UMC Seed Money: Role of Calcium Binding proteins in hippocampal degeneration in developing mice following intrauterine exposure to domoic acid. Principal Investigator 1994-1997 ($5,000)

National Ataxia Foundation: Calcium binding proteins in patients with spinocerebellar ataxias. Principal Investigator 1995-1996 ($5,000)

National Institute of Health Training Grant to Jackson State University. Research Mentor for MS degree: 1992 (Supplies $4,000)

National Institute of Health Training Grant to Jackson State University. Research Mentor for MS degree 1994 (Supplies $4,000)

National Institute of Health Training Grant to Jackson State University. Research Mentor for MS degree 1996 (Supplies $4,000).

National Ataxia Foundation : Role of polyglutamine peptides in cerebellar degeneration. Principal Investigator 1996-1997 ($10,500).

National Ataxia Foundation: Expression of calcium-binding proteins in Purkinje cells of SCA-1 transgenic mice. Principal Investigator 1997-1998 ($8,000)

Biomedical Research Support Grant, Univ. Miss Med. Center: Do Purkinje cells need calcium binding proteins to survive? Principal Investigator 1997-1998 ($12,000)

Naional Ataxia Foundation: Do Purkinje cells from spinocerebellar ataxia-1 transgenic mice survive in culture? Principal Investigator 1998-1999 ($9,000)

National Ataxia Foundation: Effects of insulin-like growth factor-1 (IGF-1) on Purkinje cell survival in SCA-1 transgenic mice Principal Investigator, Jan 2000- July 2001 ($20,000)

National Ataxia Foundation: SCA-1 Calbindin D28k null double mutant mice. Role of calbindin in ataxin-1 mediated Purkinje cell degeneration Principal Investigator, Jan 2001-June 2003 (18,424)

National Institute of Health (NINDS) Supplement Grant: Testing of candidate drug treatments for neurodegeneration in rodent models. Principal Investigator, Oct 2003-Dec 2004 ($74,000)

Mississippi Functional Genomics Network: The role of nitric oxide in domoic acid induced epilepsy. Co-Investigator, Oct. 2003-Sept. 2004 ($30,000)

National Institutes of Health (NINDS): Mechanism Ataxin-1 Mediated Purkinje Cell Death. Principal Investigator, Feb 2003-Jan 2008 ($713,000)

National Ataxia Foundation: Role of Bergmann Glia in Purkinje Cell Development and Pathology in SCA1 Principal Investigator, Jan 2008-June 2009 ($35,000)

Intramural Grant Support Program, UMC: Is ASIC1a involved in altered Purkinje cell spine density in SCA1? Principal Investigator, Oct 2008- Nov 2009 ($29,500)

Pendng Patents

Therapeutic use of dopamine D2 receptor agonists for treating SCA1.

Provisional Patent Applications (Potential for getting a patent)

Thermally targeted delivery of therapeutic peptides to the cerebellum for treating spinocerebellar ataxias and other neurodegenerative diseases.

Drs. Vig and Raucher and Hearst filed a non-provisional patent application to THE UNITED STATES PATENT AND TRADEMARK OFFICE entitled " COMPOSITION AND METHODS FOR TARGETED DELIVERY OF A THERAPEUTIC COMPOUND TO THE BRAIN OR SPINAL CORD OF A SUBJECT FOR TREATMENT OF NEURODEGENERATIVE DISEASES"

Record of Invention (Potential for getting a patent)

Angiotensin II and related peptides as therapeutics for treating cerebellar ataxias.

Publications (Journal Articles):

1. Kanwar KC and **Vig PJS**: Intestinal absorption of zinc in the fluoridated environment IRCS Med. Sci. 1983; 11:762.

2. Kanwar KC, **Vig PJS** and Kalla NR: In vitro inhibition of testosterone synthesis in the presence of fluoride ions. IRCS Med. Sci. 1983; 11:813-814.

3. Nath R, **Vig PJS**, Gulati S, Sharma M, Ravi K, and Paliwal VK: Biological and environmental monitoring of heavy metals with special reference to cadmium. In: Agarwal VP, Rana SVS, eds Sci Dev Environ. India; 1987: 113-116

4. **Vig PJS**, Singh S, Prashar S, Gulati S, Paliwal VK and Nath R: Environmental impact of heavy metals on health (An analysis of food, water, air and blood samples). In: Environmental Pollution and Health Hazards in India, New Delhi: Ashish Publishing House, Kumar R, ed, 1987: 138-146.

5. Ravi K, Paliwal VK, **Vig PJS**, Sharma M and Nath R: Do isometallothioneins regulate enzyme metabolism? Speculations Sci. Technol 1988; 11:59-61.

