

Suvro Chatterjee, Ph.D.
(alias Subhra Chattopadhyay)

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Suvro Chatterjee's research interests revolve around nitric oxide signaling in endothelial bed and vascular remodeling. The goal of the Chatterjee lab is to understand the role of nitric oxide signaling pathways in cellular migration, permeability and angiogenesis. Nitric oxide is implicated in various physiological events, extending to pathophysiology, from vascular smooth muscle relaxation to angiogenesis, as well as clinical conditions ranging from stroke to cancer. Dr. Chatterjee filed a patent application by claiming anti-angiogenesis potential of a protein called Ang 001 with his counter part in Australia, Prof. A. Dharmarajan. He made major contribution in studying the mechanism underlying nitric oxide implications in vascular biology. Specifically, he added significant work to design new strategies towards understanding the molecular mechanism of controlling endothelial nitric oxide synthase (eNOS) and thereby nitric oxide production. Trained as cell biologists at Devi Ahilya University Indore, McGill University and Mayo Clinic Rochester Dr. Chatterjee supervises five sponsored research grants from Government of India. He has 27 research articles in peer reviewed journals like PNAS, Circ Res, American Journal of Physiology, American Journal of Pathology, BBRC and Journal of Cell Sciences to his credit. Adding to his scientific contributions Dr. Chatterjee has been invited as a reviewer for highly reputed scientific journals like Hepatology, BioMedCentral, Theriogenology and Cell Biology International.

Affiliation

1. Faculty Scientist, AU-KBC Research Centre, MIT, Anna University, Chennai, India, 2004-
2. Visiting Faculty, Foundation for Revitalisation of Local Health Traditions (FRLHT), Bangalore 2005-
3. Mayo Clinic, Rochester, GI Research Unit, Research Fellow, 2001-2004.
4. McGill University, Montreal, Urology Res. Lab, Postdoctoral Research Fellow, 1998-2001.
5. D A University, Dept. Life Science, Indore, India, Research Fellow (Graduation Work) 1992-1998.

Education

1. **Ph.D.** (1999) Life Sciences, Devi Ahilya University, Indore
 2. **M.Sc.** (1991) Physiology, Calcutta University
 3. **B.Sc.(Hons)** (1989) Major-Physiology, Minor-Chemistry and Zoology, Calcutta University
- Max Plank Institute of Biophysics, Frankfurt, UNESCO fellow, 1999 (two months).
 - Training in Electrophysiology, 1997 (two weeks), Institute of Cell Biology, Shanghai UNESCO sponsored.
 - Training in Electron Microscopy, 1997 (two weeks), All India Institute of Medical Sciences, New Delhi.

Academic and Professional Honors

1. Visiting Scientist, National Institute of Health (NIH), Maryland, USA 2009 (March)
2. Visiting Scientist, University of Bern, Switzerland 2006 (November)
3. Visiting Scientist, University of Western Australia, 2006 (May)
4. Mayo Foundation Fellow Award (2001)
5. Dr. Alan B. Hawthorne Award (McGill University 2000)
6. MCBN - UNESCO Research Fellow (1998)
7. Wood Whelan Fellow (IUBMB) (1997)

Personal Details

- Date of Birth: 9th January 1968.
- Marital Status: Married
- Driving Licence: Full, clean.

Projects

Funded

- 1) 11th Plan Programme entitled “ Human performance under different operational environments”
Defence Research and Development Organization (DRDO).
- 2) Studying the effects of mTOR inhibitor and Sunitinib on Hepatic Stellate Cells. **Indo-Swiss.**
- 3) Dissecting the molecular mechanism of endothelial nitric oxide synthase translocation
(Department of Science and Technology (DST)).
- 4) Implication of shear stress-mediated production of nitric oxide in the migration of endothelial cells. **(Council of Scientific and Industrial Research (CSIR)).**
- 5) Studying the mechanism of cadmium mediated suppression of nitric oxide production in endothelial cells: Implications in endothelial cell biology. **(Indian Council of Medical Research (ICMR)).**
- 6) Dissecting nitric oxide signaling pathways of hypoxia induced tissue remodeling in lungs
(Life Science Research Board LSRB, Defence Research and Development Organization (DRDO)).
- 7) Use of nitric oxide in reversing pathologic fibrogenesis in liver: A cell biology approach to cure liver cirrhosis **(The Academy of Sciences for the Developing World – TWAS).**

