

Stachybotrys Chartarum

Peer-Reviewed Journal Articles

Literature Review by Lisa Petrison, Ph.D.

Neurotoxic Effects

Karunasena Enusha, Larrañaga Michael D., Simoni Jan S., Douglas David R., Straus David C.. Building-associated neurological damage modeled in human cells: a mechanism of neurotoxic effects by exposure to mycotoxins in the indoor environment. *Mycopathologia*. 2010;170:377–390.

Islam Zahidul, Shinozuka Junko, Harkema Jack R., Pestka James J.. Purification and comparative neurotoxicity of the trichothecenes satratoxin G and roridin L2 from *Stachybotrys chartarum*. *Journal of toxicology and environmental health. Part A*. 2009;72:1242–1251.

Islam Zahidul, Hegg Colleen C., Bae Hee Kyong K., Pestka James J.. Satratoxin G-induced apoptosis in PC-12 neuronal cells is mediated by PKR and caspase independent. *Toxicological sciences : an official journal of the Society of Toxicology*. 2008;105:142–152.

Lees-Haley Paul R.. Toxic mold and mycotoxins in neurotoxicity cases: *Stachybotrys*, *Fusarium*, *Trichoderma*, *Aspergillus*, *Penicillium*, *Cladosporium*, *Alternaria*, *Trichothecenes*. *Psychological reports*. 2003;93:561–584.

Anyanwu Ebere, Campbell Andrew W., High William. Brainstem auditory evoked response in adolescents with acoustic mycotic neuroma due to environmental exposure to toxic molds. *International journal of adolescent medicine and health*. 2002;14:67–76.

Olfactory Changes

Jia Cuihong, Hayoz Sebastien, Hutch Chelsea R., Iqbal Tania R., Pooley Apryl E., Hegg Colleen C.. An IP3R3- and NPY-expressing microvillous cell mediates tissue homeostasis and regeneration in the mouse olfactory epithelium. *PLoS one*. 2013;8.

Carey Stephan A., Plopper Charles G., Hyde Dallas M., Islam Zahidul, Pestka James J., Harkema Jack R.. Satratoxin-G from the black mold *Stachybotrys chartarum* induces rhinitis and apoptosis of olfactory sensory neurons in the nasal airways of rhesus monkeys. *Toxicologic pathology*. 2012;40:887–898.

Jia Cuihong, Sangsiri Sutheera, Belock Bethany, Iqbal Tania R., Pestka James J., Hegg Colleen C.. ATP mediates neuroprotective and neuroproliferative effects in mouse olfactory epithelium following exposure to satratoxin G in vitro and in vivo. *Toxicological sciences : an official journal of the Society of Toxicology*. 2011;124:169–178.

Islam Zahidul, Harkema Jack R., Pestka James J.. Satratoxin G from the black mold *Stachybotrys chartarum* evokes olfactory sensory neuron loss and inflammation in the murine nose and brain. *Environmental health perspectives*. 2006;114:1099–1107.

Cytokines

Bhan Urvashi, Newstead Michael J., Zeng Xianying, et al. TLR9-dependent IL-23/IL-17 is required for the generation of *Stachybotrys chartarum*-induced hypersensitivity pneumonitis. *Journal of immunology (Baltimore, Md. : 1950)*. 2013;190:349–356.

Pei Ruoting, Gunsch Claudia K.. Inflammatory cytokine gene expression in THP-1 cells exposed to *Stachybotrys chartarum* and *Aspergillus versicolor*. *Environmental toxicology*. 2013;28:51–60.

Bhan Urvashi, Newstead Michael J., Zeng Xianying, Ballinger Megan N., Standiford Louis R., Standiford Theodore J.. *Stachybotrys chartarum*-induced hypersensitivity pneumonitis is TLR9 dependent. *The American journal of pathology*. 2011;179:2779–2787.

Kankkunen Päivi, Rintahaka Johanna, Aalto Annika, et al. Trichothecene mycotoxins activate inflammatory response in human macrophages. *Journal of immunology (Baltimore, Md. : 1950)*. 2009;182:6418–6425.

Mbandi E., Pestka J. J.. Deoxynivalenol and satratoxin G potentiate proinflammatory cytokine and macrophage inhibitory protein 2 induction by *Listeria* and *Salmonella* in the macrophage. *Journal of food protection*. 2006;69:1334–1339.

Pestka James, Zhou Hui-Ren R.. Toll-like receptor priming sensitizes macrophages to proinflammatory cytokine gene induction by deoxynivalenol and other toxicants. *Toxicological sciences : an official journal of the Society of Toxicology*. 2006;92:445–455.

Chung Yong-Joo J., Jarvis Bruce, Pestka James. Modulation of lipopolysaccharide-induced proinflammatory cytokine production by satratoxins and other macrocyclic trichothecenes in the murine macrophage. *Journal of toxicology and environmental health. Part A*. 2003;66:379–391.

Huttunen Kati, Hyvärinen Anne, Nevalainen Aino, Komulainen Hannu, Hirvonen Maija-Riitta R.. Production of proinflammatory mediators by indoor air bacteria and fungal spores in mouse and human cell lines. *Environmental health perspectives*. 2003;111:85–92.

Lee M. G., Li S., Jarvis B. B., Pestka J. J.. Effects of satratoxins and other macrocyclic trichothecenes on IL-2 production and viability of EL-4 thymoma cells. *Journal of toxicology and environmental health. Part A*. 1999;57:459–474.

Ruotsalainen M., Hirvonen M. R., Hyvärinen A., Meklin Teija, Savolainen K., Nevalainen A.. Cytotoxicity, production of reactive oxygen species and cytokines induced by different strains of *Stachybotrys* sp. from moldy buildings in RAW264.7 macrophages. *Environmental toxicology and pharmacology*. 1998;6:193–199.

Immunotoxic Effects

Shi Yuhui, Porter Katie, Parameswaran Narayanan, Bae Hee Kyong K., Pestka James J.. Role of GRP78/BiP degradation and ER stress in deoxynivalenol-induced interleukin-6 upregulation in the macrophage. *Toxicological sciences : an official journal of the Society of Toxicology*. 2009;109:247–255.

Bae Hee Kyong K., Shinozuka Junko, Islam Zahidul, Pestka James J.. Satratoxin G interaction with 40S and 60S ribosomal subunits precedes apoptosis in the macrophage. *Toxicology and applied pharmacology*. 2009;237:137–145.

Edmondson David A., Barrios Christy S., Brasel Trevor L., Straus David C., Kurup Viswanath P., Fink Jordan N.. Immune response among patients exposed to molds. *International journal of molecular sciences*. 2009;10:5471–5484.

Hellgren Ulla-Maija M., Leino Marina, Aarnisalo Antti A., Mussalo-Rauhamaa Helena, Alenius Harri, Reijula Kari. Low tumor necrosis factor alpha levels and neutrophil counts in nasal lavage after mold exposure. *Annals of allergy, asthma & immunology*. 2009;102:210–215.

Wang Huiyan, Yadav Jagjit S.. DNA damage, redox changes, and associated stress-inducible signaling events underlying the apoptosis and cytotoxicity in murine alveolar macrophage cell line MH-S by methanol-extracted *Stachybotrys chartarum* toxins. *Toxicology and applied pharmacology*. 2006;214:297–308.

Hymery N., Sibiril Y., Parent-Massin D.. In vitro effects of trichothecenes on human dendritic cells. *Toxicology in vitro : an international journal published in association with BIBRA*. 2006;20:899–909.

Chung Yong-Joo J., Yang Gi-Hyeok H., Islam Zahidul, Pestka James J.. Up-regulation of macrophage inflammatory protein-2 and complement 3A receptor by the trichothecenes deoxynivalenol and satratoxin G. *Toxicology*. 2003;186:51–65.

Nielsen Kristian Fog F., Huttunen Kati, Hyvärinen Anne, Andersen Birgitte, Jarvis Bruce B., Hirvonen Maija-Riitta R.. Metabolite profiles of *Stachybotrys* isolates from water-damaged buildings and their induction of inflammatory mediators and cytotoxicity in macrophages. *Mycopathologia*. 2002;154:201–205.

Johanning E., Biagini R., Hull D., Morey P., Jarvis B., Landsbergis P.. Health and immunology study following exposure to toxigenic fungi (*Stachybotrys chartarum*) in a water-damaged office environment. *International archives of occupational and environmental health*. 1996;68:207–218.

Glávits R., Ványi A.. Effect of trichothecene mycotoxins (satratoxin H and T-2 toxin) on the lymphoid organs of mice. *Acta veterinaria Hungarica*. 1988;36:37–41.

Boján F., Dankó G., Krasznai G.. Immunological studies in experimental stachybotryotoxicosis. *Acta veterinaria Academiae Scientiarum Hungaricae*. 1976;26:223–233.

Genotoxic Effects

He Kaiyu, Zhou Hui-Ren R., Pestka James J.. Mechanisms for ribotoxin-induced ribosomal RNA cleavage. *Toxicology and applied pharmacology*. 2012;265:10–18.

Nusuetrong Punnee, Saito Masaki, Kikuchi Haruhisa, Oshima Yoshiteru, Moriya Takahiro, Nakahata Norimichi. Apoptotic effects of satratoxin H is mediated through DNA double-stranded break in PC12 cells. *The Journal of toxicological sciences*. 2012;37:803–812.

Rakkestad Kirsten E., Skaar Ida, Ansteinsson Vibeke E., et al. DNA damage and DNA damage responses in THP-1 monocytes after exposure to spores of either *Stachybotrys chartarum* or *Aspergillus versicolor* or to T-2 toxin. *Toxicological sciences : an official journal of the Society of Toxicology*. 2010;115:140–155.

Cytotoxic Effects

Nielsen Carina, Casteel Maximilian, Didier Andrea, Dietrich Richard, Märtlbauer Erwin. Trichothecene-induced cytotoxicity on human cell lines. *Mycotoxin research*. 2009;25:77–84.

Nagase Masahiro, Shiota Tetsuya, Tsushima Akiko, et al. Molecular mechanism of satratoxin-induced apoptosis in HL-60 cells: activation of caspase-8 and caspase-9 is involved in activation of caspase-3. *Immunology letters*. 2002;84:23–27.

Nagase M., Alam M. M., Tsushima A., Yoshizawa T., Sakato N.. Apoptosis induction by T-2 toxin: activation of caspase-9, caspase-3, and DFF-40/CAD through cytosolic release of cytochrome c in HL-60 cells. *Bioscience, biotechnology, and biochemistry*. 2001;65:1741–1747.