6. **Vig PJS**, Bhatia M, Gill KD and Nath R: Cadmium inhibits brain calmodulin: In vitro and in vivo studies. Bull Environ Contam Toxicol. 1989; 43: 541-547.

7. **Vig PJS**, Bhatia M, Gill KD and Nath R: Cadmium inhibits brain calmodulin activity in monkey brain. J Appl Toxicol 1989; 9:313-316.

8. **Vig PJS**, Mehrotra BD and Desaiah D: Chlordecone interaction of calmodulin binding with phosphodiesterase. J Appl Toxicol 1990; 10:55-57.

9. Yallapragada PR, **Vig PJS** and Desaiah D: Differential effects of triorganotins on calmodulin activity. Toxicol Environ Hlth 1990; 29:317-327.

10. **Vig PJS**, Mehrotra BD and Desaiah D: Holothurin: An activator of bovine brain phosphodiesterase. Res Comm Chem Pathol Pharmacol 1990; 67:419-422.

11. **Vig PJS**, Paliwal VK and Nath R: A comparative study of direct current plasma atomic emission spectrometry and atomic absorption spectrophotometry for biological monitoring of trace metals. In: Dillon HK, Ho MH, eds, Biological Monitoring of Exposure to Chemicals: Metals. New York: John Wiley, 1991: 163-171.

12. **Vig PJS** and Nath R: In Vivo effects of cadmium on calmodulin and calmodulin regulated enzymes in rat brain. Biochemistry International 1991; 23:927-934.

13. **Vig PJS**, Yallapragada PR, Kodavanti PRS and Desaiah D: Modulation of calmodulin properties by amiodarone and its major metabolite desethylamiodarone. Pharmacol Toxicol 1991; 68:26-33.

14. **Vig PJS**, Yallapragada PR, Trottman CH, Mehrotra BD and Desaiah D: Effect of organochlorine and organotin compounds on active conformation of calmodulin. J Environ Sci Hlth A1991; 26:521-534.

15. Kodavanti PRS, Cameron JA, Yallapragada PR, **Vig PJS** and Desaiah D: Inhibition of Ca^{2+} transport associated with cAMP-dependent protein phosphorylation in rat cardiac sarcoplasmic reticulum by triorganotins. Arch Toxicol 1991; 65:311-317).

16. **Vig PJS**, Ravi K and Nath R: Interaction of metals with brain calmodulin purified from normal and cadmium exposed rats. Drug Chem Toxicol 1991; 14:207-218.

17 Desaiah D, **Vig PJS**, Subramony SH and Currier RD: Inositol 1,4,5-trisphosphate receptors and protein kinase C in olivopontocerebellar atrophy. Brain Res 1991; 552:36-40.

18. Yallapragada PR, **Vig PJS**, Kodavanti PRS and Desaiah D: In vivo effect of triorganotins on calmodulin activity in rat brain. J Toxicol Environ Hlth 1991;

34:229-237.

19. **Vig PJS** and Desaiah D: Modulation of protein kinase C activity by amiodarone and desethylamiodarone. NeuroToxicology 1991; 12:595-602.

20. Pala I, Srinivasan A, **Vig PJS** and Desaiah D: In vitro effects of organophosphorus compounds on calmodulin activity. J Appl Toxicol 1991; 11:391-395.

21. Desaiah D, Pentyala SN, Trottman CH, **Vig PJS**, and Sekhon BS: Combined effects of carbon tetrachloride and chlordecone on calmodulin activity in gerbil brain. J Toxicol Environ Hlth 1991; 34:219-228.

22. **Vig PJS**, Subramony SH, Currier RD and Desaiah D: Inositol 1,4,5-trisphosphate metabolism in the cerebella of Lurcher mutant mice and patients with olivopontocerebellar atrophy. J Neurological Sci 1992; 110:139-143.

23. Desaiah D, Subramony SH, **Vig PJS** and Currier RD: Phosphoinositide second messenger system in human OPCA and the mouse model. In: Eds. Harding A, Deufel T, Advances in Neurology, vol. 61, New York: Raven Press 1993: 167-173.

24. Pentyala SN, **Vig PJS**, Sekhon BS and Desaiah D: Effect of carbon tetrachloride on inositol 1,4,5-trisphosphate dependent and independent regulation of rat brain microsomal Ca^{2+}-fluxes. Cellular Signalling 1994; 6: 561-567.

25. **Vig PJS**, Pentyala SN, Chetty CS, Rajanna B and Desaiah D: Lead alters inositol polyphosphate receptor activities: Protection by ATP. Pharmacology and Toxicology 1994; 75:17-22.

26. **Vig PJS**, Desaiah D, Joshi P, Subramony SH and Fratkin JD: Decreased insulin-like growth factor-I-mediated protein tyrosine phosphorylation in human olivopontocerebellar atrophy and lurcher mutant mouse. J Neurological Sci.1994; 124 38-44.

