

Sung Gu Han, Ph. D.

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CURRICULUM VITAE

EDUCATION

West Virginia University (Morgantown, WV, USA) Jan 2000-May 2005
Doctor of Philosophy
Program in Genetics and Developmental Biology

Dissertation: Heat shock protein 70 as an indicator of toxic heavy metal exposure and oxidative stress in the serum of asymptomatic shipyard welders.

Konkuk University (Seoul, Korea) Mar 1996- Feb1998
Master of Science
Laboratory of Molecular and Cellular Biology
Department of Animal Products Science
College of Animal Husbandry

Thesis: Antitumor activity of extracts from *Oldenlandia diffusa*.

Konkuk University (Seoul, Korea) Mar 1990- Feb1996
Bachelor of Science
Department of Animal Products Science
College of Animal Husbandry

RESEARCH EXPERIENCE

Postdoctoral Scholar May 2008-Present
University of Kentucky
Molecular and Cell Nutrition Laboratory
Superfund Basic Research Program

Responsibilities:

- Biochemical and molecular mechanism of environmental pollutants such as polychlorinated biphenyls (PCB) on vascular endothelial cell function and atherosclerosis.
- Effects of bioactive food components (e.g., flavonoids) and dietary fatty acids against PCB-induced endothelial cell dysfunction and inflammation.

Postdoctoral Scholar

May 2005-April 2008

University of Kentucky
College of Medicine
Graduate Center for Toxicology

Responsibilities:

- Pulmonary and cardiovascular toxicity of environmental tobacco smoke and nano-sized particles (carbon nanotubes) in mice.
- Atherogenic and pulmonary responses of ApoE- and LDL receptor knockout mice to cigarette smoke.
- Long term effects of nanoparticle exposure in pulmonary toxicity and cardiovascular disease including atherosclerosis in ApoE-deficient mice.
- Interactions between cigarette smoke and particulates and carbon nanotubes and ozone in mouse lungs.
- Oxidative stress, expression of antioxidant enzymes and stress response proteins by exposure to nanoparticles in mice.
- Effects of cigarette smoke condensate on UV-induced DNA adducts and repair processes in human lung fibroblast cells.
- Responses of alveolar macrophages by exposure to cigarette smoke and carbon nanotubes in mice.

Regular Research Fellow

Sep 2002-Apr 2005

National Institute for Occupational Safety and Health
Health Effect Laboratory Division
Pathology and Physiology Research Branch

Responsibilities:

- Pharyngeal exposure of nanoparticles in mouse lung and evaluation of pulmonary toxicity.
- Heat shock protein 70 as a biomarker of lung damage caused by toxic heavy metals exposure such as arsenic, cadmium and mercury.

- Changes in the serum of shipyard welders particularly investigating oxidative stress and free radical generation caused by welding fume exposure.

Research Assistant Jan 2001-Aug 2002
 West Virginia University
 Health Sciences Center
 Department of Pathology

Responsibilities:

- Function of metallothionein genes in the human prostate cell line 267B-1.
- Effects of cadmium on toxicity and induction of metallothionein in a human prostate cell line, 267B-1.

TEACHING EXPERIENCE

Teaching Assistant/Laboratory Instructor Mar 1996-Feb 1998
 Konkuk University
 College of Animal Husbandry

Undergraduate laboratory classes:
 Biochemistry, General Microbiology, Food Microbiology

OTHER EXPERIENCES

President of Korean Bioscientists Association at May 2006-April 2007
 University of Kentucky

President of Korean Students Association at Sep 2001-Aug 2002
 West Virginia University

AFFILIATION WITH SCIENTIFIC SOCIETIES

Society of Toxicology Post-doc Member 2006-Present

AWARDS, SCHOLARSHIPS, AND FELLOWSHIPS

Konkuk University Scholarship 1994, 1995

Konkuk University Graduate School Scholarship 1997

West Virginia University Conference Travel Award	2004
Konkuk University Teaching Assistantship	1996-1998
West Virginia University Research Assistantship	2001-2002
National Institute for Occupational Safety and Health (Morgantown, WV, USA) Research Fellowship	2002-2005
University of Kentucky, College of Medicine, Graduate Center for Toxicology Postdoctoral Fellowship	2005-2008
University of Kentucky, College of Agriculture, Animal and Food Sciences Postdoctoral Fellowship	2008-Present

LABORATORY SKILLS

Expertise in Instrumentation

- Electron Spin Resonance Spectrometer.
- Spectrophotometer.
- Cobas flexible automator for Randox analysis.
- Confocal microscopy.
- Fluorescent microscopy
- Luminescent spectrometer.

Procedures and Assays

- Cell culture techniques.
- Biochemical enzyme activity assays including nitric oxide, glutathione, lipid peroxidation, albumin, total antioxidants, aconitase, superoxide dismutase, hydrogen peroxide, and lactate dehydrogenase (LDH) etc.
- Reactive oxygen species and reactive nitrogen species tests.
- Chemiluminescence.

Molecular and Cellular Techniques

- Electrophoresis and immunoblotting.
- Gene cloning and site directed mutagenesis.
- RNA interference.
- Bacteria culturing for competent cells.
- Apoptosis and cytotoxicity analyses.
- PCR and Real Time-PCR.
- Many other molecular biology experiments.