Yang G. H., Jarvis B. B., Chung Y. J., Pestka J. J.. Apoptosis induction by the satratoxins and other trichothecene mycotoxins: relationship to ERK, p38 MAPK, and SAPK/JNK activation. *Toxicology and applied pharmacology*. 2000;164:149–160.

Oxidative Stress and Reactive Oxygen Species

Nusuetrong Punnee, Pengsuparp Thitima, Meksuriyen Duangdeun, et al. Satratoxin H generates reactive oxygen species and lipid peroxides in PC12 cells. *Biological & pharmaceutical bulletin*. 2008;31:1115–1120.

Nusuetrong Punnee, Yoshida Makoto, Tanitsu Masa-aki A., et al. Involvement of reactive oxygen species and stress-activated MAPKs in satratoxin H-induced apoptosis. *European journal of pharmacology*. 2005;507:239–246.

Ruotsalainen M., Hyvärinen A., Nevalainen A., Savolainen K. M.. Production of reactive oxygen metabolites by opsonized fungi and bacteria isolated from indoor air, and their interactions with soluble stimuli, fMLP or PMA. *Environmental research*. 1995;69:122–131.

Hematological Effects

Piecková Elena, Hurbánková Marta, Cerná Silvia, et al. Inflammatory and haematotoxic potential of indoor *Stachybotrys chartarum* (Ehrenb.) Hughes metabolites. *Arhiv za higijenu rada i toksikologiju*. 2009;60:401–409.

Vesper S. J., Magnuson M. L., Dearborn D. G., Yike I., Haugland R. A.. Initial characterization of the hemolysin stachylysin from *Stachybotrys chartarum*. *Infection and immunity*. 2001;69:912–916.

Vesper S. J., Dearborn D. G., Yike I., Sorenson W. G., Haugland R. A.. Hemolysis, toxicity, and randomly amplified polymorphic DNA analysis of *Stachybotrys chartarum* strains. *Applied and environmental microbiology*. 1999;65:3175–3181.

Alveolar Effects

Rand T. G., Mahoney M., White K., Oulton M.. Microanatomical changes in alveolar type II cells in juvenile mice intratracheally exposed to *Stachybotrys chartarum* spores and toxin. *Toxicological sciences : an official journal of the Society of Toxicology*. 2002;65:239–245.

Mason C. D., Rand T. G., Oulton M., MacDonald J., Anthes M.. Effects of *Stachybotrys chartarum* on surfactant convertase activity in juvenile mice. *Toxicology and applied pharmacology*. 2001;172:21–28.

Reproductive System Effects

Peltola J., Niessen L., Nielsen K. F., et al. Toxigenic diversity of two different RAPD groups of *Stachybotrys chartarum* isolates analyzed by potential for trichothecene production and for boar sperm cell motility inhibition. *Canadian journal of microbiology*. 2002;48:1017–1029.

Effects on Fetus

Hastings C., Rand T., Bergen H. T., et al. *Stachybotrys chartarum* alters surfactant-related phospholipid synthesis and CTP:cholinephosphate cytidyltransferase activity in isolated fetal rat type II cells. *Toxicological sciences : an official journal of the Society of Toxicology*. 2005;84:186–194.

Pulmonary Hypertension

West James, Hemnes Anna. Experimental and transgenic models of pulmonary hypertension. *Comprehensive Physiology*. 2011;1:769–782.

Ryan J., Bloch K., Archer S. L.. Rodent models of pulmonary hypertension: harmonisation with the world health organisation's categorisation of human PH. *International journal of clinical practice. Supplement*. 2011:15–34.

Ochiai Eri, Kamei Katsuhiko, Watanabe Akira, et al. Inhalation of *Stachybotrys chartarum* causes pulmonary arterial hypertension in mice. *International journal of experimental pathology*. 2008;89:201–208.

Respiratory Issues

Blanc A-L L., Delhaes L., Copin M-C C., Stach B., Faivre J-B B., Wallaert B.. [Interstitial lung disease due to domestic moulds]. *Revue des maladies respiratoires*. 2011;28:913–918.

Nagayoshi Masaru, Tada Yuji, West James, et al. Inhalation of *Stachybotrys chartarum* evokes pulmonary arterial remodeling in mice, attenuated by Rho-kinase inhibitor. *Mycopathologia*. 2011;172:5–15.

Lichtenstein Jamie Rosenblum H., Molina Ramon M., Donaghey Thomas C., et al. Pulmonary responses to *Stachybotrys chartarum* and its toxins: mouse strain affects clearance and macrophage cytotoxicity. *Toxicological sciences : an official journal of the Society of Toxicology*. 2010;116:113–121.

Rand Thomas G., Miller J. David. Immunohistochemical and immunocytochemical detection of SchS34 antigen in *Stachybotrys chartarum* spores and spore impacted mouse lungs. *Mycopathologia*. 2008;165:73–80.

Kováčiková Zuzana, Tátrai Erzsébet, Piecková Elena, et al. An in vitro study of the toxic effects of *Stachybotrys chartarum* metabolites on lung cells. *Alternatives to laboratory animals : ATLA*. 2007;35:47–52.

Mader Douglas R., Yike Iwona, Distler Anne M., Dearborn Dorr G.. Acute pulmonary hemorrhage during isoflurane anesthesia in two cats exposed to toxic black mold (*Stachybotrys chartarum*). *Journal of the American Veterinary Medical Association*. 2007;231:731–735.

McCrae K. C., Rand T. G., Shaw R. A., et al. DNA fragmentation in developing lung fibroblasts exposed to *Stachybotrys chartarum* (atra) toxins. *Pediatric pulmonology*. 2007;42:592–599.

Rand Thomas G., Flemming J., David Miller J., Womiloju Taiwo O.. Comparison of inflammatory responses in mouse lungs exposed to atranones A and C from *Stachybotrys chartarum*. *Journal of toxicology and environmental health. Part A.* 2006;69:1239–1251.

Leino Marina S., Alenius Harri T., Fyhrquist-Vanni Nanna, et al. Intranasal exposure to *Stachybotrys chartarum* enhances airway inflammation in allergic mice. *American journal of respiratory and critical care medicine.* 2006;173:512–518.

Pieckova Elena, Hurbankova Marta, Cerna Silvia, Pivovarova Zuzana, Kovacikova Zuzana. Pulmonary cytotoxicity of secondary metabolites of *Stachybotrys chartarum* (Ehrenb.) Hughes. *Annals of agricultural and environmental medicine : AAEM.* 2006;13:259–262.

Abdeen Nishard, Cross Albert, Cron Gregory, et al. Measurement of xenon diffusing capacity in the rat lung by hyperpolarized ¹²⁹Xe MRI and dynamic spectroscopy in a single breath-hold. *Magnetic resonance in medicine.* 2006;56:255–264.

Rosenblum Lichtenstein Jamie H., Molina Ramon M., Donaghey Thomas C., Brain Joseph D.. Strain differences influence murine pulmonary responses to *Stachybotrys chartarum*. *American journal of respiratory cell and molecular biology.* 2006;35:415–423.

Hudson B., Flemming J., Sun G., Rand T. G.. Comparison of immunomodulator mRNA and protein expression in the lungs of *Stachybotrys chartarum* spore-exposed mice. *Journal of toxicology and environmental health. Part A.* 2005;68:1321–1335.

Purdy Charles W., Layton Robert C., Straus David C., Ayers J. R.. Virulence of fungal spores determined by tracheal inoculation of goats following inhalation of aerosolized sterile feedyard dust. *American journal of veterinary research.* 2005;66:615–622.

Yike Iwona, Rand Thomas G., Dearborn Dorr G.. Acute inflammatory responses to *Stachybotrys chartarum* in the lungs of infant rats: time course and possible mechanisms. *Toxicological sciences : an official journal of the Society of Toxicology.* 2005;84:408–417.

Yike Iwona, Dearborn Dorr G.. Pulmonary effects of *Stachybotrys chartarum* in animal studies. *Advances in applied microbiology.* 2004;55:241–273.



Paradigm Change

Gregory Laurel, Pestka James J., Dearborn Dorr G., Rand Thomas G.. Localization of satratoxin-G in *Stachybotrys chartarum* spores and spore-impacted mouse lung using immunocytochemistry. *Toxicologic pathology*. 2004;32:26–34.

Flemming J., Hudson B., Rand T. G.. Comparison of inflammatory and cytotoxic lung responses in mice after intratracheal exposure to spores of two different *Stachybotrys chartarum* strains. *Toxicological sciences : an official journal of the Society of Toxicology*. 2004;78:267–275.

Leino M., Mäkelä M., Reijula K., et al. Intranasal exposure to a damp building mould, *Stachybotrys chartarum*, induces lung inflammation in mice by satratoxin-independent mechanisms. *Clinical and experimental allergy : journal of the British Society for Allergy and Clinical Immunology*. 2003;33:1603–1610.

Rand T. G., White K., Logan A., Gregory L.. Histological, immunohistochemical and morphometric changes in lung tissue in juvenile mice experimentally exposed to *Stachybotrys chartarum* spores. *Mycopathologia*. 2003;156:119–131.

Gregory L., Rand T. G., Dearborn D., Yike I., Vesper S.. Immunocytochemical localization of stachylysin in *Stachybotrys chartarum* spores and spore-impacted mouse and rat lung tissue. *Mycopathologia*. 2003;156:109–117.

Korpi A., Kasanen J-P P., Kosma V-M M., Rylander R., Pasanen A-L L.. Slight respiratory irritation but not inflammation in mice exposed to (1→3)-beta-D-glucan aerosols. *Mediators of inflammation*. 2003;12:139–146.

Yike Iwona, Vesper Stephen, Tomaszewski Joseph F., Dearborn Dorr G.. Germination, viability and clearance of *Stachybotrys chartarum* in the lungs of infant rats. *Mycopathologia*. 2003;156:67–75.

Korpi Anne, Kasanen J-P P., Raunio P., Kosma V-M M., Virtanen T., Pasanen A-L L.. Effects of aerosols from nontoxic *Stachybotrys chartarum* on murine airways. *Inhalation toxicology*. 2002;14:521–540.

Weiss Aaron, Chidekel Aaron S.. Acute pulmonary hemorrhage in a Delaware infant after exposure to *Stachybotrys atra*. *Delaware medical journal*. 2002;74:363–368.

Vesper Stephen J., Vesper Mary Jo J.. Stachylysin may be a cause of hemorrhaging in humans exposed to *Stachybotrys chartarum*. *Infection and immunity*. 2002;70:2065–2069.

Dearborn Dorr G., Smith Paul G., Dahms Beverly B., et al. Clinical profile of 30 infants with acute pulmonary hemorrhage in Cleveland. *Pediatrics*. 2002;110:627–637.

