

1 **Are You Missing Mold Illness?**

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2 **Are You Missing Mold Illness?**

- Online continuing education course for medical practitioners
- Created & presented by Dr. Jill Crista

3 **Course Curriculum**

- Stuff You Need To Know First
- Mold ~ A Formidable Foe
- Scary Scary Mycotoxins
- How To Spot Moldies
- The Testing Conundrum
- Peel The Orange
- Protect & Repair
- Fight
- When Things Go Sideways
- And The Environment

4 **Stuff You Need To Know First**

- How this course works
- Certificates

- How to navigate
- What you'll get out of it
- Impacts
-

5 **How This Course Works**

- Over 10 hours - choose when to watch
- CE/CME credit, ND Pharmacy
- 10 Modules ~
Lectures within each module
- Quizzes ~
At end of each lecture
- Case examples
- Updates
- Access for 1 year
- A note on research...

6 **Where Are The RCTs?**

- Medical Ethics
Reign Supreme

7 **Where Are The RCTs?**

- Medical Ethics Reign Supreme

8 **Certificates**

- Mold-literate certification available to licensed primary care providers
- View modules in order
- Watch entire lecture before quiz
- Quiz score >70%
- Eligible practitioners are listed on DrCrista.com
- CE/CME certificates up to 1 week

9 **How To Navigate**

- Teachable platform

- Limitations of the platform
- DO NOT CLICK "COMPLETE & CONTINUE" UNLESS YOU VIEWED 100% OF THE LECTURE
- Try us first ~ support@dr cristina.com
- How to advance
- Screenshare

10 **What You'll Get Out of It**

- Identify the mold-sick patient
- Clinical tool to track progress
- Patient handouts
- Choose best diagnostics
- Confidence with the process
- Select effective treatments
- Target to individual patients
- Remediation primer
- Save you time! ~ patient support

11 **Put Simply . . .**

- What are molds & mycotoxins
- Who's impacted
- How to test
- What to do if you find it

12 **Impacts of Mold Illness**

- How Common Is It?
- Threats of Indoor Mold
- How Does It Get There?
- Historical Perspective
- Mold vs Yeast
- Definition of Mold Illness
- Do You Agree?

-

13 **Indoor Mold Occurrence**

- More than a quarter of all buildings (OSHA)
- Homes, apartments, schools, hospitals, workplaces, college housing, churches, hotels, summer camps, etc
- 66% of materials from WDB contain molds & mold toxins
- Elevated fungal and microbial diversity in dust from WDB
- Molds & mycotoxins persist - test positive at 5 months post WD event
- PMID: 21531835, 19757292, 21585551

14 **Indoor Mold Threats**

- WDBs grow mold in biofilm
- Creating superbugs via antifungals in paint
- Negatively affects all living creatures
- Mold harms via spores, spore fragments, mycotoxins, and chemicals
- Increases the biologic and toxic load (biotoxins) on the inhabitants
- PMID: 12781669, 22017920, 19191921

15 **Problematic Situations**

- Locations
 - Humid climates, coasts, near water, poor drainage, river bottoms
- Building specifics
 - OSB/air tight combo in new construction, dirt crawl spaces, older run-down homes, finished basements, installation of moldy materials
- Budget/Upkeep Issues
 - Low-income housing, college housing, institutional buildings (schools, hospitals, churches)
- During remediation
- PMID: 22017920

16 **Water Intrusions**

- From The Outside-

- Roof Leaks
- Siding/Flashing Leaks
- Wall Cavities
- Floods
- Sewer Drain
- Shared Walls
(condo, apt)
- Finished Basements
- Air Intake Filters

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18 **Historical Perspective**

- The Original
Indoor Environmental Illness
- Bible - physical & spiritual illness
- Remediation guidance
- Speaks to dangers to inhabitants
and village

19 Indoor Mold: Biblical Remediation

- Leviticus 14: 33-45
- 34 “When you enter the land of Canaan, which I am giving you as your possession, and I put a spreading mold in a house in that land, 35 the owner of the house must go and tell the priest, ‘I have seen something that looks like a defiling mold in my house.’ 36 The priest is to order the house to be emptied before he goes in to examine the mold, so that nothing in the house will be pronounced unclean. After this the priest is to go in and inspect the house. 37 He is to examine the mold on the walls, and if it has greenish or reddish depressions that appear to be deeper than the surface of the wall, 38 the priest shall go out the doorway of the house and close it up for seven days. 39 On the seventh day the priest shall return to inspect the house. If the mold has spread on the walls, 40 he is to order that the contaminated stones be torn out and thrown into an unclean place outside the town. 41 He must have all the inside walls of the house scraped and the material that is scraped off dumped into an unclean place outside the town. 42 Then they are to take other stones to replace these and take new clay and plaster the house.
- 43 “If the defiling mold reappears in the house after the stones have been torn out and the house scraped and plastered, 44 the priest is to go and examine it and, if the mold has spread in the house, it is a persistent defiling mold; the house is unclean. 45 It must be torn down—its stones, timbers and all the plaster—and taken out of the town to an unclean place.

