Syed F. Ali, Ph.D.

Senior Biomedical Research Scientist
Head, Neurochemistry Laboratory
Division of Neurotoxicology, HFT-132
National Center for Toxicological Research/FDA, Jefferson, AR 72079
Adjunct Professor - Depts. of Biochemistry and Molecular Biology; Neurology; and Pharmacology & Toxicology, University of Arkansas for Medical Sciences, Little Rock, AR, and Dept. of Pharmacology, Duke University Medical Center, Durham, NC

Education

Aligarh Muslim University, Aligarh, India, B.Sc. (Hons), Chemistry (1973)
Aligarh Muslim University, Aligarh, India, M.Sc., Chemistry (Organic) (1975)
Aligarh Muslim University, Aligarh, India, M. Phil, Chemistry (Neurochemistry) (1977)
Aligarh Muslim University, Aligarh, India, Ph.D., Neurochemistry/Neurotoxicology (1980)
Junior/Senior Research Fellow, J.N. Medical College, Aligarh Muslim University (1975-1979)
Postdoctoral Research Fellow, J.N. Medical College, Aligarh Muslim University (1980-1981)
Fogarty International Fellow, NIEHS, Research Triangle Park, NC (1981-1982)
Postdoctoral Research Fellow/Research Associate, UAMS, Little Rock, AR (1982-1984)
Staff Fellow, NCTR/FDA (1984-1986)

Research Interests

Dr. Ali's primary research focus is the study of cellular and molecular mechanisms of oxidative stress and free radical-induced neurodegeneration and potential neuroprotective mechanisms of antioxidants. Dr. Ali has demonstrated that selective CNS-acting drugs, drugs of abuse, dietary supplements, environmental agents, pesticides, and organometals induce neurotoxicity by generating free radicals. Using different pharmacological and genetic approaches Dr. Ali's laboratory has demonstrated that peroxynitrite is responsible in methamphetamine (METH)-induced dopaminergic neurotoxicity. His laboratory utilizes the MPTP-mouse model of Parkinson's disease (PD) and to examine the neuroprotective role of nitric oxide inhibitors, protease inhibitors and selective dopaminergic agonists and antagonists. Dr. Ali's laboratory uses a non-human primate model of PD in examining the use of a wireless sensor, to stimulate the subthalamic area to activate the dopamine system, as a potential treatment of PD.

The use of silver, gold, copper, manganese and aluminum nanoparticles (NP) and other nanomaterials, such as single- or double-wall carbon nanotubes and titanium oxide, is becoming more widespread in commercial applications, such as the computer industry and drug delivery systems. Because of their nanosize the properties of NP differ significantly from those of bulk materials and their interaction with biological systems is still unknown. Dr. Ali's laboratory is studying the effects of nanomaterials on the central nervous system. Dr. Ali's laboratory has demonstrated that NP are capable of generating oxidative stress and free radials, which may in turn produce neurotoxicity. Carbon nanotubes (CNTs) are considered to have revolutionized the field of nanotechnology because of their light weight. However, this property can be potentially hazardous if it allows CNTs to reach the lung and blood stream after environmental exposure. Using *in vitro* and *in vivo* approaches, Dr. Ali's laboratory plans to investigate the potential of CNTs to produce any adverse effects on cellular systems due to their ability to cross the blood brain barrier.

Recent Relevant Publications:

Sharma, H.C., Hussain, S. M., Schlager, J.J., **Ali, S,F**,. and Sharman, A. Influence of nanoparticles on blood brain barrier permeability and brain edema formation in rats. Brain Edema, 2009 (In Press).

Sharma, H.S., **Ali, S.F.,** Tian, Z.R., Hussain, S.H., Schlager, J.J., Sjoquist, P., Sharma, A. and Muresanu, D.F. Chronic treatment with nanoparticles exacerbates hyperthermia induced blood brain barrier breakdown, cognitive dysfunction and brain pathology in the rat. Neuroprotective effects of nanowired-antioxidant compound H-290/51. Neuroscience and Nanotechnology, 9:5073- 5090, 2009.