Project completed

- 1) Testing the potential of organosulfurs as drug to protect lungs from high altitude induced pulmonary edema using cell and animal tissue models **(Defence Research and Development Organization (DRDO)) 2007**
- 2) Dissecting the mechanism of active metabolites of garlic in the activation of nitric oxide synthase in pulmonary artery endothelial cells under hypoxia **(Defence Research and Development Organization (DRDO)) 2006**
- 3) Single cell investigations of the mechanical properties of human ventricular myocytes from biopsies **Sri Ramchandra Medical College (SRMC), Chennai 2006**

Publications

1. Barh D, Kumar A, Chatterjee S, and Liloglou T (2009) Molecular Pathogenesis and Drug Targets in Cardiac Myxoma. *Current Cancer Drug Targets* (In Press)
2. Majumder S, Rajaram M, Muley A, Himabindu Reddy S, Tamilarasan KP, Kolluru GK, Sinha S, Siamwala JH, Gupta R, Ilavarasan R, Venkataraman S, Sivakumar KC, Anishetty S, Pradeep Kumar G, **Chatterjee S**. (2009) Thalidomide attenuates nitric oxide driven angiogenesis by interplaying with soluble guanylate cyclase. *British Journal of Pharmacology* (In Press).
3. Majumder S, Gupta R, Himabindu Reddy S., Sinha S, Muley A, Kolluru GK, **Chatterjee S**. (2009) Cadmium attenuates bradykinin driven nitric oxide production by interplaying with the localization pattern of endothelial nitric oxide synthase. *Biochem Cell Biol*.
4. Arora S, Tyagi YK, Kumar A, Majumder S, Saluja D, Raj HG, **Chatterjee S**, Saso L, Prasad AK, Singh PV (2009) The Role of Calreticulin Transacetylase in the Activation of Human Platelet Nitrite Reductase by Polyphenolic Acetates. *Biological and Pharmaceutical Bulletin*. 32(2): 161-5.
5. Kolluru GK, Tamilarasan KP, Rajkumar AS, Geetha Priya S, Rajaram M, Saleem NK, Majumder S, Jaffar Ali BM, Illavazagan G, **Chatterjee S**. (2008) Hypoxia promotes leakiness in endothelium: Nitric oxide-cGMP shields the endothelial cells from hypoxia-mediated leakiness. *Eur. J. Cell Biol*. 87:147-61.
6. Majumder S, Muley A, Kolluru GK, Saurabh S, Tamilarasan KP, Chandrasekhar S, Reddy H, Purohit SB, **Chatterjee S** (2007) Cadmium reduces nitric oxide production by impairing phosphorylation of endothelial nitric oxide synthase: A basis for cadmium-mediated endothelial dysfunction. *Biochem Cell Biol* 85:709-720.
7. Majumder S, Tamilarasan KP, Kolluru GK, Muley A, Nair C M, Omanakuttan A, Murty KVGK and **Chatterjee S**. (2007) Activated pericyte attenuates endothelial functions: Nitric oxide cGMP rescues activated pericyte associated endothelial dysfunctions. *Biochem Cell Biol*. 85 (6):709-20.
8. Billadeau DD, **Chatterjee S**, Bramati P, Sreekumar R, Shah V, Hedin K and Urrutia R. (2007) Characterization of the CXCR4 Signaling in Pancreatic Cancer Cells. *Int J Gastrointest Canc* 37: 110-9.
9. Kang-Decker N, Cao S, **Chatterjee S**, Yao J, Egan LJ, Semela D, Mukhopadhyay D, Shah V. (2007) Nitric oxide promotes endothelial cell survival signaling through S-nitrosylation and activation of dynamin-2. *J Cell Sci* 120:492-501.
10. Iwakiri Y, Satoh A, **Chatterjee S**, Toomre DK, Chalouni CM, Fulton D, Groszmann RJ, Shah VH, Sessa WC. (2006) Nitric oxide synthase generates nitric oxide locally to regulate compartmentalized protein S-nitrosylation and protein trafficking. *Proc Natl Acad Sci U S A*. Dec 26;103(52):19777-82.
11. Tamilarasan KP, Kolluru GP, Rajaram M, Indhumathy M, Saranya R, **Chatterjee S** (2006). Thalidomide attenuates nitric oxide mediated angiogenesis by blocking migration of endothelial cells. *BMC Cell Biol*. 4;7:17.
12. Kolluru GK, Tamilarasan KP, Geetha Priya S, Durgha NP, **Chatterjee S** (2006) Cadmium induced endothelial dysfunctions: Consequence of defective migratory pattern of endothelial cells in association with poor nitric oxide availability under cadmium challenge. *Cell Biol. Int*. 30(5): 427-38.