20 Mold vs Yeast

- Mold ~
 - Multi-cellular fungi
 - Grow in filamentous hyphae (branches)
 - Reproduce via sexual & asexual methods
 - Produce airborne spores
 - Require organic matter for nutrition

21 Spores, Spore Fragments & Mycotoxins

- Occurrence ratio
500:1 ~ Fragment:Spore
- Fragments ~ disrupted mold
- Fragment size ~ nanoparticle-3 microns
- Fragments ~ more allergenic (smaller size, ability to bypass lung clearance)
- Fragments & spores secrete mycotoxins

22 **Mold Spore vs Mycotoxin**

- Mold Spores ~
 - Large enough to trigger allergic-type reactions
 - Trigger mucociliary clearance
 - Recognized as causal for Type I Hypersens reactions
 - Associated with the enigma 'Sick Building Syndrome'

23 **Scary Scary Mycotoxins: History**

- Middle Ages, St. Anthony's Fire
- Salem Witch Trials
- Ergotism ~ Rye & other grains
- Ergot ~ mycotoxin from *Claviceps purpurea*
- Ingest mycotoxin-infected grain
- Symptoms ~ convulsive & gangrenous
- Loss of digits/limbs (small vessel vasculitis), mania (CNS), GI convulsions

24 **The Current Definition of Mold Illness**

Do you Agree?

25 **Mold Illness Defined**

- "Spore illness"
- Spores ~ large enough to trigger local resp system irritation & immune responses
- NIOSH (Nat'l Inst for Occupational Safety & Health):
"health problems associated with excessive damp conditions and mold, to include: allergies, hypersensitivity pneumonitis, and asthma"

26 **Mold Illness Defined**

- WHO GUIDELINES FOR INDOOR AIR QUALITY: DAMPNESS AND MOULD
- Sufficient epidemiological evidence is available from studies conducted in different countries and under different climatic conditions to show that the occupants of damp or mouldy buildings, both houses and public buildings, are at increased risk of respiratory symptoms, respiratory infections and exacerbation of asthma. Some evidence suggests increased risks of allergic rhinitis and asthma. Although few intervention studies are available, their results show that remediation of dampness problems can reduce adverse health outcomes.

- There is clinical evidence that exposure to mould and other dampness-related microbial agents increases the risks of rare conditions, such as hypersensitivity pneumonitis, allergic alveolitis, chronic rhinosinusitis and allergic fungal sinusitis. Toxicological evidence obtained in vivo and in vitro supports these findings, showing the occurrence of diverse inflammatory and toxic responses after exposure to microorganisms – including their spores, metabolites and components – isolated from damp buildings.
- While groups such as atopic and allergic people are particularly susceptible to biological and chemical agents in damp indoor environments, adverse health effects have also been found in nonatopic populations.
- The increasing prevalences of asthma and allergies in many countries increase the number of people susceptible to the effects of dampness and mould in buildings.

27 **Susceptibility**

- Does everyone exposed to a WDB react the same?
- Predispositions
- Polymorphisms ~ on the rise
- HLA typing
- In my experience, beware the non-allergic

28 **Missing Something In The Dx?**

- Being that spore illness is the only recognized mold illness
- Being that spore fragments are formed 500:1 spores
- Being that spores AND fragments secrete mycotoxins
- Could we be missing symptoms and conditions that are in fact mold?

29 **Review**

- How this course works
- Certification
- How to navigate
- What you'll get out of it
- Impacts

-

30  Thank You

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- Naturopathic Doctor
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2 **Mold ~ A Formidable Foe**

- Are You Missing Mold Illness In Your Patients?
- Dr. Jill Crista

3 **Mold ~ A Formidable Foe**

- Personality profile ~ a survivor
- Mold's Specific Carbohydrate Diet
- How mold creates harm
- Mold, biofilm, and colonization

4 **16 Mold Facts You Need To Know**

- Natural function ~ compost/recycle
- Excrete 1° and 2° metabolites ~ inhaled, ingested, and absorbed
- 1° metabolites ~ nec for survival aldehydes, alcohols, odors, digestive enzymes, and structural elements (beta-glucans etc)
- 2° metabolites ~ competitive antimicrobials, mycotoxins

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6 **Mold Facts**

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7 **Tenacious**

- Moisture ~ 1° element for growth, 2° is organic substrate
- Obvious or visible water not necessary
- High relative humidity is all that's required
- Grows on WD surface within 24-48 hours
- Difficult to kill
- Spore formation and release increases more when drying than when wet (survival of species)
- It's goal is to compost YOU

8 **Question**

-
- True or False?