Meklin T., Husman T., Vepsäläinen A., et al. Indoor air microbes and respiratory symptoms of children in moisture damaged and reference schools. *Indoor air*. 2002;12:175–183.

Hodgson Michael, Dearborn Dorr G.. Human pulmonary disease and exposure to *Stachybotrys chartarum* and other toxigenic fungi. *Journal of occupational and environmental medicine / American College of Occupational and Environmental Medicine*. 2002;44:705–707.

Yike Iwona, Miller Martha J., Sorenson W. G., Walenga Ronald, Tomaszefski Joseph F., Dearborn Dorr G.. Infant animal model of pulmonary mycotoxicosis induced by *Stachybotrys chartarum*. *Mycopathologia*. 2002;154:139–152.

McCrae K. C., Rand T., Shaw R. A., et al. Analysis of pulmonary surfactant by Fourier-transform infrared spectroscopy following exposure to *Stachybotrys chartarum* (atra) spores. *Chemistry and physics of lipids*. 2001;110:1–10.

Centers for Disease Control and Prevention (CDC) . Update: Pulmonary hemorrhage/hemosiderosis among infants—Cleveland, Ohio, 1993-1996. *MMWR. Morbidity and mortality weekly report*. 2000;49:180–184.

Rao C. Y., Brain J. D., Burge H. A.. Reduction of pulmonary toxicity of *Stachybotrys chartarum* spores by methanol extraction of mycotoxins. *Applied and environmental microbiology*. 2000;66:2817–2821.

Vesper S. J., Dearborn D. G., Elidemir O., Haugland R. A.. Quantification of siderophore and hemolysin from *Stachybotrys chartarum* strains, including a strain isolated from the lung of a child with pulmonary hemorrhage and hemosiderosis. *Applied and environmental microbiology*. 2000;66:2678–2681.

From the Centers for Disease Control and Prevention. Update: pulmonary hemorrhage/hemosiderosis among infants—Cleveland, Ohio, 1993-1996. *JAMA : the journal of the American Medical Association*. 2000;283:1951–1953.

Vesper S., Dearborn D. G., Yike I., et al. Evaluation of *Stachybotrys chartarum* in the house of an infant with pulmonary hemorrhage: quantitative assessment before, during, and after remediation. *Journal of urban health : bulletin of the New York Academy of Medicine*. 2000;77:68–85.

Novotny W. E., Dixit A.. Pulmonary hemorrhage in an infant following 2 weeks of fungal exposure. *Archives of pediatrics & adolescent medicine*. 2000;154:271–275.

Tripi P. A., Modlin S., Sorenson W. G., Dearborn D. G.. Acute pulmonary haemorrhage in an infant during induction of general anaesthesia. *Paediatric anaesthesia*. 2000;10:92–94.

Sudakin D. L.. Mycotoxins and pulmonary hemorrhage. *Archives of pediatrics & adolescent medicine*. 1999;153:205–206.

Flappan S. M., Portnoy J., Jones P., Barnes C.. Infant pulmonary hemorrhage in a suburban home with water damage and mold (*Stachybotrys atra*). *Environmental health perspectives*. 1999;107:927–930.

Knapp J. F., Michael J. G., Hegenbarth M. A., Jones P. E., Black P. G.. Case records of the Children's Mercy Hospital, Case 02-1999: a 1-month-old infant with respiratory distress and shock. *Pediatric emergency care*. 1999;15:288–293.

Elidemir O., Colasurdo G. N., Rossmann S. N., Fan L. L.. Isolation of *Stachybotrys* from the lung of a child with pulmonary hemosiderosis. *Pediatrics*. 1999;104:964–966.

Hodgson M. J., Morey P., Leung W. Y., et al. Building-associated pulmonary disease from exposure to *Stachybotrys chartarum* and *Aspergillus versicolor*. *Journal of occupational and environmental medicine / American College of Occupational and Environmental Medicine*. 1998;40:241–249.

Wilkins C. K., Larsen S. T., Hammer M., Poulsen O. M., Wolkoff P., Nielsen G. D.. Respiratory effects in mice exposed to airborne emissions from *Stachybotrys chartarum* and implications for risk assessment. *Pharmacology & toxicology*. 1998;83:112–119.

Mason C. D., Rand T. G., Oulton M., MacDonald J. M., Scott J. E.. Effects of *Stachybotrys chartarum* (atra) conidia and isolated toxin on lung surfactant production and homeostasis. *Natural toxins*. 1998;6:27–33.

Jarvis B. B., Sorenson W. G., Hintikka E. L., et al. Study of toxin production by isolates of *Stachybotrys chartarum* and *Memnoniella echinata* isolated during a study of pulmonary hemosiderosis in infants. *Applied and environmental microbiology*. 1998;64:3620–3625.

Etzel R. A., Montaña E., Sorenson W. G., et al. Acute pulmonary hemorrhage in infants associated with exposure to *Stachybotrys atra* and other fungi. *Archives of pediatrics & adolescent medicine*. 1998;152:757–762.

Centers for Disease Control and Prevention (CDC) . Update: pulmonary hemorrhage/hemosiderosis among infants—Cleveland, Ohio, 1993-1996. *MMWR. Morbidity and mortality weekly report*. 1997;46:33–35.

Nikulin M., Reijula K., Jarvis B. B., Veijalainen P., Hintikka E. L.. Effects of intranasal exposure to spores of *Stachybotrys atra* in mice. *Fundamental and applied toxicology*. 1997;35:182–188.

Nikulin M., Reijula K., Jarvis B. B., Hintikka E. L.. Experimental lung mycotoxicosis in mice induced by *Stachybotrys atra*. *International journal of experimental pathology*. 1996;77:213–218.

Asthma

Cai Gui-Hong H., Hashim Jamal Hisham H., Hashim Zailina, et al. Fungal DNA, allergens, mycotoxins and associations with asthmatic symptoms among pupils in schools from Johor Bahru, Malaysia. *Pediatric allergy and immunology*. 2011;22:290–297.

Vesper Stephen J., McKinstry Craig, Yang Chin, et al. Specific molds associated with asthma in water-damaged homes. *Journal of occupational and environmental medicine / American College of Occupational and Environmental Medicine*. 2006;48:852–858.

Viana Michael E., Coates Najwa Haykal H., Gavett Stephen H., Selgrade MaryJane K., Vesper Stephen J., Ward Marsha D.. An extract of *Stachybotrys chartarum* causes allergic asthma-like responses in a BALB/c mouse model. *Toxicological sciences : an official journal of the Society of Toxicology*. 2002;70:98–109.

Thorn J., Brisman J., Torén K.. Adult-onset asthma is associated with self-reported mold or environmental tobacco smoke exposures in the home. *Allergy*. 2001;56:287–292.

Allergy

Abbas Shahid, Katelaris Connie H., Singh Anand B., et al. World allergy organization study on aerobiology for creating first pollen and mold calendar with clinical significance in islamabad, pakistan;: a project of world allergy organization and pakistan allergy, asthma & clinical immunology centre of islamabad. *The World Allergy Organization journal*. 2012;5:103–110.

Shi C., Miller J. D.. StachS3 epitopes and their application as biomarkers to detect specific IgE. *Molecular immunology*. 2012;50:271–277.

Denis Olivier, Van Cauwenberge Anne, Treutens Greta, et al. Characterization of new *Alternaria alternata*–specific rat monoclonal antibodies. *Mycopathologia*. 2012;173:151–162.

Shi Chunhua, Smith Myron L., Miller J. David. Characterization of human antigenic proteins SchS21 and SchS34 from *Stachybotrys chartarum*. *International archives of allergy and immunology*. 2011;155:74–85.

Nayak Ajay P., Green Brett J., Janotka Erika, et al. Production and characterization of IgM monoclonal antibodies against hyphal antigens of *Stachybotrys* species. *Hybridoma (2005)*. 2011;30:29–36.

Barnes Charles S., Amado Mercedes, Portnoy Jay M.. Reduced clinic, emergency room, and hospital utilization after home environmental assessment and case management. *Allergy and asthma proceedings : the official journal of regional and state allergy societies*. 2010;31:317–323.

Chung Yong Joo J., Copeland Lisa B., Doerfler Donald L., Ward Marsha D.. The relative allergenicity of *Stachybotrys chartarum* compared to house dust mite extracts in a mouse model. *Inhalation toxicology*. 2010;22:460–468.

Cai G-H H., Bröms K., Mälarstig B., et al. Quantitative PCR analysis of fungal DNA in Swedish day care centers and comparison with building characteristics and allergen levels. *Indoor air*. 2009;19:392–400.

Bellanger A-P P., Reboux G., Roussel S., et al. Indoor fungal contamination of moisture-damaged and allergic patient housing analysed using real-time PCR. *Letters in applied microbiology*. 2009;49:260–266.

Green Brett J., Tovey Euan R., Beezhold Donald H., et al. Surveillance of Fungal Allergic Sensitization Using the Fluorescent Halogen Immunoassay. *Journal de mycologie medicale*. 2009;19:253–261.

Xu Jianping, Liang Yinan, Belisle Donald, Miller J. David. Characterization of monoclonal antibodies to an antigenic protein from *Stachybotrys chartarum* and its measurement in house dust. *Journal of immunological methods*. 2008;332:121–128.

Green Brett J., Tovey Euan R., Sercombe Jason K., Blachere Françoise M., Beezhold Donald H., Schmechel Detlef. Airborne fungal fragments and allergenicity. *Medical mycology*. 2006;44 Suppl 1:245–255.

Schmechel D., Simpson J. P., Lewis D. M.. The production and characterization of monoclonal antibodies to the fungus *Aspergillus versicolor*. *Indoor air*. 2005;15 Suppl 9:11–19.

Rydjord B., Hetland G., Wiker H. G.. Immunoglobulin G antibodies against environmental moulds in a Norwegian healthy population shows a bimodal distribution for *Aspergillus versicolor*. *Scandinavian journal of immunology*. 2005;62:281–288.

Vojdani Aristo. Antibodies against *Stachybotrys chartarum* extract and its antigenic components, Stachyhemolysin and Stachyrase-A: a new clinical biomarker. *Medical science monitor : international medical journal of experimental and clinical research*. 2005;11.

Cogen Frederick C.. *Stachybotrys*-related allergy. *Annals of allergy, asthma & immunology*. 2004;92.

Hossain Mohammad Ashraf A., Ahmed Mohamed Sotohy S., Ghannoum Mahmoud Afif A.. Attributes of *Stachybotrys chartarum* and its association with human disease. *The Journal of allergy and clinical immunology*. 2004;113.