13. Perri R, Langer DA, **Chatterjee S**, Gibbons SJ, Gadgil J, Farrugia G, Shah V (2006) Defects in cGMP-PKG pathway contribute to impaired NO dependent relaxation in activated hepatic stellate cells. *Am J Physiol Gastrointest Liver Physiol.* 290(3):G535-42.
14. Lee J.S., Decker NK, **Chatterjee S**, Yao J, Friedman S, Shah V (2005) Mechanisms of nitric oxide interplay with Rho GTPase family members in modulation of actin membrane dynamics in pericytes and fibroblasts. *Am J. Pathol.* 166:1861-1870.
15. Lim I, Strege PR, Gibbons SJ, Lyford GL, Miller SM, Sarr MG, **Chatterjee S**, Shah V, Farrugia G (2004) Carbon monoxide activates human intestinal smooth muscle L-type Ca⁺⁺ channels through a nitric oxide dependent mechanism. *Am J. Physiol.* 288:G7-G14.
16. Gulati R, Jevremovic D, Peterson TE, **Chatterjee S**, Shah V, Vile RG, Simari RD (2003) Functional heterogeneity of cells with an endothelial phenotype obtained from adult human blood. *Cir Res* 93:1023-1025.
17. Hendrickson H, **Chatterjee S**, Cao M, Morales Ruiz M, Sessa WC, Shah V (2003) Influence of caveolin on a constitutively activated form of recombinant eNOS: Insights into eNOS dysfunction in the bile duct ligated liver. *Am J Physiol Gastrointest Liver Physiol.* 285:652-660.
18. **Chatterjee S**, Cao, S. and Shah, V. (2003) Inhibition of GTP-dependent vesicle trafficking impairs internalization of plasmalemmal eNOS and cellular nitric oxide production *J Cell Sci.* 116:3645-3655.
19. **Chatterjee, S.**, Gagnon, G. (2001) Cryopreservation alters membrane sulfhydryl status of bull spermatozoa : Protection by oxidized glutathione. *Mol. Reprod. Dev.* 60 : 498-506.
20. **Chatterjee, S.**, Laloraya, M., Kumar, G.P. (2001) Sperm disposal system in spermatic granuloma: A link with superoxide radicals. *Int. J. Androl.* 24: 278-283.
21. **Chatterjee, S.**, Gagnon, C. (2001) Evidence for the production of oxygen free radicals during freezing/thawing of bull spermatozoa. *Mol. Reprod. Dev.* 59(4):451-8.
22. **Chatterjee, S**; Laloraya, M., Kumar, G.P.(2001) Regional variations in thiol distribution pattern and superoxide dismutase activity of male reproductive tract of rat modulate the transport of spermatozoa through epididymis and vas deferens. *Urol. Int.* 66: 100-104.
23. Herrero, M.B., **Chatterjee, S.**, Lefièvre, L., de Lamirande, E., Gagnon, C. (2000) Nitric Oxide interacts with the cAMP pathway to modulate capacitation of human spermatozoa. *Free Rad. Biol. Med.* 29(6) (2000) pp. 522-536.
24. Bilodeau, J.F., **Chatterjee, S.**, Sirad, M.A., Gagnon, C. (2000) Levels of antioxidant defenses are decreased in bovine spermatozoa after a cycle of freezing and thawing. *Mol. Rep. Dev. Mol Reprod Dev* 2000, 5:282-288.
25. **Chatterjee, S.**, Purohit, S.B., Laloraya, M. and Kumar G.P. (1997) Vasectomy induced SOD inactivation in the male reproductive tract of rat : A prerequisite for spermatic granuloma formation. *Urologia Internationalis* 59:23-25.
26. **Chatterjee, S.**, Laloraya, M. and Kumar G.P. (1997) Superoxide anion radical mediated dissection of rat sperm : An in vitro study. *Arch. Androl.* 39: 101-104.
27. **Chatterjee, S.**, Laloraya, M. and Kumar G.P. (1997) Free radical mediated sperm load management in the vagina of rat. *Arch Androl.* 39: 127-133.