- Mold is an old building problem

9 Answer

- False!
- Mold can grow in any building within 48 hours of the water damage event, no matter how old the structure

10 Mold's Specific Carbohydrate Diet

11 Mold Types Found in WDBs

- *Penicillium chrysogenum*
- *Aspergillus versicolor*, *A. fumigatus*, *A. melleus*, *A. niger*, *A. ochraceus*
- *Chaetomium* spp
- *Acremonium* spp
- *Cladisporium herbarum*
- *Ulocladium* spp
- *Stachybotrys* spp
- *Mucor racemosus*, *M. spinosus*
- *Trichoderma* spp
- *Arthrinium phaeospermum*
- *Aureobasidium pullulans*
- Study limitation: only collection plates/flood conditions
Penicillium verrucosum, *Alternaria*, *Fusarium* missed
- PMID: 21531835, 19191921

12 Mold Types By Material

- Wallpaper & Gypsum (drywall) ~
 Penicillium chrysogenum
 Acremonium spp
 Ulocladium spp
 Stachybotrys spp
- Wood & "Was-Wood" ~
 (plywood/modified wood products)
 Cladosporium herbarum
 Trichoderma spp
 Arthriniun phaeospermum
 Aureobasidium pullulans
- PMID: 21531835

13 **Attic**

14 **Attic**

15 **Drywall**

16 **Drywall**

17 **Shower**

18 **Mold Types By Material**

- Concrete & Flooring Materials ~
 Aspergillus versicolor, A. fumigatus,
 A. melleus, A. niger, A. ochraceus
 Chaetomium spp
 Mucor racemosus, M. spinosus
- Other ~
 Penicillium verrucosum - ceiling tiles
 Alternaria spp - carpets, textiles, horiz surfaces
 Fusarium spp - HVAC, humidifiers
- PMID: 21531835

19 **Basement - Stachy + Chaetomium**

20 **Air Duct**

21 **Flood**

22 Other Air Quality Considerations

- VOCs and microbial VOCs
- Dander
- Allergens
- Rodent feces
- Gas (leaks, gas stove, sewer)
- Formaldehyde ('new' smell)
- Fiberglass
- Fragrances
- PCBs (candles)
- Insecticides, pesticides
- EMFs (WiFi, smart meters)
- Radon (granite, foundation cracks)
- Heavy metals (hunters/hobby, lead)
- Endotoxins

23 How Mold Creates Harm

24 Respiratory System vs Mold

- Mold
- Spores-
- Cladosporium 3-5 m
- Aspergillus 2-5 m
- Penicillium 1-5 m
- Fragments-
- 1-2 m
- Mycotoxins-
- 0.1 m

25 Spores

- Immune responses are highly variable ~
From allergic to life-threatening disseminated fungal infection (IFI)
- General ROT ~
Spores induce
Mycotoxins suppress
*but both deplete I/S with ongoing exposure
- Mechanisms ~
Induce inflammatory reaction
Reduce respiratory mucosal ciliary function
Adhesion
Evasion
Invasion
- “007” analogy
- PMID: 27623953, 26600019, 29371501, 27092126, 8463496, 19527167, 19201896

26 Spores & Airways

- First point of contact is most likely an airway epithelial cell (AEC)
- First response by AEC is to “season it, then try to eat it”
- If that doesn’t work, AEC’s next response is to send out gene intel to I/S, then commit suicide
- Stachybotrys alters phospholipid synthesis related to surfactant ~
Keep the lungs hyperinflated for easier invasion
- PMID: 25449202, 12221236, 26600019, 29371501, 27092126, 30589860

27 Spore Effects

- Inhalation of *A. fumigatus* extract in mice induced a dramatic rise in IgE accompanied by an increase in airway mast cells, and signs indicating an elevated systemic mast cell load.
- Analyses of potential cellular targets of IgE revealed that IgE antibodies are not required for the induction of mast cell progenitors in response to allergen but rather act by sustaining the survival of mature mast cells.

28 Spore Effects

32 Spore Effects

- Af-exposed mice: ↑PI3K-δ
- With admin of a selective inhibitor of PI3K-δ (IC87114, alpelisib & ..lisib Rx family) ↓NLRP3
- "PI3K-δ (phosphoinositide 3-kinase) plays a key role in regulation of immune processes through activating immune cells and trafficking inflammatory cells."
- "PI3K-δ is also activated in response to fungal exposure and plays a role in the regulation of ER stress, thereby being crucially implicated in fungal allergic inflammation."
- "Inhibition of PI3K-δ improves Af-induced allergic lung inflammation through regulation of NLRP3 inflammasome assembly/activation."

33 Spore Effects

- "These findings demonstrate that fungi-induced assembly/activation of NLRP3 inflammasome in airway epithelium may be modulated by PI3K-δ, which is mediated partly through the regulation of mtROS generation."
- "Inhibition of PI3K-δ may have potential for treating fungi-induced severe allergic lung inflammation."
-

34 Spore Effects

- "Oxidative stress has been shown to be strongly associated with most of the features of asthma and leads to accumulation of phosphatidyl inositol (3,4) bis-phosphate, which in turn activates PI3K pathway and contributes to oxidative stress."
- "Thus, there exists a vicious loop between oxidative stress and lipid phosphatase signaling."
- "These results suggest a novel mechanism of action of resveratrol in attenuating asthma phenotype by downregulating PI3K-Akt pathway via upregulating INPP4A."