Sharma, H.S., **Ali, S.F.,** Hussain, S.H., Schlager, and Sharma, A. Influence of engineered nanoparticles from metals on the blood brain barrier permeability, cerebral blood flow, brain edema and neurotoxicity. An experimental study in the rat and mice using biochemical and morphological approaches. Neuroscience and Nanotechnology, 9:5055-5072, 2009.

Sharma, H.S., **Ali, S.F.,** Tian, Z.R., Patnaik, R., Patnaik, S., Lek, P., Sharma, A. and Lundstedt, T. Nano-Drug delivery and neurorotection in spinal cord injury. Neuroscience and Nanotechnology, 9:5014 - 5037, 2009.

Perez-De La Cruz, V., Elinos-Calderon, D., Robledo-Arratia, Y., Medina-Campos, O.N., Pedraza-Chaverri, ., **Ali, S.F.** and Santamaria, A. Targeting oxidative/nitregic stress ameliorates motor impairment, and attenuates synaptic mitochondrial dysfunction and lipid peroxidation in two models of hunting's disease. Beh. Brain Res., 199:210-217, 2009.

Rahman, M.F., Wang, J., Patterson, T.A., Saini, U.T., Robinson, B.L., Newport, G.D., Murdock, R.C., Schlager, J.J., Hussain, S.M. and **Ali, S.F**., Expression of genes related to oxidative stress in the mouse brain after exposure to silver-25 nanoparticles. Tox. Letters, 187: 15-21, 2009

Wang, J., Rahman, M.F., Duhart, H.M., Newport, G.D., Patterson, T.A., Murdock, R.C., Hussain, S.M., Schlager, J.J., and **Ali, S.F.,** Expression changes of dopaminergic system related genes in PC 12 cells induced by manganese, silver or copper nanoparticles. Neurotoxicology (Submitted for publication). 2009.

Zhu, J.P.Q., Xu, W., Wang, J., **Ali, S. F.** and Angulo, J.A., Modulation of methamphetamine-induced striatal apotosis and nitric oxide synthesis by the neurokinin-1 receptor in mice. J. Neurochem. XXXXXX (Submitted for Publication).

Ali, S. F., Jiang, H., Rongzhu, L., Milatovic, D. and Aschner, M. Methamphetamine Dysregulates redox status in primary astrocyte and neuronal rat cultures. International J. Neurodegene. Neuroregene. (Accepted for publication) 2009.

Rinderknecht, A.L., Ericson, J.E., **Ali, S.F.,** Kapadia, B. and Kleinman, M.T. Maternal exposure to inhaled manganese alters neurological response to toxic challenges in the progeny: implication to developmental exposure. Neurobeh. Ter/Toxicol. (Submitted for publication) 2009.

Tariq, E., Lyn-Cook, B., Duhart, H., Newport, G.D. and **Ali, S.F.** Acrylamide decreased dopamine and 3-nitrotyrosine (3-NT) levels in PC 12 cells. Neurosci. Letters, Accepted for publication (2009).

Zou, X., Sadovova, N., Patterson, T.A., Divine, R.L., Hotchkiss, C.E., **Ali, S.F**., Hanig, J.P., Paule, M.G., Slikker, W.,Jr., and Wang, C. The effects of L-Carnitine on the combination of inhalation anesthetic-induced developmental, neuronal apoptosis in the rat frontal cortex. Neurosci. 151: 1053-1065, 2008.

Bowyer, J.F., Thomas, M., Schmued, L.C. and Ali, S.F., The relative importance of dose, hyperthermia, seizures and the blood brain barrier in the brain region specific neurotoxic profiles induced by amphetamine. Ann. NY. Acad. Sci., 1139: 127-139, 2008.