28. **Chatterjee, S.**, Laloraya, M. and Kumar G.P. (1997) Free radical induced liquefaction of ejaculated human semen : A new dimension in semen biochemistry. Arch. Androl. 38:107-111.
29. **Chatterjee, S** (1995) Vasectomy induced male infertility : An error in sperm-surface thiol expression programme linked with membrane dynamics. Fertil. Sex. Steril. suppliment September, 1995.
30. **Chatterjee, S.**, Laloraya, M. and Kumar, G.P. (1994) Free radical bombing of spermatozoa in spermatic granuloma : An attempt to prevent autoimmune switch-on. Biochem. Biophys. Res. Commun.(1), 472-477.
31. **Chatterjee, S.**, Laloraya, M. and Kumar G.P. (1993) Exorbitantly enhanced protein gyration and eronious membrane modification programmes in spermatozoa after vasectomy : A biophysical basis for low fertility revival after vasectomy. Biochem. Biophys. Res. Commun. (2), 450-458.

Patents

Awarded an International Patent by claiming anti-angiogenesis potential of sFRP4 with Prof. A. Dharmarajan, University of Western Australia (April 2007).

Title: ANTI-ANGIOGENIC AGENTS AND METHODS OF THEIR USE

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DHARMARAJAN, Arunasalam [AU/AU]; 23 Woolley Street, Willetton, Western Australia 6155 (AU).

Invited Lectures

1. **Chatterjee, S.** A cross talk between thalidomide and soluble guanylate cyclase leads to the inhibition of angiogenesis, March 8, National Institute of Health (NIH), Maryland, 2009.
2. **Chatterjee, S.** Thalidomide interferes with the activity of soluble guanylate cyclase to attenuate nitric oxide driven angiogenesis. Nitric Oxide Symposium, Patel Chest Institute, Delhi, Jan 12, 2009.
3. Reddy HB and **Chatterjee S.** Actin-dynamin-eNOS: The trio programs the permeability of endothelium under hypoxia. 1st Congress of Asia Pacific Mountain Sickness Society, New Delhi Nov 28-30, 2008.
4. **Chatterjee, S.** Mechanistic study of thalidomide implications in the inhibition of angiogenesis Institute of Himalayan Bioresource Technology (IHBT), Palampur. August 4, 2008.
5. **Chatterjee, S.** In vitro assessment of bioactivity of crude extracts & compound formulae in Ayurveda. Satellite Workshop on S & T to Support Traditional Pharmaceuticals Foundation for Revitalisation of Local Health Traditions (FRLHT), Bangalore May 28, 2008.