35 Spore Fragments

- 500:1 Fragment:spore
- Usu occurs when dead/dried mold is disrupted
- Become ultrafine particulate in permanent suspension, even in lungs
- Highly inflammatory to sinus & lung tissue ~
More potent than spores at inducing proinflam cytokines
Asp/Pen - enhance TLR2-dependent expression and release of IL-6 + IL-8 in human bronchial epithelial cells
- Airway remodeling if persistent exposure

- “Mold-othelioma” - mesothelioma-type LU condition related to mold fragment exposure vs asbestos:
Shortness of breath, cough, pain in the chest or abdomen, fatigue, fever or night sweats, respiratory complications, muscle weakness, nausea or bloating
- PMID: 30917597, 31116698

36 Spore Effects

- “Human bronchial epithelial cells were exposed to X-ray treated spores and hyphal fragments from pure cultures of *Aspergillus fumigatus*, *Penicillium chrysogenum*, *Aspergillus versicolor* and *Stachybotrys chartarum*.”
- “Hyphal fragments of *A. fumigatus* and *P. chrysogenum* induced expression and release of the pro-inflammatory cytokines, while none of the other hyphal preparations had effects.”
- [*Is this how the more toxigenic species like *Stachy* persist? By evading allergic detection?]
- “Untreated *A. fumigatus* spores formed hyphae and triggered expression of pro-inflammatory genes with similarities to the effects of hyphal fragments.”

37 Mycotoxin Immune Overview

- Immunosuppressive via:
 - Direct action on immune cells
 - Epigenetic alterations to the immune response
 - Direct genetic alterations
- Inhibit host defense via:
 - NK cell hypofunction
 - T-/B-cell deficiency
 - LT exposure - Ig subclass def (false neg allergy/infection labs)
- Leukopenia w relative lymphopenia, neutrophilia & eosinophilia
- TGF- β 1 \uparrow
 - \uparrow impairs T-reg fxn \rightarrow immune overactivation/asthma
- Disordered GALT, affects nutrient absorption, intestinal apoptosis
- PMID: 26474839, 27178040, 25449202, 12221236, 26600019

38 Spore Effects

- “Our results are the first to suggest that AFB1 promotes Swine Influenza Virus (SIV) replication and SIV-related lung damage by activating the TLR4-NF κ B pathway.

- This finding is supported by previous studies demonstrating that TLR4 antagonists or TLR4 knockout can prevent lethal influenza infection (20, 42). Therefore, we infer that AFB1 might promote TLR4 overexpression and excessive inflammatory responses and reduce tolerance (43), thereby promoting SIV replication."

39 Spore Effects

- Swine Influenza Virus (SIV) replication correlates to increasing concentrations of AFB1.
- "Taken together, our results suggest that AFB1 exposure promotes SIV replication in vitro."
-

40 Spore Effects

- "In addition, the inflammatory response was quantified by the release of TNF- α and IL-10, and the results showed that AFB1 at doses of 10 to 40 $\mu\text{g}/\text{kg}$ markedly increased TNF- α release but significantly decreased IL-10 release in sera (Figures 5D,E)."

41 Spore Effects

- "To further verify the in vitro results, lung tissues were taken from SIV-infected mice exposed to AFB1 to assess viral replication...and histological damage.
- The areas of hemorrhage are denoted with the blue arrows.
- SIV-infected mice exhibited decreased weight gain, but enhanced... inflammatory cell infiltration compared with mice from the blank group, and these changes were aggravated following exposure to 10–40 $\mu\text{g}/\text{kg}$ AFB1.
- AFB1 promotes SIV replication and lung damage in mice."

42 Spore Effects

- "...given the differences in morbidity and mortality following SIV infection, we hypothesize that AFB1 promotes SIV infection.

43 Spore Effects

- "...macrophages are the first line of defense against viral infection,...critical for the defense against influenza virus infection.
- M1 macrophages produce proinflammatory cytokines, thus contributing to host defense against pathogens and tissue injury;
- M2 macrophages produce anti-inflammatory cytokines, thus promoting tissue repair.
- The phenomenon of the existence of the two contrasting M1/M2 phenotypes is referred to as 'macrophage polarization'.

- Macrophage polarization can occur at any point in an inflammatory process;
- multiple phenotypic markers, cytokines and growth factors, such as nitric oxide synthase (iNOS), TNF- α and IL-10, interact to determine the final polarization state.
- Previous studies indicated that AFB was immunotoxic to porcine alveolar macrophages (PAMs) and that AFB leads to time- and dose-dependent decreases in the viability and phagocytic activity of PAMs;
- furthermore, AFB decreases proinflammatory cytokine levels and increases anti-inflammatory cytokine levels in macrophages. "

44 **Spore Effects**

- "Inflammatory cell infiltration, inflammatory cells in the bronchial lumen and areas of hemorrhage are denoted with the black, yellow and blue arrows, respectively.

45 **Spore Effects**

- Low levels of AFB promote SIV infection, inflammatory responses, immune organ damage, induce a switch in alveolar macrophage polarization from M1 to M2, and confer poorer outcomes in SIV-infected in mice.