Kärkkäinen Marja, Raunio Päivi, Rautiainen Jaakko, Auriola Seppo, Hinke Kaj, Pasanen Anna-Liisa L.. Partial amino acid sequence of a cellulase-like component with IgE-binding properties from *Stachybotrys chartarum*. *International archives of allergy and immunology*. 2004;133:136–144.

Vojdani Aristo. Cross-reactivity of *Aspergillus*, *Penicillium*, and *Stachybotrys* antigens using affinity-purified antibodies and immunoassay. *Archives of environmental health*. 2004;59:256–265.

Vojdani Aristo, Campbell Andrew W., Kashanian Albert, Vojdani Elroy. Antibodies against molds and mycotoxins following exposure to toxigenic fungi in a water-damaged building. *Archives of environmental health*. 2003;58:324–336.

Chapman Jean A.. *Stachybotrys chartarum* (*chartarum* = *atra* = *alternans*) and other problems caused by allergenic fungi. *Allergy and asthma proceedings : the official journal of regional and state allergy societies*. 2003;24:1–7.

Vojdani Aristo, Thrasher Jack D., Madison Roberta A., Gray Michael R., Heuser Gunnar, Campbell Andrew W.. Antibodies to molds and satratoxin in individuals exposed in water-damaged buildings. *Archives of environmental health*. 2003;58:421–432.

Patovirta Riitta-Liisa L., Reiman Marjut, Husman Tuula, Haverinen Ulla, Toivola Mika, Nevalainen Aino. Mould specific IgG antibodies connected with sinusitis in teachers of mould damaged school: a two-year follow-up study. *International journal of occupational medicine and environmental health*. 2003;16:221–230.

Jaakkola M. S., Laitinen S., Piipari R., et al. Immunoglobulin G antibodies against indoor dampness-related microbes and adult-onset asthma: a population-based incident case-control study. *Clinical and experimental immunology*. 2002;129:107–112.

Barnes Charles, Buckley Steve, Pacheco Freddy, Portnoy Jay. IgE-reactive proteins from *Stachybotrys chartarum*. *Annals of allergy, asthma & immunology*. 2002;89:29–33.

Lander F., Meyer H. W., Norn S.. Serum IgE specific to indoor moulds, measured by basophil histamine release, is associated with building-related symptoms in damp buildings. *Inflammation research*. 2001;50:227–231.

Larsen F. O., Meyer H. W., Ebbehøj N., et al. Are fungi-specific IgE found in staff suffering from nonallergic sick building syndrome? *Inflammation research*. 1997;46 Suppl 1.

Stachyflin

Watanabe Kazuhiro, Sakurai Junji, Abe Hideki, Katoh Tadashi. Total synthesis of (+)-stachyflin: a potential anti-influenza A virus agent. *Chemical communications (Cambridge, England)*. 2010;46:4055–4057.

Minagawa Kazuyuki, Kouzuki Shuichi, Tani Hiroyoshi, et al. Novel stachyflin derivatives from *Stachybotrys* sp. RF-7260. Fermentation, isolation, structure elucidation and biological activities. *The Journal of antibiotics*. 2002;55:239–248.

Minagawa Kazuyuki, Kouzuki Shuichi, Kamigauchi Toshiyuki. Stachyflin and acetylstachyflin, novel anti-influenza A virus substances, produced by *Stachybotrys* sp. RF-7260. II. Synthesis and preliminary structure-activity relationships of stachyflin derivatives. *The Journal of antibiotics*. 2002;55:165–171.

Minagawa Kazuyuki, Kouzuki Shuichi, Yoshimoto Jun, et al. Stachyflin and acetylstachyflin, novel anti-influenza A virus substances, produced by *Stachybotrys* sp. RF-7260. I. Isolation, structure elucidation and biological activities. *The Journal of antibiotics*. 2002;55:155–164.

Nakatani Mari, Nakamura Masahiko, Suzuki Akiyuki, Inoue Munenori, Katoh Tadashi. A new strategy toward the total synthesis of stachyflin, a potent anti-influenza A virus agent: concise route to the tetracyclic core structure. *Organic letters*. 2002;4:4483–4486.

Combined Effects with *Streptomyces Californicus*

Markkanen Penttinen Piia, Pelkonen Jukka, Tapanainen Maija, Mäki-Paakkanen Jorma, Jalava Pasi I., Hirvonen Maija-Riitta R.. Co-cultivated damp building related microbes *Streptomyces californicus* and *Stachybotrys chartarum* induce immunotoxic and genotoxic responses via oxidative stress. *Inhalation toxicology*. 2009;21:857–867.

Penttinen Piia, Pelkonen Jukka, Huttunen Kati, Hirvonen Maija-Riitta R.. Co-cultivation of *Streptomyces californicus* and *Stachybotrys chartarum* stimulates the production of cytostatic compound(s) with immunotoxic properties. *Toxicology and applied pharmacology*. 2006;217:342–351.

Penttinen Piia, Pelkonen Jukka, Huttunen Kati, Toivola Mika, Hirvonen Maija-Riitta R.. Interactions between *Streptomyces californicus* and *Stachybotrys chartarum* can induce apoptosis and cell cycle arrest in mouse RAW264.7 macrophages. *Toxicology and applied pharmacology*. 2005;202:278–288.

Penttinen Piia, Huttunen Kati, Pelkonen Jukka, Hirvonen Maija-Riitta R.. The proportions of *Streptomyces californicus* and *Stachybotrys chartarum* in simultaneous exposure affect inflammatory responses in mouse RAW264.7 macrophages. *Inhalation toxicology*. 2005;17:79–85.

Huttunen Kati, Pelkonen Jukka, Nielsen Kristian Fogg F., Nuutinen Ulla, Jussila Juha, Hirvonen Maija-Riitta R.. Synergistic interaction in simultaneous exposure to *Streptomyces californicus* and *Stachybotrys chartarum*. *Environmental health perspectives*. 2004;112:659–665.

Penttinen Piia, Tampio Marjo, Mäki-Paakkanen Jorma, Vähäkangas Kirsi, Pelkonen Jukka, Hirvonen Maija-Riitta R.. DNA damage and p53 in RAW264.7 cells induced by the spores of co-cultivated *Streptomyces californicus* and *Stachybotrys chartarum*. *Toxicology*. 2007;235:92–102.

Antibiotic Effects

Tew Gregory N., Clements Dylan, Tang Haizong, Arnt Lachelle, Scott Richard W.. Antimicrobial activity of an abiotic host defense peptide mimic. *Biochimica et biophysica acta*. 2006;1758:1387–1392.

Butt Z. L., Ghaffar A.. Inhibition of fungi, actinomycetes and bacteria by *Stachybotrys atra*. *Mycopathologia et mycologia applicata*. 1972;47:241–251.

Stachybotrys Health Effects Overview

Yike Iwona, Dearborn Dorr. Guest editorial–novel insights into the pathology of *Stachybotrys chartarum*. *Mycopathologia*. 2011;172:1–3.

Al-Ahmad M., Manno M., Ng V., Ribeiro M., Liss G. M., Tarlo S. M.. Symptoms after mould exposure including *Stachybotrys chartarum*, and comparison with darkroom disease. *Allergy*. 2010;65:245–255.

Pestka James J., Yike Iwona, Dearborn Dorr G., Ward Marsha D., Harkema Jack R.. *Stachybotrys chartarum*, trichothecene mycotoxins, and damp building-related illness: new insights into a public health enigma. *Toxicological sciences : an official journal of the Society of Toxicology*. 2008;104:4–26.

Lai K. M.. Hazard identification, dose-response and environmental characteristics of stachybotryotoxins and other health-related products from *Stachybotrys*. *Environmental technology*. 2006;27:329–335.

Ochiai Eri, Kamei Katsuhiko, Hiroshima Kenzo, et al. The Pathogenicity of *Stachybotrys chartarum*. *Nihon Ishinkin Gakkai zasshi = Japanese journal of medical mycology*. 2005;46:109–117.

Li D-W W., Yang C. S.. Taxonomic history and current status of *Stachybotrys chartarum* and related species. *Indoor air*. 2005;15 Suppl 9:5–10.

Hintikka Eeva-Liisa L.. The role of *stachybotrys* in the phenomenon known as sick building syndrome. *Advances in applied microbiology*. 2004;55:155–173.

Saxon Andrew, Hardin Bryan D., Kelman Bruce J.. Exposure-dose-response: critical considerations in toxicology and immunology alike. *The Journal of allergy and clinical immunology*. 2004;114.

Jarvis Bruce B.. *Stachybotrys chartarum*: a fungus for our time. *Phytochemistry*. 2003;64:53–60.

Yoganathan K., Yang Lay-kien K., Rossant Christine, et al. Cochlioquinones and epi-cochlioquinones: antagonists of the human chemokine receptor CCR5 from *Bipolaris brizae* and *Stachybotrys chartarum*. *The Journal of antibiotics*. 2004;57:59–63.

Revankar Sanjay G.. Clinical implications of mycotoxins and *Stachybotrys*. *The American journal of the medical sciences*. 2003;325:262–274.

Miller J. David, Rand Thomas G., Jarvis Bruce B.. *Stachybotrys chartarum*: cause of human disease or media darling? *Medical mycology*. 2003;41:271–291.

Musmand Jon. Does *Stachybotrys* actually cause adverse effects? *Annals of allergy, asthma & immunology*. 2003;90.

Etzel Ruth A.. *Stachybotrys*. *Current opinion in pediatrics*. 2003;15:103–106.

Kuhn D. M., Ghannoum M. A.. Indoor mold, toxigenic fungi, and *Stachybotrys chartarum*: infectious disease perspective. *Clinical microbiology reviews*. 2003;16:144–172.

Sudakin Daniel L.. Trichothecenes in the environment: relevance to human health. *Toxicology letters*. 2003;143:97–107.

Black mold and human illness. *Texas medicine*. 2002;98:53–56.

Page E. H., Trout D. B.. The role of *Stachybotrys* mycotoxins in building-related illness. *AIHAJ : a journal for the science of occupational and environmental health and safety*. 2001;62:644–648.

Terr A. I.. *Stachybotrys*: relevance to human disease. *Annals of allergy, asthma & immunology*. 2001;87:57–63.

Mahmoudi M., Gershwin M. E.. Sick building syndrome. III. *Stachybotrys chartarum*. *The Journal of asthma*. 2000;37:191–198.

Sudakin D. L.. *Stachybotrys chartarum*: current knowledge of its role in disease. *MedGenMed : Medscape general medicine*. 2000;2.

Bitnun A., Nosal R. M.. *Stachybotrys chartarum* (atra) contamination of the indoor environment: Health implications. *Paediatrics & child health*. 1999;4:125–129.