6. **Chatterjee, S.** Defining vascular pattern with shear stress under ischemia: A nitric oxide saga. Winter Symposia CMC Vellore, Vellore January 10-12, 2008.
7. **Chatterjee, S.** No slip on the slope with NO: Beneficial interactions between endothelial cells and nitric oxide under low oxygen environment, Federation of Indian Physiological Societies (FIPS), New Delhi January 10-12, 2007.
8. **Chatterjee, S.** Nitric Oxide reverts Hypoxia-induced hyper-permeability of endothelial cells: Dissection of Nitric Oxide down stream signaling, National Conference of Association of Physiologists and Pharmacologists of India (APPICON-2006), Surat, 19-23 December 2006.
9. **Chatterjee, S.** Nitric Oxide mediated angiogenesis ensuing on Thalidomide treatment: Discussion of Nitric oxide down stream signaling in endothelial cells, Department of Clinical research, University of Bern, Switzerland, 17 November 2006.
10. **Chatterjee, S.** Cross-talk between endothelial and stellate cells in Cirrhotic liver: role of Nitric Oxide, RGCB, Trivandrum, 11 October 2006.
11. **Chatterjee, S.** Nitric Oxide Implications in High Altitude induced Pulmonary Edema, DIPAS, Defence Research and Development Organization (DRDO), Delhi, 21 January 2006.
12. **Chatterjee, S.** (Jan 6,2006) A Cellular basis of Nitric Oxide Implications in High Altitude induced Pulmonary Edema, V Annual conference of Society for Free Radical Research in India (SFRR), Kolkata, 17-19 January 2006.
13. **Chatterjee S.** Time, Space and Nitric Oxide: The three dimensions of NOS (Invited Lecture) IV Annual conference of Society for Free Radical Research in India (SFRR), Bangalore, 10-12 January 2005.

Editorial assignments

- Hepatology
- Theriogenology
- BioMedCentral.
- Cell Biology International

Professional Memberships

- New York Academy of Sciences (NYAS)
- American Physiological Society (Regular Member)
- International Society of Heart Research (ISHR)

Presentations

1. **Chatterjee S** and Reddy Hima Bindu. Actin-Dynamin-eNOS: The trio programme permeability of endothelium under hypoxia. Actin dynamin interaction modulate subcellular localization of eNOS in endothelial cell under hypoxia. Oral presentation in the conference: First Congress of Asia-Pacific Society for Mountain Medicine (APSMM) 28-30 November 2008. Delhi
2. Reddy Hima Bindu and **Chatterjee S.** Actin dynamin interactions modulate sub-cellular localization of eNOS in endothelial cells under hypoxia. First Congress of Asia-Pacific Society for Mountain Medicine (APSMM) 28-30 November 2008. Delhi

3. S.Himabindu Reddy and **Chatterjee, S.** Actin dynamin interactions in endothelial cells modulates eNOS localization under hypoxia cells (poster presentation) 77th Annual meeting of SBC, held at IIT Madras, Chennai from 18th to 20th December, 2008.
4. Swaraj Sinha and **Chatterjee, S.** : Nitric oxide: The Lord of the "endothelial" ring (poster presentation) 77th Annual meeting of SBC, held at IIT Madras, Chennai from 18th to 20th December, 2008.
5. Ajit Muley, Arun M Dharmarajan and **Chatterjee, S.** :Wnts: New players in Redox biology of endothelial cells (poster presentation) 77th Annual meeting of SBC, to be held at IIT Madras, Chennai from 18th to 20th December, 2008.
6. Gopi Krishna Kolluru and **Chatterjee, S.:** The role of Rho/ Rho-kinase signaling pathway in endothelial nitric oxide synthase patterning and angiogenesis under shear stress (poster presentation) 77th Annual meeting of SBC, held at IIT Madras, Chennai from 18th to 20th December, 2008.
7. Jamila H Siamwala and **Chatterjee, S.:** Simulated microgravity uses iNOS -cGMP -PKG pathway to promote nitric oxide supported angiogenesis in endothelial cells (poster presentation) 77th Annual meeting of SBC, held at IIT Madras, Chennai from 18th to 20th December, 2008.
8. Syamantak Majumder and **Chatterjee, S.** Thalidomide attenuates nitric oxide driven angiogenesis by interplaying with soluble guanylate cyclase (poster presentation) 77th Annual meeting of SBC, held at IIT Madras, Chennai from 18th to 20th December, 2008.
9. S.Himabindu Reddy and **Chatterjee, S.** Actin dynamin interactions modulate subcellular localization of eNOS in endothelial cells under hypoxia (poster presentation)"Life and living in high mountains" 1st Congress of Asia Pacific Society of Mountain Medicine (APSMM)-Delhi 28-30 November -2008.
10. Sundaramoorthy, S.; Sree rama chaitanya, S.; **Chatterjee, S.** Nitric Oxide: The ringmaster. Society for Biotechnology Conference, Chennai October 17, 2008.
11. Muley A, and **Chatterjee, S.** Wnt: New players in Redox biology of endothelial cells. Gordon Research conference on Thiol Based Redox Regulation and Signaling. Il Ciocco Barga, Italy 25-30 May 2008.
12. **Chatterjee S.** Pericytes cross talk with endothelial cells: Nitric oxide reverses inhibitory effects of pericytes on endothelial cells. Gordon Conference Nitric Oxide 2007 Ventura, CA, February 4-9, 2007.
13. Gopi Krishna Kolluru and **Chatterjee S.** Nitric Oxide implicates in Cadmium induced endothelial dysfunctions: A basis for Cadmium mediated cardiovascular anomalies. Joint Annual Meeting of International Society of Heart Research (ISHR) and International Academy of Cardiovascular Sciences (IACS), Chennai, 12-14 January 2006.
14. S. Geetha Priya, K.P.Tamilarasan, Gopi Krishna Kolluru and **Chatterjee S.** Thalidomide interferes with nitric oxide signaling of angiogenesis. International symposium on translational research – Apoptosis and Cancer, Trivandrum, 18-21 December 2005.
15. **Chatterjee S.** Time, Space and Nitric Oxide: The three dimensions of NOS (Invited Lecture) IV Annual conference of Society for Free Radical Research in India (SFRR), Bangalore, 10-12 January 2005.
16. Durga NP, Tamilarasan KP, **Chatterjee S.** Overexpression of connexin 43 attenuates nitric oxide production in endothelial cells: An epiphenomenon of cell density dependent eNOS distribution in