46 **Mold Wins**

- Breathing changes ~
Shallow, airway constriction
- Chronic inflammation ~
All resp passages
Nasal, sinus, lung
- Airway remodeling ~
Lower lobes of lungs
Scarring
- Immune deficiency ~
Mucosal lining
NK cell dysfunction
T- and B-cell disorder
- Neuroinflammation
- Parallel GI tract inflammation
- PMID: 23710148

47 **Recognized Human Impacts**

- Allergic (IgE-mediated) ~
Allergic rhinitis
Hypersensitivity Pneumonitis
Asthma
- Non-allergic (non IgE-mediated) ~
Non-IgE mediated asthma exacerbation
- Infection ~
Aspergillosis
- PMID: 24368325

48 **Mold: Mis*sed*Diagnoses**

- Seasonal Allergies
- Chronic Sinusitis
- Interstitial Lung Disease
- Anxiety/Depression
- Tinnitus
- Sarcoidosis
- T-cell Abnormality
- Acquired Immunodeficiency
- Chronic Fatigue Syndrome
- Interstitial Cystitis
- Nephritis
- Insomnia/Sleep Apnea
- Dysautonomia/Neuropathies
- Mast Cell Activation Syndrome
- Cancer
- PMID: 26738372, 25616361, 25745963, 22253638

49 **STORY | Carpet Mushrooms**

- College friend invitation to see her carpet mushrooms
- Three species of mushroom crops sprouting up through her carpet

- Repurposed barn to a cottage
- Initial ~ acne and fatigue
- Next ~ nausea and decreased appetite
- Cyclical vomiting syndrome
- In 3 months, developed kidney disease
- Too sick to go to school or work
- No explanation for why this previously fit, healthy 20-yo woman was falling apart so quickly
- A few weeks out of the cottage, she started to feel a little better
- Her chiropractor asked about her living environment and made connection
- More than a building issue, it was literally killing her
- Took years to recover kidney function
- * * *

50 **Mold, Colonization & Biofilm**

51 **Colonization**

- Different than infection (Aspergillosis)
- Sinuses of normal controls ~
fungus, bacteria normal findings
- So what's the big deal?
- Only sick people's fungal colonies behave badly
form mycotoxins
- Colonization
sinuses (>90%), lungs, GI tract
- PMID: 24368325, 23710148

52 **Colonization, biofilm, or both?**

- Mycotoxins ~ competitive survival tactic
- Other microbes in sinus to compete?
- Culprits ~ MARCoNS, Pseudomonas, Klebsiella

- Chronic rhinosinusitis patients
endoscopic sinus surgery
those w biofilm ~
more severe disease preoperatively
persistence of postoperative sx
ongoing mucosal inflammation
increase infections
- PMID: 20537281, 24368325, 23710148

53 My Theory

- Persistence despite Avoidance?
- Normal controls: +fungus, -mycotoxins
Sick pts: +fungus, +mycotoxins
- WDB exp is the key ∴ mycotoxins the trigger
- If susceptible and/or sufficient exposure duration:
Mycotoxins trigger protective mechanism
Conversion of healthy microbiome to pathogenic biofilm
Fungal overburden
- Once recovered, mycotoxins can re-trigger old pattern
- Theory explains persistence and flares
- Rationale for effectiveness of antifungals w/o infection Dx

54 Biofilm

- In nature, is more the rule than the exception
- Slime layer
- Mixed microbial inhabitants
- Matrix-like compound
Protects & adheres inhabitants
- Quorum sensing
Share survival information
Collectively survey host immunity
Determine when to reproduce
- Assist and compete (Mad Max)

- Study | “microbiology of sinusitis is influenced by prev antimicrobial therapy, vaccinations & the presence of normal flora capable of interfering w growth of pathogens.”

- PMID: 27086363

55 **The Key Is . . .**

- Exposure to a water-damaged building

56 **Review**

- Personality profile ~ a survivor
- Mold’s Specific Carbohydrate Diet
- How mold creates harm
- Mold, biofilm, and colonization

57 **Thank You**

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2 **Scary Scary Mycotoxins**

- Are You Missing Mold Illness In Your Patients?
- Dr. Jill Crista

3 **Mycotoxin Overview**

- What's a mycotoxin anyway?
- Negative health impacts
- Mycotoxin affinities & the body
- Other than mycotoxins

4 **STORY | Stressed Out**

- Woman, Mid-40s, CFS & "stress"
- Fatigue, sinus congestion, allergies, insomnia
- Episodic unnerving feeling of dread, Dxd panic attacks
- Incr freq, < work/travel
- "High strung" at work, exhausted when not
- Steroidal sinus spray qd-bid
- Tylenol PM hs
- Antianxiety Rx - s/e anxious/fatigue next day

- Work~historic preserv in restored Victorian mansion
- Bldg described as “musty” but had “gotten used to it”
- Hobby ~ historic sites/historic B&Bs
- Labs~ mult strains sinus fungus+hi urine mycotoxins
- Work building had an invisible mold problem
- Didn’t connect the dots that work caused her sinus issues/panic attacks bc neither happened immed
- Moved locations for work/tx for mold
- >fatigue, stress, panic attacks, allergies, sinuses, sleep
- Steroid sinus spray/Tylenol PM d/c’d over time
- Panic attacks dt mold, not an inability to handle stress
- * * *

5 What’s A Mycotoxin Anyway?

6 Mycotoxin Reminder

- Ergotism - Middle Ages St. Anthony’s Fire, Salem Witch Trials
- Ergot - mycotoxin from infected grain caused convulsions gangrene via small vessel vasculitis
- Ergotamine - used in different Rx forms for postpartum hemmorrhage, migraine, analgesia
- Alcohol - brewer’s yeast