Fung F., Clark R., Williams S.. *Stachybotrys*, a mycotoxin-producing fungus of increasing toxicologic importance. *Journal of toxicology. Clinical toxicology*. 1998;36:79–86.

Fung F., Clark R., Williams S.. *Stachybotrys*: still under investigation. *Journal of toxicology. Clinical toxicology*. 1998;36:633–634.

Johanning E.. *Stachybotrys* revisited. *Journal of toxicology. Clinical toxicology*. 1998;36:629–631.

Jarvis B. B., Salemme J., Morais A.. *Stachybotrys* toxins. 1. Natural toxins. 1995;3:10–16.

Bata A., Harrach B., Ványi A., Lepom P.. Macrocyclic trichothecene toxins produced by *Stachybotrys atra*. *Acta veterinaria Hungarica*. 1988;36:221–227.

Toxic Mold Syndrome & Sick Building Syndrome

Straus David C.. The possible role of fungal contamination in sick building syndrome. *Frontiers in bioscience (Elite edition)*. 2011;3:562–580.

Cabral João P.. Can we use indoor fungi as bioindicators of indoor air quality? Historical perspectives and open questions. *The Science of the total environment*. 2010;408:4285–4295.

Straus David C.. Molds, mycotoxins, and sick building syndrome. *Toxicology and industrial health*. 2009;25:617–635.

Ashcroft Carol. Toxic mould syndrome—can the link be proved? *Nursing New Zealand (Wellington, N.Z. : 1995)*. 2009;15:22–23.

Jarvis Bruce B., Miller J. David. Mycotoxins as harmful indoor air contaminants. *Applied microbiology and biotechnology*. 2005;66:367–372.

McGinnis Michael R.. Pathogenesis of indoor fungal diseases. *Medical mycology*. 2004;42:107–117.

Levy Michael B., Fink Jordan N.. Toxic mold syndrome. *Advances in applied microbiology*. 2004;55:275–288.

Terr Abba I.. Are indoor molds causing a new disease? *The Journal of allergy and clinical immunology*. 2004;113:221–226.

Rea William J., Didriksen Nancy, Simon Theodore R., Pan Yaqin, Fenyves Ervin J., Griffiths Bertie. Effects of toxic exposure to molds and mycotoxins in building-related illnesses. *Archives of environmental health*. 2003;58:399–405.

Chapman Jean A., Terr Abba I., Jacobs Robert L., Charlesworth Ernest N., Bardana Emil J.. Toxic mold: phantom risk vs science. *Annals of allergy, asthma & immunology*. 2003;91:222–232.

Ammann Harriet M.. Is indoor mold contamination a threat to health? Part two. *Journal of environmental health*. 2003;66:47–49.

Bardana Emil J., Chapman Jean A., Charlesworth Ernest N., Jacobs Robert L., Terr Abba L.. Crossing over to the dark side of the mold issue: a dissenting view. *Annals of allergy, asthma & immunology*. 2003;91.

Bardana Emil J.. Indoor air quality and health does fungal contamination play a significant role? *Immunology and allergy clinics of North America*. 2003;23:291–309.

Fog Nielsen Kristian. Mycotoxin production by indoor molds. *Fungal genetics and biology* : FG & B. 2003;39:103–117.

Hardin Bryan D., Kelman Bruce J., Saxon Andrew. Adverse human health effects associated with molds in the indoor environment. *Journal of occupational and environmental medicine / American College of Occupational and Environmental Medicine*. 2003;45:470–478.

The truth about mold. Most experts say there's more fear than fact to "toxic mold." But that doesn't mean that indoor mold can't cause health problems. *Harvard health letter / from Harvard Medical School*. 2003;28:1–3.

Piecková E., Jesenská Z.. Microscopic fungi in dwellings and their health implications in humans. *Annals of agricultural and environmental medicine : AAEM.* 1999;6:1–11.

Johanning E., Landsbergis P., Gareis M., Yang C. S., Olmsted E.. Clinical experience and results of a Sentinel Health Investigation related to indoor fungal exposure. *Environmental health perspectives.* 1999;107 Suppl 3:489–494.

Fatal fungus. *Environmental health perspectives.* 1998;106.

Cooley J. D., Wong W. C., Jumper C. A., Straus D. C.. Correlation between the prevalence of certain fungi and sick building syndrome. *Occupational and environmental medicine.* 1998;55:579–584.

Page E., Trout D.. Mycotoxins and building-related illness. *Journal of occupational and environmental medicine / American College of Occupational and Environmental Medicine.* 1998;40:761–764.

Acute Toxicity in Animals

Gelev I., Dimitrov Kh h., Tomova A.. [Immunological activity of the blood sera from cattle with chronic mycotoxicosis]. *Veterinarno-meditsinski nauki.* 1986;23:16–24.

Dzhurov A., Aleksandrov M., Belchev L., Ignatov G.. [Pathomorphology of stachybotryotoxicosis in calves during the nursing period]. *Veterinarno-meditsinski nauki.* 1984;21:49–56.

Hajtós I., Harrach B., Szigeti G., Fodor L., Malik G., Varga J.. Stachybotryotoxicosis as a predisposing factor of ovine systemic pasteurellosis. *Acta veterinaria Hungarica.* 1983;31:181–188.

Schneider D. J., Marasas W. F., Dale Kuys J. C., Kriek N. P., Van Schalkwyk G. C.. A field outbreak of suspected stachybotryotoxicosis in sheep. *Journal of the South African Veterinary Association.* 1979;50:73–81.

Le Bars J., Gérard J. P., Michel C.. [Demonstration of stachybotryotoxicosis in France: a case of acute intoxication in deer]. *Annales de la nutrition et de l'alimentation.* 1977;31:509–517.

FORGACS J., CARLL W. T., HERRING A. S., HINSHAW W. R.. Toxicity of *Stachybotrys atra* for animals. *Transactions of the New York Academy of Sciences*. 1958;20:787–808.

Anecdotal Cases

Lee Tang G.. Health symptoms caused by molds in a courthouse. *Archives of environmental health*. 2003;58:442–446.

Wålinder R., Norbäck D., Wessen B., Venge P.. Nasal lavage biomarkers: effects of water damage and microbial growth in an office building. *Archives of environmental health*. 2001;56:30–36.

Historical Discussion

Meggs William J.. Epidemics of mold poisoning past and present. *Toxicology and industrial health*. 2009;25:571–576.

Heller Richard M., Heller Toni W., Sasson Jack M.. Mold: "tsara'at," Leviticus, and the history of a confusion. *Perspectives in biology and medicine*. 2003;46:588–591.

Aizenman B. E., Kudlař D. G.. [History of the discovery of the causative agent of *Stachybotrys toxicosis*]. *Mikrobiolohichnyř zhurnal*. 1978;40:264–270.

Newberne P. M.. Mycotoxins: toxicity, carcinogenicity, and the influence of various nutritional conditions. *Environmental health perspectives*. 1974;9:1–32.

Clearance

Amuzie Chidozie J., Islam Zahidul, Kim Jae Kyung K., Seo Ji-Hyun H., Pestka James J.. Kinetics of satratoxin g tissue distribution and excretion following intranasal

exposure in the mouse. *Toxicological sciences : an official journal of the Society of Toxicology*. 2010;116:433–440.

Layton Robert C., Purdy Charles W., Jumper Cynthia A., Straus David C.. Detection of macrocyclic trichothecene mycotoxin in a caprine (goat) tracheal instillation model. *Toxicology and industrial health*. 2009;25:693–701.

Rao C. Y., Burge H. A., Brain J. D.. The time course of responses to intratracheally instilled toxic *Stachybotrys chartarum* spores in rats. *Mycopathologia*. 2000;149:27–34.

Biomarkers

Yike Iwona, Distler Anne M., Ziady Assem G., Dearborn Dorr G.. Mycotoxin adducts on human serum albumin: biomarkers of exposure to *Stachybotrys chartarum*. *Environmental health perspectives*. 2006;114:1221–1226.

Schmechel Detlef, Simpson Janet P., Beezhold Donald, Lewis Daniel M.. The development of species-specific immunodiagnosics for *Stachybotrys chartarum*: the role of cross-reactivity. *Journal of immunological methods*. 2006;309:150–159.

Page Elena, Biagini Raymond E., Beezhold Donald H.. Methodologic issues concerning Stachyhemolysin and Stachyrase-A as clinical biomarkers. *Medical science monitor : international medical journal of experimental and clinical research*. 2005;11

Substrate Effects

Elanskiĭ S. N., Petrunina Ia a. V., Lavrova O. I., Likhachev A. N.. [A comparative analysis of *Stachybotrys chartarum* strains isolated in Russia]. *Mikrobiologĭia*. 2004;73:73–79.

Murtoniemi T., Nevalainen A., Suutari M., Toivola M., Komulainen H., Hirvonen M. R.. Induction of cytotoxicity and production of inflammatory mediators in raw264.7 macrophages by spores grown on six different plasterboards. *Inhalation toxicology*. 2001;13:233–247.

Omar S. A., Ismail M. A.. Microbial populations, ammonification and nitrification in soil treated with urea and inorganic salts. *Folia microbiologica*. 1999;44:205–212.

El-Kady I. A., Moubasher M. H.. Some cultural conditions that control production of verrucarin J, a cytotoxic metabolite of *Stachybotrys chartarum*. *Zentralblatt für Mikrobiologie*. 1982;137:241–246.

Environmental Presence

Fu Xi, Lindgren Torsten, Guo Moran, Cai Gui-Hong H., Lundgren Håkan, Norbäck Dan. Furry pet allergens, fungal DNA and microbial volatile organic compounds (MVOCs) in the commercial aircraft cabin environment. *Environmental science. Processes & impacts*. 2013;15:1228–1234.

Kondratiuk T. O., Nakonechna L. T., Kharkevich O. S.. [Microscopic fungi in the air of film documents depositories]. *Mikrobiolohichnyĭ zhurnal (Kiev, Ukraine : 1993)*. 2012;74:48–53.

Lanier Caroline, André Véronique, Séguin Virginie, et al. Recurrence of *Stachybotrys chartarum* during mycological and toxicological study of bioaerosols collected in a dairy cattle shed. *Annals of agricultural and environmental medicine : AAEM*. 2012;19:61–67.

Marinelli L., Maggi O., Aurigemma C., Tufi D., De Giusti M.. Fresh vegetables and ready-to eat salads: phenotypic characterization of moulds and molecular characterization of yeasts. *Annali di igiene : medicina preventiva e di comunità*. 2012;24:301–309.