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New Delhi. London, 1995: pp. 194-200.

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35. Rao JV, Desaiah D, **Vig PJS**, Venkateswarlu Y, Marine biomolecules inhibit rat brain nitric oxide synthase. Toxicol. 129: 103-112 (1998)

36. M Pande, J A Cameron, **P J S Vig** and D Desaiah. Phencyclidine block of Ca" ATPase in rat heart sarcoplasmic reticula. Toxicology 129: 95-102 (1998).

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41. Pande M, Cameron JA, **Vig PJS**, Ali SF, D Desaiah. Inhibition of calcium ATPase by phencyclidine in rat brain. Mol Cell Biochem 194:(1-2) 173-177 (1999).

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43. **Vig PJS**, McDaniel DO, Subramony S H, Qin Z. The effects of calbindin D-28K and parvalbumin antisense oligonucleotides on the survival of cultured Purkinje cells. Res Commun Mol Pathol Pharmacol. 103: (3) 249-259 (1999)

44. Subramony SH, **Vig PJS**, McDaniel DO. Dominantly inherited ataxias. Semin Neurol 19: (4) 419-425 (1999)

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47. **Vig PJS**, Subramony SH, McDaniel DO. Calcium homeostasis and spinocerebellar ataxia-1 (SCA-1) Brain Res. Bull. 56, 221-225 (2001)

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51. Akifumi Mizutani, Lei Wang, Harini Rajan**, PJS Vig**, William A Alaynick, Joshua P Thaler and Chih-Cheng Tsai. BOAT, an AXH domain protein, suppresses the cytotoxicity of mutant ataxin-1. EMBO J. 24: 3339-3351 (2005).

52. **P J S Vig**, S.H. Subramony, D R D'Souza, J. Wei, M E Lopez. Intranasal

administration of IGF-I improves behavior and Purkinje cell pathology in SCA1 mice. Brain Res. Bull. 69:574-579, (2006).

53. D.R. D'Souza, J. Wei, M. E. Lopez, J.D. Hebert, S.H. Subramony, **P.J.S.Vig** Tissue transglutaminase crosslinks ataxin-I: Possible role in SCA1 pathogenesis. Neuroscience Letters 409: 4-9 (2006)

54. **PJS Vig**, M E Lopez, J Wei, D R D'Souza, S H. Subramony, J Henegar and J D Fratkin. Glial S-100B Vacuoles in Purkinje Cells: Earliest Morphological Abnormality in SCA1 Transgenic Mice. J. Neurological Sci. (Online: Free Access) 23: 166-174 (2006).

55. Pande M, Harps A, Sundaram M, **Vig PJS**. Role of nitric oxide in domoic acid induced hippocampal degeneration. J. Neurological Sci. (Online: Free Access) 24: 16-24 (2007).

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57. Vig, PJS, Shao, Q, Lopez, ME, (2009). Glial response to polyglutamine-mediated stress. Biosci. Hypotheses 2, 148-150.

58. **Vig PJS** (2009) S100B - A common connection between depression and cerebellar disorders. . Biosci. Hypotheses 2, 343 -344.

59. **PJS Vig**, Q Shao, SH Subramony, M E Lopez and E Safaya, (2009) Bergmann Glial S100B activates myo-inositol monophosphatase 1 and co-localizes to Purkinje Cell Vacuoles in SCA1 Transgenic Mice. Cerebellum 8, 231- 244.

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61. Hearst S, Lopez M, Shao Q, Liu Y, **Vig PJ** (2010)**.** Dopamine D2 receptor signaling modulates mutant ataxin-1 S776 phosphorylation and aggregation . J. Neurochem 1143 Aug (3):706-716

62. Fratkin JD, **Vig PJS** (2012). Neuropathology of degenerative ataxias. Handb Clin Neurol, 103:111-125.

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64. Hearst SM, Walker LR, Shao Q, Lopez M, Raucher D, **Vig PJS** (2011). The Design and Delivery of a Thermally Responsive Peptide to Inhibit S100B Mediated Neurodegeneration. Neuroscience 2011 Dec 1;197:369-80

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Abstracts and presentations

1. **Vig PJS**, Paliwal V, Nath R. A comparative study of direct current plasma atomic emission spectrometry and atomic absorption spectrophotometry for biological monitoring of trace metals. American Chemical Society 1985, Miami, FL.

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3. Nath R, **Vig PJS**, Gulati S, Ravi, D, Paliwal VK. Seminar on Science, Development and Environment. 1986, Muzaffarnagar, India.

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inositol 1,4,5-trisphosphate receptors and protein kinase C activity. The Toxicologist 1991; 11: 331.

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