Animal Experiments

- Pharyngeal aspiration of nanoparticles and evaluation of pulmonary and respiratory toxicity.

Animal sacrifice, operation, tissue collection and fixation.
Performing bronchoalveolar lavage fluid and its analyses.
Mouse gavaging.
Tumor cell inoculation in nude mice.
Mouse endothelial cell isolation and primary cell culture

COMPUTER SKILLS

Sigma Stat, Sigma Plot; Image Quantitation; Microsoft Excel, Word, Powerpoint;
Adobe Photoshop etc.

PUBLICATIONS

Sung Gu Han, Rodney Andrews, C. Gary Gairola and Deepak K. Bhalla. Acute pulmonary effects of combined exposure to carbon nanotubes and ozone in mice. *Inhalation Toxicology*. 20(4): 391-398, 2008.

Sung Gu Han, Vince Castranova, and Val Vallyathan. Comparative cytotoxicity of cadmium and mercury in a human bronchial epithelial cell line (BEAS-2B) and its role in oxidative stress and induction of heat shock protein 70. *Journal of Toxicology and Environmental Health Part A*. 70(10): 852-860, 2007.

Jin-Sung Kim, Mi-Jin Yang, Sung Gu Han, Choong-Yong Kim, Sang-Sup Han and Chang-Woo Song. A modification of oropharyngeal aspiration technique for mouse using syringe pump. *Journal of Toxicology and Public Health*. 23(3): 239-244, 2007.

Sung Gu Han, Yangho Kim, Michael L. Kashon, Donna L. Pack, Vincent Castranova, and Val Vallyathan. Correlates of oxidative stress and free-radical activity in serum from asymptomatic shipyard welders. *American Journal of Respiratory Critical Care Medicine*. 172:1541-1548, 2005.

Sung Gu Han, Vince Castranova, and Val Vallyathan. Heat shock protein 70 as an indicator of early lung injury caused by exposure to arsenic. *Molecular and Cellular Biochemistry*. 277(1-2):153-164, 2005.

Sung Gu Han, Rodney Andrews and C. Gary Gairola. Pulmonary toxicity and inflammation induced by multi-wall carbon nanotubes in mice. (*In preparation*).

Sung Gu Han, and C. Gary Gairola. Pulmonary and cardiovascular effects of multiwall carbon nanotubes in AopE-deficient mice. (*In preparation*).

Sung Gu Han, Deborah Howatt, Alan Daugherty and C. Gary Gairola. Atherogenic and pulmonary response of ApoE- and LDL Receptor-deficient mice to cigarette smoke. (*In preparation*).

Sung Gu Han, and C. Gary Gairola. Effects on pulmonary responses and alveolar macrophage function by combined exposure to cigarette smoke and carbon nanotubes. (*In preparation*).

ABSTRACTS

Sung Gu Han, Deborah Howatt, Alan Daugherty and Gary Gairola. Atherogenic and pulmonary response of ApoE- and LDL Receptor-deficient mice to cigarette smoke. Society of Toxicology Annual Meeting. March 2008.

S. G. Han, D. Howatt, A. Daugherty, R. Andrews and C. G. Gairola. Pulmonary and cardiovascular effects of multiwall carbon nanotubes in ApoE-deficient mice. 10th Anniversary Gill Heart Institute Cardiovascular Research Day. October 2007.

C. Gary Gairola, Sung Gu Han, Rodney Andrews and Deepak K. Bhalla. Interaction between carbon nanotubes and ozone in the induction of pulmonary toxicity in mice. Society of Toxicology Annual Meeting. March 2007.

Sung Gu Han, Deborah Howatt, Alan Daugherty and C. Gary Gairola. Pulmonary and cardiovascular toxicity of multiwall carbon nanotubes in mice. Society of Toxicology Annual Meeting. March 2007.

A. Daugherty, D. A. Howatt, S. G. Han, C. G. Gairola. Deficiency of AT-1a receptors profoundly reduces sidestream cigarette smoke-augmented atherosclerosis in LDL receptor *-/-* mice. 8th Annual Conference on Arteriosclerosis, Thrombosis, and Vascular Biology. April 2007.

Sung Gu Han, Rodney Andrews, and C. Gary Gairola. Pulmonary toxicity of multiwall carbon nanotubes in mice. 10th International Inhalation Symposium. May 2006.

Sung Gu Han, Deepak K. Bhalla, and C. Gary Gairola. Ozone-induced lung toxicity in rat pups following *in utero* exposure to environmental tobacco smoke. Society of Toxicology Annual Meeting. March 2006.

Sung Gu Han, and Val Vallyathan. Indicators of oxidative stress in the serum of asymptomatic shipyard welders. American Thoracic Society Meeting. May 2005.

Sung Gu Han, and Val Vallyathan. Comparison of metals in cytotoxicity, free radical generation, and heat shock protein expression in a human bronchial

epithelial cell line, BEAS-2B. Society of Toxicology Annual Meeting. March 2005.

Sung Gu Han, Vince Castranova, and Val Vallyathan. Heat shock protein 70 as an indicator of early lung injury caused by exposure to arsenic. Society of Toxicology Annual Meeting. April 2004.

PERSONAL

Date of Birth: August 20, 1970
Gender: Male
Marital Status: Married
Citizenship: Korea (South)

REFERENCES

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Professor, Graduate Center for Toxicology
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University of Kentucky, College of Medicine
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