Malta-Vacas J., Viegas S., Sabino R., Viegas C.. Fungal and microbial volatile organic compounds exposure assessment in a waste sorting plant. *Journal of toxicology and environmental health. Part A*. 2012;75:1410–1417.

Andersen Birgitte, Frisvad Jens C., Søndergaard Ib, Rasmussen Ib S., Larsen Lisbeth S.. Associations between fungal species and water-damaged building materials. *Applied and environmental microbiology*. 2011;77:4180–4188.

Awad Mohamed F., Kraume M.. Mycological survey of activated sludge in MBRs. *Mycoses*. 2011;54.

Cai Gui-Hong H., Mälarstig Björn, Kumlin Anders, Johansson Ingrid, Janson Christer, Norbäck Dan. Fungal DNA and pet allergen levels in Swedish day care centers and associations with building characteristics. *Journal of environmental monitoring* : JEM. 2011;13:2018–2024.

Frazer Schale, Magan Naresh, Aldred David. The influence of water activity and temperature on germination, growth and sporulation of *Stachybotrys chartarum* strains. *Mycopathologia*. 2011;172:17–23.

Ayanbimpe G. M., Wapwera S. D., Kuchin D.. Indoor air mycoflora of residential dwellings in Jos metropolis. *African health sciences*. 2010;10:172–176.

Milićević Dragan R., Skrinjar Marija, Baltić Tatjana. Real and perceived risks for mycotoxin contamination in foods and feeds: challenges for food safety control. *Toxins*. 2010;2:572–592.

Bloom E., Grimsley L. F., Pehrson C., Lewis J., Larsson L.. Molds and mycotoxins in dust from water-damaged homes in New Orleans after hurricane Katrina. *Indoor air*. 2009;19:153–158.

Thrasher Jack D., Crawley Sandra. The biocontaminants and complexity of damp indoor spaces: more than what meets the eyes. *Toxicology and industrial health*. 2009;25:583–615.

Menetrez M. Y., Foarde K. K., Webber T. D., Dean T. R., Betancourt D. A.. Mold growth on gypsum wallboard—a summary of three techniques. *Journal of environmental health*. 2009;72:24–28.

Bloom Erica, Nyman Eva, Must Aime, Pehrson Christina, Larsson Lennart. Molds and mycotoxins in indoor environments—a survey in water-damaged buildings. *Journal of occupational and environmental hygiene*. 2009;6:671–678.

Seo Sung-Chul C., Reponen Tiina, Levin Linda, Grinshpun Sergey A.. Size-fractionated (1→3)-beta-D-glucan concentrations aerosolized from different moldy building materials. *The Science of the total environment*. 2009;407:806–814.

Seo Sung-Chul C., Reponen Tiina, Levin Linda, Borchelt Tiffany, Grinshpun Sergey A.. Aerosolization of particulate (1→3)-beta-D-glucan from moldy materials. *Applied and environmental microbiology*. 2008;74:585–593.

Codina R., Fox R. W., Lockey R. F., DeMarco P., Bagg A.. Typical levels of airborne fungal spores in houses without obvious moisture problems during a rainy season in Florida, USA. *Journal of investigational allergology & clinical immunology*. 2008;18:156–162.

Wang Hong-Kai K., Hyde Kevin D., Soyong Kasem, Lin Fu-Cheng C.. Fungal diversity on fallen leaves of *Ficus* in northern Thailand. *Journal of Zhejiang University. Science. B*. 2008;9:835–841.

Menetrez M. Y., Foarde K. K., Webber T. D., Dean T. R., Betancourt D. A.. Testing antimicrobial paint efficacy on gypsum wallboard contaminated with *Stachybotrys chartarum*. *Journal of occupational and environmental hygiene*. 2008;5:63–66.

Gottschalk Christoph, Bauer Johann, Meyer Karsten. Detection of satratoxin g and h in indoor air from a water-damaged building. *Mycopathologia*. 2008;166:103–107.

Pan Hao-Qin Q., Yu Jin-Feng F., Wu Yue-Ming M., Zhang Tian-Yu Y., Wang Hong-Feng F.. Diversity analysis of soil dematiaceous hyphomycetes from the Yellow River source area: I. *Journal of Zhejiang University. Science. B*. 2008;9:829–834.

Aydogdu Halide, Asan Ahmet. Airborne fungi in child day care centers in Edirne City, Turkey. *Environmental monitoring and assessment*. 2008;147:423–444.

Labuda Roman, Tancinová Dana. Fungi recovered from Slovakian poultry feed mixtures and their toxinogenicity. *Annals of agricultural and environmental medicine : AAEM*. 2006;13:193–200.

Olishevs'ka S. V., Vasylevs'ka A. I., Fomina M. O., Manichev V. I.. [Copper ions sorption by soil micromycetes]. *Mikrobiolohichnyi zhurnal (Kiev, Ukraine : 1993)*. 2006;68:60–70.

Krause Michael, Geer William, Swenson Lonie, Fallah Payam, Robbins Coreen. Controlled study of mold growth and cleaning procedure on treated and untreated wet gypsum wallboard in an indoor environment. *Journal of occupational and environmental hygiene*. 2006;3:435–441.

Solomon Gina M., Hjelmroos-Koski Mervi, Rotkin-Ellman Miriam, Hammond S. Katharine. Airborne mold and endotoxin concentrations in New Orleans, Louisiana, after flooding, October through November 2005. *Environmental health perspectives*. 2006;114:1381–1386.

Straus David C., Wilson Stephen C.. Respirable trichothecene mycotoxins can be demonstrated in the air of *Stachybotrys chartarum*-contaminated buildings. *The Journal of allergy and clinical immunology*. 2006;118.

Yli-Pirilä Terhi, Kusnetsov Jaana, Hirvonen Maija-Riitta R., Seuri Markku, Nevalainen Aino. Effects of amoebae on the growth of microbes isolated from moisture-damaged buildings. *Canadian journal of microbiology*. 2006;52:383–390.

Godish Thad J., Godish Diana R.. Mold infestation of wet spray-applied cellulose insulation. *Journal of the Air & Waste Management Association* (1995). 2006;56:90–95.

D'Annibale A., Rosetto F., Leonardi V., Federici F., Petruccioli M.. Role of autochthonous filamentous fungi in bioremediation of a soil historically contaminated with aromatic hydrocarbons. *Applied and environmental microbiology*. 2006;72:28–36.

Baxter Daniel M., Perkins Jimmy L., McGhee Charles R., Seltzer James M.. A regional comparison of mold spore concentrations outdoors and inside "clean" and "mold contaminated" Southern California buildings. *Journal of occupational and environmental hygiene*. 2005;2:8–18.

Demirel Rasime, Ilhan Semra, Asan Ahmet, Kinaci Engin, Oner Setenay. Microfungi in cultivated fields in Eskişehir province (Turkey). *Journal of basic microbiology*. 2005;45:279–293.

Kuhn Ryan C., Trimble Mingyi W., Hofer Vasanthi, Lee Michael, Nassof Russell S.. Prevalence and airborne spore levels of *Stachybotrys* spp. in 200 houses with water incursions in Houston, Texas. *Canadian journal of microbiology*. 2005;51:25–28.

Thacker Paul D.. Airborne mycotoxins discovered in moldy buildings. *Environmental science & technology*. 2004;38.

Ahearn Donald G., Price Daniel L., Simmons Robert, Noble-Wang Judith, Crow Sidney A.. Indoor moulds and their associations with air distribution systems. *Advances in applied microbiology*. 2004;55:113–138.

Khan Noreen N., Wilson Bobby L.. An environmental assessment of mold concentrations and potential mycotoxin exposures in the greater Southeast Texas area. *Journal of environmental science and health. Part A, Toxic/hazardous substances & environmental engineering*. 2003;38:2759–2772.

Murtoniemi Timo, Nevalainen Aino, Hirvonen Maija-Riitta R.. Effect of plasterboard composition on *Stachybotrys chartarum* growth and biological activity of spores. *Applied and environmental microbiology*. 2003;69:3751–3757.

Murtoniemi T., Hirvonen M-R R., Nevalainen A., Suutari M.. The relation between growth of four microbes on six different plasterboards and biological activity of spores. *Indoor air*. 2003;13:65–73.

Meklin Teija, Hyvärinen Anne, Toivola Mika, et al. Effect of building frame and moisture damage on microbiological indoor air quality in school buildings. *AIHA journal : a journal for the science of occupational and environmental health and safety*. 2003;64:108–116.

Gao Pengfei, Martin Jennifer. Volatile metabolites produced by three strains of *Stachybotrys chartarum* cultivated on rice and gypsum board. *Applied occupational and environmental hygiene*. 2002;17:430–436.

Li Shuxian, Hartman Glen L., Jarvis Bruce B., Tak Heekyung. A *Stachybotrys chartarum* isolate from soybean. *Mycopathologia*. 2002;154:41–49.

Wilson S. C., Straus D. C.. The presence of fungi associated with sick building syndrome in North American zoological institutions. *Journal of zoo and wildlife medicine*. 2002;33:322–327.

Shelton Brian G., Kirkland Kimberly H., Flanders W. Dana, Morris George K.. Profiles of airborne fungi in buildings and outdoor environments in the United States. *Applied and environmental microbiology*. 2002;68:1743–1753.

Karunasena E., Markham N., Brasel T., Cooley J. D., Straus D. C.. Evaluation of fungal growth on cellulose-containing and inorganic ceiling tile. *Mycopathologia*. 2001;150:91–95.



Paradigm Change

Scheel C. M., Rosing W. C., Farone A. L.. Possible sources of sick building syndrome in a Tennessee middle school. *Archives of environmental health*. 2001;56:413–417.

Tuomi T., Reijula K., Johnsson T., et al. Mycotoxins in crude building materials from water-damaged buildings. *Applied and environmental microbiology*. 2000;66:1899–1904.

Nielsen K. F.. Mycotoxins from mould infested building materials. *Mycotoxin research*. 2000;16 Suppl 1:113–116.

Rowan N. J., Johnstone C. M., McLean R. C., Anderson J. G., Clarke J. A.. Prediction of toxigenic fungal growth in buildings by using a novel modelling system. *Applied and environmental microbiology*. 1999;65:4814–4821.

Gravesen S., Nielsen P. A., Iversen R., Nielsen K. F.. Microfungal contamination of damp buildings—examples of risk constructions and risk materials. *Environmental health perspectives*. 1999;107 Suppl 3:505–508.

Sudakin D. L.. Toxigenic fungi in a water-damaged building: an intervention study. *American journal of industrial medicine*. 1998;34:183–190.

Marwick C.. Floods carry potential for toxic mold disease. *JAMA : the journal of the American Medical Association*. 1997;277.

Andersson M. A., Nikulin M., Kõljalg U., et al. Bacteria, molds, and toxins in water-damaged building materials. *Applied and environmental microbiology*. 1997;63:387–393.

Dill I., Trautmann C., Szewzyk R.. [Mass development of *Stachybotrys chartarum* on compostable plant pots made from recycled paper]. *Mycoses*. 1997;40 Suppl 1:110–114.

Shaban G. M.. Further studies on Egyptian soil fungi: succession of sugar and osmophilic fungi in soil amended with five organic substrates. *Mycopathologia*. 1996;136:33–40.

Nikulin M., Pasanen A. L., Berg S., Hintikka E. L.. Stachybotrys atra Growth and Toxin Production in Some Building Materials and Fodder under Different Relative Humidities. Applied and environmental microbiology. 1994;60:3421–3424.

Tantaoui-Elaraki A., Mekouar S. L., Hamidi M., Senhaji M.. Toxigenic strains of Stachybotrys atra associated with poisonous straw in Morocco. Veterinary and human toxicology. 1994;36:93–96.

Kady I. A., Maraghy S. S., Zohri A. A.. Mycotoxin production on different cultivars and lines of broad bean (*Vicia faba* L.) seeds in Egypt. Mycopathologia. 1991;113:165–169.

Maghraby O. M., Bean G. A., Jarvis B. B., Aboul-Nasr M. B.. Macrocyclic trichothecenes produced by Stachybotrys isolated from Egypt and eastern Europe. Mycopathologia. 1991;113:109–115.

Abdel-Hafez S. I., Moubasher A. H., Shoreit A. A., Ismail M. A.. Fungal flora associated with combine harvester wheat and sorghum dusts from Egypt. Journal of basic microbiology. 1990;30:467–479.

Abdel-Hafez S. I., Kady I. A., Mazen M. B., Maghraby O. M.. Mycoflora and trichothecene toxins of paddy grains from Egypt. Mycopathologia. 1987;100:103–112.

Harrach B., Bata A., Sándor G., Ványi A.. Isolation of macrocyclic and non-macrocylic trichothecenes (stachybotrys and fusarium toxins) from the Environment of 200 III Sport Horses. Mycotoxin research. 1987;3:65–68.

Jarvis B. B., Lee Y. W., Cömezoglu S. N., Yatawara C. S.. Trichothecenes produced by Stachybotrys atra from Eastern Europe. Applied and environmental microbiology. 1986;51:915–918.

Bagy M. M.. Fungi on the hair of large mammals in Egypt. Mycopathologia. 1986;93:73–75.

Aleksandrov M.. [Mycoflora of hay and straw]. Veterinarno-meditsinski nauki. 1986;23:61–65.

Abdel-Hafez S. I., Shoreit A. A., Abdel-Hafez A. I., Maghraby O. M.. Mycoflora and mycotoxin-producing fungi of air-dust particles from Egypt. Mycopathologia. 1986;93:25–32.

Abdel-Hafez S. I., Shoreit A. A.. Mycotoxins producing fungi and mycoflora of air-dust from Taif, Saudi Arabia. *Mycopathologia*. 1985;92:65–71.

Bata A., Harrach B., Ujszászi K., Kis-Tamás A., Lásztity R.. Macrocyclic trichothecene toxins produced by *Stachybotrys atra* strains isolated in Middle Europe. *Applied and environmental microbiology*. 1985;49:678–681.

Abbas H. K., Mirocha C. J., Shier W. T.. Mycotoxins produced from fungi isolated from foodstuffs and soil: comparison of toxicity in fibroblasts and rat feeding tests. *Applied and environmental microbiology*. 1984;48:654–661.

Harrach B., Bata A., Bajmócy E., Benko M.. Isolation of satratoxins from the bedding straw of a sheep flock with fatal stachybotryotoxicosis. *Applied and environmental microbiology*. 1983;45:1419–1422.

Harrach B., Nummi M., Niku-Paavola M. L., Mirocha C. J., Palyusik M.. Identification of "water-soluble" toxins produced by a *Stachybotrys atra* strain from Finland. *Applied and environmental microbiology*. 1982;44:494–495.

Harrach B., Mirocha C. J., Pathre S. V., Palyusik M.. Macrocyclic trichothecene toxins produced by a strain of *Stachybotrys atra* from Hungary. *Applied and environmental microbiology*. 1981;41:1428–1432.

Stack M. E., Eppley R. M.. High pressure liquid chromatographic determination of satratoxins G and H in cereal grains. *Journal - Association of Official Analytical Chemists*. 1980;63:1278–1281.

Szathmary C. I., Mirocha C. J., Palyusik M., Pathre S. V.. Identification of mycotoxins produced by species of *Fusarium* and *Stachybotrys* obtained from Eastern Europe. *Applied and environmental microbiology*. 1976;32:579–584.

Korpinen E. L., Ylimäki A.. Discovery of toxicogenic *Stachybotrys chartarum* strains in Finland. *Experientia*. 1972;28:108–109.

Testing and Remediation

Lee Tang G.. Mold remediation in a hospital. *Toxicology and industrial health*. 2009;25:723–730.

Wilson Stephen C., Carriker Curtis G., Brasel Trevor L., et al. Culturability and toxicity of sick building syndrome-related fungi over time. *Journal of occupational and environmental hygiene*. 2004;1:500–504.

Chung Yong-Joo J., Jarvis Bruce B., Tak Heekyung, Pestka James J.. Immunochemical Assay for Satratoxin G and other Macrocylic Trichothecenes Associated with Indoor Air Contamination by *Stachybotrys chartarum*. *Toxicology mechanisms and methods*. 2003;13:247–252.

Burton Nancy Clark C., Adhikari Atin, Iossifova Yulia, Grinshpun Sergey A., Reponen Tiina. Effect of gaseous chlorine dioxide on indoor microbial contaminants. *Journal of the Air & Waste Management Association (1995)*. 2008;58:647–656.

Korzun William, Hall Jeffrey, Sauer Ronald. The effect of ozone on common environmental fungi. *Clinical laboratory science : journal of the American Society for Medical Technology*. 2008;21:107–111.

Johnson David, Thompson David, Clinkenbeard Rodney, Redus Jason. Professional judgment and the interpretation of viable mold air sampling data. *Journal of occupational and environmental hygiene*. 2008;5:656–663.

Pitkäranta M., Meklin T., Hyvärinen A., et al. Analysis of fungal flora in indoor dust by ribosomal DNA sequence analysis, quantitative PCR, and culture. *Applied and environmental microbiology*. 2008;74:233–244.

Pietarinen Veli-Matti M., Rintala Helena, Hyvärinen Anne, Lignell Ulla, Kärkkäinen Päivi, Nevalainen Aino. Quantitative PCR analysis of fungi and bacteria in building materials and comparison to culture-based analysis. *Journal of environmental monitoring : JEM*. 2008;10:655–663.

D'Annibale Alessandro, Leonardi Vanessa, Federici Ermanno, Baldi Franco, Zecchini Fulvio, Petruccioli Maurizio. Leaching and microbial treatment of a soil contaminated by sulphide ore ashes and aromatic hydrocarbons. *Applied microbiology and biotechnology*. 2007;74:1135–1144.

Segvić Klarić M., Kosalec I., Mastelić J., Piecková E., Pepeljnak S.. Antifungal activity of thyme (*Thymus vulgaris* L.) essential oil and thymol against moulds from damp dwellings. *Letters in applied microbiology*. 2007;44:36–42.

Barnes Charles S., Dowling Paul, Van Osdol Tom, Portnoy Jay. Comparison of indoor fungal spore levels before and after professional home remediation. *Annals of allergy, asthma & immunology*. 2007;98:262–268.

Bloom Erica, Bal Karol, Nyman Eva, Must Aime, Larsson Lennart. Mass spectrometry-based strategy for direct detection and quantification of some mycotoxins produced by *Stachybotrys* and *Aspergillus* spp. in indoor environments. *Applied and environmental microbiology*. 2007;73:4211–4217.

Black J. A., Foarde K. K.. Comparison of four different methods for extraction of *Stachybotrys chartarum* spore DNA and verification by real-time PCR. *Journal of microbiological methods*. 2007;70:75–81.

Mercier Julien, Jiménez Jorge I.. Potential of the volatile-producing fungus *Muscodor albus* for control of building molds. *Canadian journal of microbiology*. 2007;53:404–410.

Bloom Erica, Bal Karol, Nyman Eva, Larsson Lennart. Optimizing a GC-MS method for screening of *Stachybotrys* mycotoxins in indoor environments. *Journal of environmental monitoring : JEM*. 2007;9:151–156.

Dean Timothy R., Kohan Michael, Betancourt Doris, Menetrez Marc Y.. A simple polymerase chain reaction-sequencing analysis capable of identifying multiple medically relevant filamentous fungal species. *Mycopathologia*. 2006;162:265–271.

Charpin-Kadouch Carmel, Maurel Gilles, Felipo Rachel, et al. Mycotoxin identification in moldy dwellings. *Journal of applied toxicology : JAT*. 2006;26:475–479.

Gottschalk C., Bauer J., Meyer K.. Determination of macrocyclic trichothecenes in mouldy indoor materials by LC-MS/MS. *Mycotoxin research*. 2006;22:189–192.

Black J. A., Foarde K. K., Menetrez M. Y.. Solvent comparison in the isolation, solubilization, and toxicity of *Stachybotrys chartarum* spore trichothecene mycotoxins in an established in vitro luminescence protein translation inhibition assay. *Journal of microbiological methods*. 2006;66:354–361.

Dean Timothy R., Roop Barbara, Betancourt Doris, Menetrez Marc Y.. A simple multiplex polymerase chain reaction assay for the identification of four environmentally relevant fungal contaminants. *Journal of microbiological methods*. 2005;61:9–16.

Wilson S. C., Wu C., Andriychuk L. A., et al. Effect of chlorine dioxide gas on fungi and mycotoxins associated with sick building syndrome. *Applied and environmental microbiology*. 2005;71:5399–5403.

Charpin Denis, Boutin-Forzano Sandrine, Chabbi Sophie, Dumon Henri, Charpin-Kadouch Carmel. [Wall relative humidity: a simple and reliable index for predicting *Stachybotrys chartarum* infestation in dwellings]. *Bulletin de l'Académie nationale de médecine*. 2005;189.

Brasel T. L., Martin J. M., Carriker C. G., Wilson S. C., Straus D. C.. Detection of airborne *Stachybotrys chartarum* macrocyclic trichothecene mycotoxins in the indoor environment. *Applied and environmental microbiology*. 2005;71:7376–7388.

Green Christopher F., Davidson Craig S., Scarpino Pasquale V., Gibbs Shawn G.. Ultraviolet germicidal irradiation disinfection of *Stachybotrys chartarum*. *Canadian journal of microbiology*. 2005;51:801–804.

Keswani Jyoti, Kashon Michael L., Chen Bean T.. Evaluation of interference to conventional and real-time PCR for detection and quantification of fungi in dust. *Journal of environmental monitoring : JEM*. 2005;7:311–318.

Dean Timothy R., Kohan Michael, Betancourt Doris, Menetrez Marc Y.. A simple polymerase chain reaction/restriction fragment length polymorphism assay capable of identifying medically relevant filamentous fungi. *Molecular biotechnology*. 2005;31:21–28.

Wilson Stephen C., Layton Robert C.. The microbial status and remediation of contents in mold-contaminated structures. *Advances in applied microbiology*. 2004;55:425–435.

Wilson S. C., Brasel T. L., Carriker C. G., et al. An investigation into techniques for cleaning mold-contaminated home contents. *Journal of occupational and environmental hygiene*. 2004;1:442–447.

Boutin-Forzano S., Charpin-Kadouch C., Chabbi S., Bennedjai N., Dumon H., Charpin D.. Wall relative humidity: a simple and reliable index for predicting *Stachybotrys chartarum* infestation in dwellings. *Indoor air*. 2004;14:196–199.

Lange J. H.. Airborne mold clearance criteria for remediation. *Annals of allergy, asthma & immunology*. 2004;92.

Reeslev M., Miller M., Nielsen K. F.. Quantifying mold biomass on gypsum board: comparison of ergosterol and beta-N-acetylhexosaminidase as mold biomass parameters. *Applied and environmental microbiology*. 2003;69:3996–3998.

Spurgeon Joe C.. A method for detecting fungal contaminants in wall cavities. *AIHA journal : a journal for the science of occupational and environmental health and safety*. 2003;64:40–47.

Wady Loay, Bunte Annicka, Pehrson Christina, Larsson Lennart. Use of gas chromatography-mass spectrometry/solid phase microextraction for the identification of MVOCs from moldy building materials. *Journal of microbiological methods*. 2003;52:325–332.

Price D. L., Ahearn D. G.. Sanitation of wallboard colonized with *Stachybotrys chartarum*. *Current microbiology*. 1999;39:21–26.

E J., M G., S Y. C., et al. Toxicity screening of materials from buildings with fungal indoor air quality problems (*Stachybotrys chartarum*). *Mycotoxin research*. 1998;14:60–73.

Toxin Dispersion

Tucker Kathryn, Stolze Jessica L., Kennedy Aaron H., Money Nicholas P.. Biomechanics of conidial dispersal in the toxic mold *Stachybotrys chartarum*. *Fungal genetics and biology : FG & B*. 2007;44:641–647.

Brasel T. L., Douglas D. R., Wilson S. C., Straus D. C.. Detection of airborne *Stachybotrys chartarum* macrocyclic trichothecene mycotoxins on particulates smaller than conidia. *Applied and environmental microbiology*. 2005;71:114–122.

Wady L., Larsson L.. Determination of microbial volatile organic compounds adsorbed on house dust particles and gypsum board using SPME/GC-MS. *Indoor air*. 2005;15 Suppl 9:27–32.

Mycology

Picart Pere, Goedegebuur Frits, Díaz Pilar, Javier Pastor F. I.. Expression of novel β -glucanase Cel12A from *Stachybotrys atra* in bacterial and fungal hosts. *Fungal biology*. 2012;116:443–451.

Koster Brenda, Wong Bess, Straus Neil, Malloch David. A multi-gene phylogeny for *Stachybotrys* evidences lack of trichodiene synthase (*tri5*) gene for isolates of one of three intrageneric lineages. *Mycological research*. 2009;113:877–886.

Black Jonathan A., Dean Timothy R., Foarde Karin, Menetrez Marc. Detection of *Stachybotrys chartarum* using rRNA, *tri5*, and beta-tubulin primers and determining their relative copy number by real-time PCR. *Mycological research*. 2008;112:845–851.

Picart Pere, Diaz Pilar, Pastor Javier I.. *Stachybotrys atra* BP-A produces alkali-resistant and thermostable cellulases. *Antonie van Leeuwenhoek*. 2008;94:307–316.

Yike Iwona, Rand Thomas, Dearborn Dorr G.. The role of fungal proteinases in pathophysiology of *Stachybotrys chartarum*. *Mycopathologia*. 2007;164:171–181.

Panaccione Daniel G., Coyle Christine M.. Abundant respirable ergot alkaloids from the common airborne fungus *Aspergillus fumigatus*. *Applied and environmental microbiology*. 2005;71:3106–3111.

Karunasena Enusha, Cooley J. Danny, Straus Douglas, Straus David C.. Protein translation inhibition by *Stachybotrys chartarum* conidia with and without the mycotoxin containing polysaccharide matrix. *Mycopathologia*. 2004;158:87–97.

Castlebury Lisa A., Rossman Amy Y., Sung Gi-Ho H., Hyten Aimee S., Spatafora Joseph W.. Multigene phylogeny reveals new lineage for *Stachybotrys chartarum*, the indoor air fungus. *Mycological research*. 2004;108:864–872.

Andersen Birgitte, Nielsen Kristian F., Thrane Ulf, Szaro Tim, Taylor John W., Jarvis Bruce B.. Molecular and phenotypic descriptions of *Stachybotrys chlorohalonata* sp. nov. and two chemotypes of *Stachybotrys chartarum* found in water-damaged buildings. *Mycologia*. 2003;95:1227–1238.

Wilkins Ken, Nielsen Kristian Fog F., Din Sla Ud U.. Patterns of volatile metabolites and nonvolatile trichothecenes produced by isolates of *Stachybotrys*, *Fusarium*, *Trichoderma*, *Trichothecium* and *Memnoniella*. *Environmental science and pollution research international*. 2003;10:162–166.

Van Emon Jeanette M., Reed Allan W., Yike Iwona, Vesper Stephen J.. ELISA measurement of stachylysin in serum to quantify human exposures to the indoor mold *Stachybotrys chartarum*. *Journal of occupational and environmental medicine / American College of Occupational and Environmental Medicine*. 2003;45:582–591.

Andersen Birgitte, Nielsen Kristian F., Jarvis Bruce B.. Characterization of *Stachybotrys* from water-damaged buildings based on morphology, growth, and metabolite production. *Mycologia*. 2002;94:392–403.

Jarvis Bruce B.. Chemistry and toxicology of molds isolated from water-damaged buildings. *Advances in experimental medicine and biology*. 2002;504:43–52.

Kordula Tomasz, Banbula Agnieszka, Macomson Jeremy, Travis James. Isolation and properties of stachyrase A, a chymotrypsin-like serine proteinase from *Stachybotrys chartarum*. *Infection and immunity*. 2002;70:419–421.

Zaïchenko O. M., Mendzhul M. I., Lysenko T. H., Andriienko O. V., Shaïns'ka O. O., Busakhina I. V.. [Use of cyanobacteria for indication of toxic action of stachybotrys toxins]. *Mikrobiolohichnyi zhurnal (Kiev, Ukraine : 1993)*. 2002;64:31–39.

Cruse Michael, Telerant Robin, Gallagher Thomas, Lee Thomas, Taylor John W.. Cryptic species in *Stachybotrys chartarum*. *Mycologia*. 2002;94:814–822.

Raunio P., Kärkkäinen M., Virtanen T., Rautiainen J., Pasanen A. L.. Preliminary description of antigenic components characteristic of *Stachybotrys chartarum*. *Environmental research*. 2001;85:246–255.

Hinkley S. F., Mazzola E. P., Fettinger J. C., Lam Y. F., Jarvis B. B.. Atranones A-G, from the toxigenic mold *Stachybotrys chartarum*. *Phytochemistry*. 2000;55:663–673.

Senkpiel K., Sassenberg D., Keller R., Ohgke H.. Content of mycotoxins in conidiospores from mould in buildings. *Mycotoxin research*. 2000;16 Suppl 1:88–93.

Wilkins K.. Volatile sesquiterpenes from *Stachybotrys chartarum*: Indicators for trichothecene producing mold species? *Environmental science and pollution research international*. 2000;7:77–78.

Haugland R. A., Heckman J. L.. Identification of putative sequence specific PCR primers for detection of the toxigenic fungal species *Stachybotrys chartarum*. *Molecular and cellular probes*. 1998;12:387–396.

Andrienko E. V., Zaïchenko A. M.. [The physiological and biochemical characteristics of *Stachybotrys chartarum* 13959a in relation to the biosynthesis of stachybotryotoxins]. *Mikrobiolohichnyï zhurnal (Kiev, Ukraine : 1993)*. 1998;60:34–38.

Sorenson W. G., Frazer D. G., Jarvis B. B., Simpson J., Robinson V. A.. Trichothecene mycotoxins in aerosolized conidia of *Stachybotrys atra*. *Applied and environmental microbiology*. 1987;53:1370–1375.

Aerts G. M., De Bruyne C. K.. Effects of alcohols on hydrolysis catalyzed by beta-D-glucosidase from *Stachybotrys atra*. *Biochimica et biophysica acta*. 1981;660:317–324.

De Bruyne C. K., Aerts G. M., De Gussem R. L.. Hydrolysis of aryl beta-D-glucopyranosides and beta-D-xylopyranosides by an induced beta-D-glucosidase from *Stachybotrys atra*. *European journal of biochemistry / FEBS*. 1979;102:257–267.

Van Opstal O., Aerts G., Kersters-Hilderson H., De Bruyne C. K.. Beta-D-Glucosidase from *Stachybotrys atra* DSL 1: kinetic determination of the number of active sites and alpha-deuterium kinetic isotope effects. [proceedings]. *Archives internationales de physiologie et de biochimie*. 1979;87:856–857.

Gussem R. L., Aerts G. M., Claeysens M., Bruyne C. K.. Purification and properties of an induced beta-D-glucosidase from *stachybotrys atra*. *Biochimica et biophysica acta*. 1978;525:142–153.

Pohland A. E.. Studies concerning the metabolites produced by *Stachybotrys atra*, *Penicillium islandicum*, *Penicillium viridicatum* and *Aspergillus versicolor*. *Annales de la nutrition et de l'alimentation*. 1977;31:663–684.

Eppley R. M., Mazzola E. P., Highet R. J., Bailey W. J.. Structure of satratoxin H, a metabolite of *Stachybotrys atra*. Application of proton and carbon-13 nuclear magnetic resonance. *The Journal of organic chemistry*. 1977;42:240–243.

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