7 Mycotoxins Of Concern

- Aflatoxin
Aspergillus flavus, A. parasiticus
- Chaetoglobosin A,C
Chaetomium globosum
- Gliotoxin
Aspergillus fumigatus
- Ochratoxin A
Aspergillus ochraseus, A. niger, Penicillium verrucosum, P. nordicum, P. chrysogenum

- Sterigmatocystin
Precursor of Aflatoxin, *A. versicolor*
- Trichothecenes (..Zearin)
Stachybotrys chartarum, *Trichoderma viridae*, *Fusarium* spp

8 **Wide Structural & Biosynthetic Diversity**

- Aflatoxin
Aspergillus flavus, *A. parasiticus*
- Chaetoglobosin A,C
Chaetomium globosum
- Gliotoxin
Aspergillus fumigatus
- Ochratoxin A
Aspergillus ochraceus, *A. niger*, *Penicillium verrucosum*,
P. nordicum, *P. chrysogenum*
- Sterigmatocystin
Precursor of Aflatoxin, *A. versicolor*
- Trichothecenes (..Zearin)
Stachybotrys chartarum, *Trichoderma viridae*, *Fusarium* spp

9 **Mycotoxins**

- Produced by all fungal elements
- Vary by mold species
- ***Lipophilic*** molecules
- Secreted onto substrate & aerosolized
- Wide structural and biosynthetic diversity
- Energetically expensive
- Competitive inhibition of other microbes
- Interfere with vital cellular processes
protein & RNA/DNA synthesis
∴ most are cytotoxic

- Harmful to human health
- Inhaled, ingested & absorbed
- Commodified for oncology & weaponized

10 **Question**

-
- True or False?
- You know you have a mold problem, because it stinks

11 **Answer**

- False!
- Mycotoxins, the most toxic part of mold, which seep through building materials and poison indoor air, have no scent
- Musty or moldy smells are from other mold chemicals, and need air exposure to stink. If it's trapped, you can't smell it

12 **Negative Health Impacts**

13 **Mycotoxins ~ Health Impacts**

- Immunotoxic
- Neurotoxic
- Alimentary toxic
- Dermatotoxic
- Nephrotoxic
- Hepatotoxic
- Hepatocarcinogenic
- Genotoxic
- Teratogenic
- Carcinogenic
- PMID: 26474839, 27178040, 25449202, 12221236, 26600019

14 **Mycotoxins ~ Health Impacts**

- Highly inflammatory to resp tissue
- ↓ ciliary clearance due to sm size
- Airway remodeling if persistent
- Some xBBB and reduce its integrity
- Inhalation ~ olfactory n. to hippocampus, frontal lobe
- Many cross the placenta
bioactivate in utero
- Found in breast milk
- Implicated in neuropsych, ASD pathogenesis
- PMID: 26474839, 27178040, 25449202, 12221236, 26600019, 19854819, 29880330

15 **Mycotoxins ~ Health Impacts**

- Induce apoptosis of intestinal epithelia
- Induce bladder wall irritation/ulceration
- Modified by multiple enzymes ~
Cyt P450s, glutathione S-transferases, UDP-glucuronosyltransferases, sulfur-transferases
- Deplete glutathione
- Cause mitochondrial damage
- Nrf2 ("oxidant thermostat") activation & depletion
- PMID: 26474839, 27178040, 25449202, 12221236, 26600019

16 **Mycotoxins ~ Health Impacts**

- Interfere with protein synthesis:
DNA/RNA, actin/myosin(muscle/cardiac), keratin/elasticin, enzymes, immune globulins, hemoglobin, albumin
- Inhibit host defense
 - ↓ antibody-producing cells
 - ↓ antibody titres in blood serum
 - ↓ phagocytosis
- Relative lymphopenia, neutrophilia, eosinophilia

- PMID: 26474839, 27178040, 25449202, 12221236, 26600019, 7637687

17 **Mycotoxin Affinities & The Body**

18 **Aflatoxin**

- Hepatocellular carcinoma
esp pre-existing Hep B
- EBV-associated Burkitt's lymphoma
- Desquamative Interstitial Pneumonitis
- Immune impairment
decr lymphocytes & sIgA
- Encourages viral replication with increased inflammation
- Polymorphisms in CYP3A5 affect susceptibility
-
- PMID: 27571469, 26424750, 15735246

19 **Chaetoglobosin**

- Crosses BBB
- Oncology uses provide clues:
 - CLL - induce apoptosis of leukemic cells via cytoskeleton
 - Ovarian - induces apoptosis cisplatin-resistant CA cells
 - Inhibits tumor angiogenesis via downregulation of vascular epithelial growth factor-binding hypoxia-inducible factor 1alpha.
- Mouse study: necrosis of thymus/spleen, spermatocyte degen
- PMID: 24280868, 25304379, 23695013, 713122

20 **Citrinin**

- Toxic effects on the heart, liver, kidney, intestines, reproductive
- Broad spectrum of bioactivities
- Oxidative stress + mito dysfunction
- Triggers endoplasmic reticulum (ER) stress