endothelial cells IV Annual conference of Society for Free Radical Research in India (SFRR), Bangalore, 10-12 January 2005.

17. Gulati R, Jevremovic D, Peterson TE, **Chatterjee S**, Shah V, Vile RG, Simari RD. Functional Heterogeneity of Cells with an Endothelial Phenotype Obtained from Adult Human Blood" Samuel A . *Levine Young Clinical Investigator's Award*, American Heart Association Scientific Sessions, November 11, 2003, Orlando FL.
18. **Chatterjee, S.**, Hendrickson, H., Shah, V. Caveolin inhibits a constitutively activated form of recombinant eNOS in hepatic stellate cells: Possible mechanism for dysfunction of recombinant eNOS gene delivery to liver. ASSLD Meeting. Boston, OCT 24-28, 2003.
19. **Chatterjee, S.**, Cao, S., Shah, V. Inhibition of GTP-dependent vesicle trafficking impairs bradykinin-dependent internalization of plasmalemmal eNOS and ensuing nitric oxide production in hepatocytes and endothelial cell lines. ASSLD Meeting. Boston, Nov1-5, 2002
20. **Chatterjee, S.**, Gagnon, C. Cryopreservation alters membrane thiol status of bull spermatozoa: Protection by oxidized glutathione. 7th Annual Meeting of the Oxygen Society. San Diego, Nov 16-21, 2000
21. **Chatterjee, S.**, Gagnon, C. Generation of reactive oxygen species during the various steps of sperm cryopreservation. 6th Annual Meeting of The Oxygen Society. New Orleans. November 18-22, 2000.
22. Herrero, B., **Chatterjee, S.**, Gagnon, C. Measurement of nitric oxide (NO) in human spermatozoa by electron Paramagnetic resonance (EPR) spectroscopy spectrum: Capacitation increases NO production. American society of Andrology 44 Annual Meeting, Louisville, Kentucky, April 10-13, 1999
23. **Chatterjee, S.** Superoxide anion radical induced human semen liquefaction with special reference to a novel technique for the determination of semen liquefaction time : An approach with Electron Spin Resonance Spectroscopy. 2nd International Conference on Bioradicals and 5th International workshop on ESR imaging and in vivo ESR spectroscopy. October 12-16, 1997.
24. **Chatterjee, S.** Vasectomy induced male infertility: An error in sperm-surface thiol expression programme linked with membrane dynamics, 15th World Congress on Fertility and Sterility, Montpellier, France. 17-22 September, 1995.