Wang, J. H.M. Duhart, Z. Xu, T. A. Patterson, G. D. Newport and **S. F. Ali** Comparison of the time courses of selective gene expression and dopaminergic depletion induced by MPP+ in MN9D cells. Neurochem. International 52:6, 1037-1043, 2008.

Wang, C., Sadovova, N., Patterson, T.A., Zou, X., Fu, X., Hanig, J.P., Paule, M.G., **Ali, S.F**., Zhang, X. and Slikker, W., Jr. Protective effects of 7-nitroindazole on ketamine-induced neurotoxicity in rat forebrain culture. NeuroToxicology. 29: 613-620, 2008.

Li, H., Campbell, A., **Ali, S.F.,** Cong, P. and Bondy, S, Chronic exposure to low levels of aluminum alters cerebral cell signaling in response to acute MPTP administration. Tox. and Industr. Health 22: 515-524, 2008.

Bowyer, J.F., Robinson, B.L., Ali, S.F. and Schmued, L.C., Neurotoxic-related changes in tyrosine hydroxylase, microglia, myelin, and the blood brain barrier in the caudate-putamen from acute methamphetamine exposure. Synapse, 62: 193-202, 2008

Wang, J., Xu, W., **Ali, S. F.** and Angulo, J. A., Concentration between the striatal neurokinin-1 receptor and nitric oxide formation during methamphetamine exposure. Ann. N.Y. Acad. Sci. 1139: 164-171, 2008.

Pereira, F.C., Rolo, M. R., Marques, E., Mendes, V. M., Ribeiro, C. F., **Ali, S. F.,** Morgadinho, T. And Macedo, T. R. Acute increase of glutamate-glutamine cycling in discrete brain areas after administration of a single dose of amphetamine. Ann. N.Y. Acad. Sci., 1139: 212-221, 2008.

Tareke, E., Lyn-Cook, B., Robinson, B. and **Ali, S.F.** Acrylamide: A dietary carcinogen formed in Vivo? J Agricultural and Food Chem (2008) (In Press).

Sharma, H.S. and **Ali, S. F.,** Acute administration of 3,4-methlenedioxymethamphetamine induced profound hyperthermia, blood-brain, barrier disruption, brain edema formation, and cell injury: an experimental study in rats and mice using biochemical and morphological approaches. Ann. N. Y. Acad. Sci., 1139: 242-258, 2008.

Gonzalez-Cortes, C., Salinas-Lara, C., Gomez-Lopez, M. A., Tena-Suck, M.L., Perez-De La Cruz, V., Rembao-Bojorquez, D., Pedraza-Chaverri, J., Gomez-Ruiz, C., Galvan-Arzate, S., **Ali, S.F.** and Santamaria, A. Iron porphyrinate Fe(TPPS) reduces brain cell damage in rats intrastriatally lesioned by quinolinate. Neurotox and Teratology**,** 30:510-519, 2008.

Hu, M., Zhang D., Pang, H., Caudle, W.P., Li, Y., Gao, H., Liu, Y., Qian, L., Wilson, B., Di-Monte, D.A., **Ali, S.F.,** Zhang, J., Block, M. and Hong, J.S. Macrophage antigen complex-1 mediates reactive microgliosis and progressive dopaminergic neurodegeneration in the MPTP model of Parkinson's disease. J. Immunology 181: xxx-xxx, 2008.

Zou, X., Sadovova, N., Patterson, T.A., Divine, R.L., Hotchkiss, C.E., **Ali, S.F**., Hanig, J.P., Paule, M.G., Slikker, W., Jr., and Wang, C. The effects of L-Carnitine on the combination of inhalation anesthetic-induced developmental, neuronal apoptosis in the rat frontal cortex. *Neurosci.* **151**:1053-1065, 2008.

Wang, J, H. M. Duhart, Z. Xu, T. A. Patterson, G. D. Newport and **S. F. Ali.** Comparison of the time courses of selective gene expression and dopaminergic depletion induced by MPP+ in MN9D cells. *Neurochem. Internat*. **52**:1037-1043, 2008.