- Intestines ~
 - ↓ nmbv viable human intestinal cells Induced apoptotic events via:
 - mito membrane permeability
 - activates programmed cell death enzyme
 - elevated production of ROS
- Inhibits oocyte maturation and early embryo development
- PMID: 28993214, 29165056, 28404941

21 **Diacetoxyscirpenol (DAS)**

- Crosses BBB, neurotoxic
- Developmental exposure "reversibly" disrupts hippocampal neurogenesis via ~
 - Apoptosis of neural stem cells
 - Induce oxidative cellular injury
 - Suppress differentiation of granule cell lineages
- Large bowel toxicity
- Fertility ~ cytotoxic effects
 - Decr male-related fertility, direct toxic effects on the testes
- PMID: 10626642, 31836554, 31791183

22 **Enniatin**

- Crosses BBB, neurotoxic
- Apoptotic
- Brain carcinogenic ~
 - Astrocytoma cells most sensitive
 - Brain capillary endothelial cells
 - Brain microvascular endothelial
- Fertility ~ Cytotoxic effects
 - Pre- + post-implant embryos
 - Induce intracell oxidative stress and immunotoxicity in fetuses
- PMID: 29768483, 30259633

23 **Gliotoxin**

- Not specific to brain. Named after fungi.

- Disulfide bond ~ unique to other mycotoxins (affects IgG subclass III preferentially bc of it's prevalence of disulfide bonds)
- Immunosuppressive: T-lymph, PMNs, macrophages, monocytes, NK cells
- Inhibits Nf-kB (cytokines) yet incr ROS
- Mitochondria
reduced ATP
hyperpolarized membrane
- Decreases rate of protein synthesis
- Neurotoxic
- Depletes glutathione
- Inhibits histone methyltransferase (MCAS?)
- PMID: 26445050, 26258781, 23278106, 22148349, 24039048

24 **Ochratoxin A**

- Kidneys ~ nephropathy, acute renal failure, chronic interstitial nephropathy, renal carcinogenicity
- Renal fibrosis with chronic exposure
- Inhib protein synthesis + energy prod
- Depletes glutathione, incr intracell ROS
- Immune ~ cytotoxic to neutrophils
- Carcinogenic effects ~ combined direct and indirect mechanisms (genotoxicity, oxidative stress, epigenetic factors)
- Male specific neurotox → mRNA changes poss trigger for autism & its male prev
- PMID: 27384585, 27092524, 26095584, 27597255, 25597866

25 **Patulin**

- Damage to liver, kidney, spleen, intestines, I/S
- Lung and brain edema
- Retention sites - erythrocytes, blood-rich organs (spleen, kidney, lung and liver)
- Mutagenicity, teratogenicity, chromosomal aberration, DNA strand damage
- Affects the vital organs by damaging DNA
- Classified as Category 3 human carcinogen
- D/c'd past use chemo+Abs bc too toxic/carcinogenic

- Protein synthesis inhibition ~
 Binds to sulfhydryl group on AAs in proteins
 Protein cross-linking w thiol groups, esp cysteine, lysine, histidine (think MCS, viral, MCAS)
- Induces apoptosis via mitochondrial pathway
- I/S ~
 decr IFN-gamma-producing T-lymphs → Th2 dominance → allergies
 Reduces macrophage fxn → reduced innate resistance to pathogens → frequent infxns, autoimmunity, CA
- Note: add yeast to patulin foods for adsorption (apples)
- PMID: 30090541, 12112629, 26394380, 24931906

26 **Trichothecenes In General**

- Cell level ~
- Potent protein synthesis inhibitor, incl DNA/RNA; mito fxn, effects on cell division + membranes.
- GI ~
 - N/V, intestinal epithelial blunting
 - Alimentary Toxic Aleukia
- Lung Inflammation ~
 - Pulmonary Hemosiderosis
- Immune deficiency ~
 - Compromised resistance to infxn, cancer - *Glioblastoma, Melanoma?
 - Haematotoxic ~ coagulation
 - Endocrine disrupter
- PMID: 26572613, 15342083, 27198722, 22982764, 25542145

27 **Zearelanone**

- Endocrine disruptor → reproductive disorders, infertility
- Non-steroidal estrogenic mycotoxin, but still binds to/lowers albumin (risk of C.diff)
- ER binding affinity as potent as coumestrol and genistein, but ERβ is same as affinity for ERα → carcinogenic + immunotoxic

- Arrhythmic (other Fusarium myco DON)
2nd-degree AV block, atrial brady, decr total power

• PMID: 24632555, 28365492, 29868851, 27840141, 21804309

28 **Other Than Mycotoxins**

29 **Mycophenolic Acid (MPA)**

- Not technically a mycotoxin
- Part of "other chemicals" secreted by mold as part of normal metabolism
- But mycotoxins formed in competition
- ∴ where there's mold, there's MPA, but not nec mycotoxins
- Readily absorbed (w/in first few hrs)
- Excreted quickly in bile IF liver can detox
- Detox'd/excreted in Phase II as glucuronides
- PMID: 4629779, 28327659

30 **Mycophenolic Acid (MPA)**

- Compromises intestinal membrane integrity → GI toxicity + leaky gut
- Changes lipid-metabolizing proteins
- Affects intracellular nucleotide levels, nucleotide-dependent processes, expression of structural proteins, fatty acid and lipid metabolism
- Immunosuppressive
- Rx transplant rejection, BRCA tx
-
- PMID: 4629779, 28327659

31 **Endotoxins**

- Bacterial byproducts found in WDBs, humidifiers,
- Highly inflam LPSs
- Change inflam mediators in airways +/- or blood ~
Eosinophils, IL-8, IL-1beta, TNFa, CRP
- Reduce neutrophil count

- SI ~↓ oxygenation enterocytes → hypermotility in attempt to reoxygenate
- GI ~ genetic reduction in replication, energy production, absorption, immunity
- Combo w mycotoxins ↑dmg to liver
- Reduction improves steatohepatitis
- PMID: 11409488, 17878567, 28477419, 26709789

32 Review

- What's a mycotoxin anyway?
- Negative health impacts
- Mycotoxin affinities & the body
- Other than mycotoxins

33 Thank You

-
-
-
- Dr. Jill Crista
- Naturopathic Doctor
- support@drchrista.com

1 **Are You Missing Mold Illness?**

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2 **How To Spot Moldies**

- Are You Missing Mold Illness In Your Patients?
- Dr. Jill Crista

3 **How To Spot Moldies**

- It's All About The History
- Symptoms
- Questionnaire
- Look Alikes & Comorbidities
- Differential Diagnoses
- Physical Exam Clues

4 **It's All About The History**

5 **Informed by History**

- Exposure to WDB at any time in life
- Gestation fwd (bioactivate in utero)
- Include neonatal exposure
- Ask ~ schools, college housing, occupations, camp, vacation
- Will forget, take them through space by space

- No minimum duration required
- Ask about water events, musty smell, not only mold
- Toxic mold is commonly not visible
- Building test results

6 **Onset of Symptoms**

- Onset timing varies
- Start vague and nondescript
- Tolerable and excusable
- Mold canaries earlier
- Women earlier
- Assuming daily exp ~ 3-6 months

7 **Symptoms**

8 **Recognized Human Impacts**

- Allergic (IgE-mediated) ~
Allergic rhinitis
Hypersensitivity Pneumonitis
Asthma
- Non-allergic (non IgE-mediated) ~
Non-IgE mediated asthma exacerbation
- Infection ~
Aspergillosis
- PMID: 24368325

9 **Respiratory System vs Mold**

- Mold
- Spores-
 - Cladosporium 3-5 μ m
 - Aspergillus 2-5 μ m
 - Penicillium 1-5 μ m
- Fragments-

- 1-2*m*
- Mycotoxins-
- 0.1*m*

10 **Totality of Symptoms**

- Many systems
- Many symptoms
- No single diagnostic symptom
- Genetic diversity
- Individualized reactions
- Symptoms abound
- ∴ Totality

11 **EENT (Eyes, Ears)**

- Dry eyes
- Red, irritated eyes
- Ocular pruritis
- Floaters
- Light sensitivity
- Eye fatigue
- Allergic shiners
- Dark, sunken eyes
- Blurry vision
- Double vision
- Frequently changing vision
- Icterus
- Pruritic ear canal
- Sore inner ears
- Ear fullness
- Ear popping

- Freq yawning to pop ears
- Ear pain
- Noise sensitivity
- Tinnitus
- Serous otitis media
- Hearing loss

12 **EENT (Nose, Throat)**

- Sneezing
- Runny nose
- Blow nose often
- Nose bleeds
- Post-nasal drip
- Nasal voice
- Sinusitis
- Blood-streaked mucous
- Daily sinus spray/Neti
- Nasal polyps
- Allergies (esp not > tx)
- Hayfever
- Coated tongue
- Thrush
- Mouth sores
- Palatal petechiae
- Dry throat
- Itchy throat
- Sore throat
- Back of throat feels full
- Clears throat often

- Globus hystericus
- Cervical lymphadenopathy
-

13 **STORY | Student Athlete**

- College athlete
- URI ↑ frequency & duration
- →bacterial more often ~ sinuses or lungs
- Require antibiotics
- Affecting his ability to compete
- Other sx's "tolerated" -insomnia, itchy ears, "blow his throat" every am
- Rarely had to blow his nose, even though nasal voice
- PND at school, cleared up when home
- Discovered living moldy building at school
- Genetics not extreme sensitive
- CMQ score only slightly probable for mold
- Exercise routine helped him clear mycotoxins
- Treated but refused move - grad soon
- I/S strengthened - ↓ frequency of URIs + improved PND, pruritis, sleep
- Competitive again at his sport
- When he left the moldy place to take a new job, he thrived
- * * *

14 **Respiratory System**

- Dyspnea <exertion
- Frequent yawn/sigh
- Chronic dry cough
- Episodic cough
- Recurrent respiratory infxns

- Colds go to lungs
- Delayed recovery
- Wheezing
- Blood streaked sputum
- Asthma
- Incr need for inhaler meds
- