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## Misalignment between Clinical Mold Antigen Extracts and Airborne Molds Found in Water-damaged Homes

This week we welcomed back Dr. Bill Sothern and Chris Mikrut to discuss their recent paper called Misalignment between Clinical Mold Antigen Extracts and Airborne Molds Found in Water-damaged Homes. The authors have collected a great deal of data from the real world that should help answer these questions.

Bill Sothern is a Certified Industrial Hygienist, LEED AP, and Chief Operating Officer of Microecologies, Inc., a NYC-based indoor environmental consulting firm he founded in 1993. He earned his Doctorate in Public Health from CUNY, and is a recognized contributor to NYC DOHMH, NIEHS, HUD and WHO guidance documents. Bill is an active advocate for changes in law and policy that can improve health outcomes at the population level. He is the primary author of NYC Local Law 13 - 2014 that prohibits the use of paper-faced gypsum boards in moisture-prone building areas, which serves to reduce the occurrence of mold growth and the incidence of asthma. Bill is an active health researcher and is the lead author of the article *Misalignment between Clinical Mold Antigen Extracts and Airborne Molds Found in Water-Damaged Homes* published in the May 2022 issue of the Annals of the American Thoracic Society. Since the onset of the COVID-19 pandemic, he has conducted environmental assessments for schools, NGO's and businesses throughout NYC to assess HVAC systems and implement ventilation controls to reduce airborne concentration levels of SARS-CoV-2 and thereby reduce risk of transmission of COVID-19 in schools and workplaces. Bill currently serves as a court-appointed independent consultant on mold, water damage and ventilation issues to the NYC Public Housing Authority (NYCHA).

Chris Mikrut is a Senior Investigator at Microecologies, Inc., an indoor environmental consulting firm in New York City. He earned his Masters Degree in Environmental and Occupational Health Science from Hunter College where he was awarded the prestigious National Institute of Safety and Health's (NIOSH) Scholarship. Chris is an EPA Certified Lead Risk Assessor and NYS Certified Mold Assessor, and over the past 10 years has conducted over 1,000 indoor air quality and indoor environmental inspections in residential and commercial settings involving water damage and mold growth conditions, chemical vapor emissions, construction dust and crystalline silica infiltration, lead-based paint hazards, and other indoor environmental exposure factors. Chris has been a key contributor to program development for response to mold, water damage, and exhaust ventilation issues in NYC Public Housing Authority's (NYCHA) and administration of classroom and field training for NYCHA staff. Chris has also collaborated on several projects as part of Microecologies' research team and is a co-author of the article *Misalignment between Clinical Mold Antigen Extracts and Airborne Molds Found in Water-Damaged Homes* published in the May 2022 issue of the Annals of the American Thoracic Society.

Michael Berg, Phd joined Eurofins EMLab P&K in 2005 and worked as Department Manager, Regional Director and Technical Director. He holds a Ph.D. in Biology from the Technical University of Darmstadt, Germany. Dr. Berg researched plant pathology and plant genetics as postdoctoral fellow at Oklahoma State University. He also worked in fungicide research for BASF in Germany. Dr. Berg engages in training and other educational events with focus on the topics of infection control, water risk management and molecular biology.

***Did the study receive financial support?*** No financial support for the study was received.

***Who were the authors of the study?*** The study authors are a diverse group including: practitioners, scientists, and medical clinicians.

- Sothern, William M
- O'Beirne, Sarah L
- Berg, Michael

- Devine, Daniel
- Khandaker, Nasrin
- Mikrut, Christopher
- Kaner, Robert J.

***What led to doing this research?*** Microecologies, Inc. is closely aligned with the clinical medical community from which it receives client referrals. The clinical community bases patient testing and treatment on antigen and serum testing results which are more focused on fungi found outdoors rather than on the unique set of fungi found in water damaged properties. Pulmonologist, Dr Robert J. Kander, MD referred cases to Microecologies. Bill and his group found mold problems in large, costly, pristinely maintained homes that were not readily obvious to occupants. When mold problem could be identified and remediated, occupants were able to see improvements and substantial recoveries. Antigen testing is prone to false negatives. No antigen extracts are available for water damage related molds.

Bill Sothern pitched Michael Berg on the idea of using Eurofins large bank of culture data. Culture data is valuable because it determines the species. Ben Devine sifted through Eurofins data, analyzed and developed a list of common fungi found in homes in which occupants complained.

According to Chris Mikrut, physicians were brought into the research project to interpret and characterize data.

There is a need to do valid mold antigen testing internationally. Pulmonologist, Dr. Sarah L. O' Beirne assessed European antigen testing and found similarity with what is used in the US.

#### Study Table 1-Indicators for the Primary Reason for Investigation

- Health Concerns 58%
- Visible Fungi 10%
- Water damage or dampness 16%
- Musty odors 12%
- Proactive evaluation 4%

Full speciation lab analysis data is important.

Spore trap sampling is more common than culturing. Bill Sothern requests full speciation analysis because his firm's clients are recommended by physicians. Full speciation sampling reveals that in damp buildings *Penicillium* is 3 times more likely to be found than *Aspergillus*. *Penicillium* is a major cause of allergy, asthma and hypersensitivity pneumonitis.

Chris Mikrut- Condensation is a common cause of hidden molds: back sides of ceilings, walls, HVAC system, cooling coils, blower, PTAC units, etc. Mold problems in HVAC systems are often maintenance, installation and/or material driven. Problems include, lack of maintenance, installation issues which makes inspection and maintenance difficult or impossible and lined ductwork which is prone to gross fungal contamination.

Bill Sothern- Pipe leaks and condensation are primary moisture sources indoors. Interior lined insulated ductwork is a curse.

Chris Mikrut performs physical inspection using meters and thermal imaging. Special concentration used in areas of complaint. Findings then used to create a sampling plan.

Study- Misalignment Table shows that the alignment between molds found outdoors and those found indoors in water damaged buildings isn't good. The mold antigens currently in use are 40-50 years old. New mold antigens need to be reformulated to accurately reflect fungi growing in damp buildings. There is only 1 antigen extract available for clinical use.

Bill Sothern- Surprised that penicillin was more predominate than aspergillus in water damaged buildings. It's well established that mold exposure can lead to a higher probability of asthma. Mold remediation is essential. The problem must be indentified before remediation. Physician referrals- based on current allergic sensitivity reports are deficient.

Bill Sothern- Antigen extracts match up better with outdoor molds than indoor molds. Allergists and pulmonologists using antigen extracts designed for outdoor molds for testing people exposed to water related mold indoors is likely to result in a false negative test.

Changing antigen manufacturers' thinking will take time and effort. Working with allergists and pulmonologists to meet with antigen manufacturers and labs and explain the study's indications.

Michael Berg- Antigen manufacturers require clinical evidence on culture activity and potential allergic reactions. Bill Southern added see page 752 of report not a lot of potential for cross activity.

Chris Mikrut- Antigen change will come about through advocacy.

Bill Sothern- Feedback from medical community has been positive. Need research money and knowledge to develop more reflective allergy extracts.

*Z-Man signing off*

### **Trivia**

Name the small organic molecules which only stimulate antibody production when combined with a larger molecule?

Answer: haptens or haptenes

Answered by Vic Cafaro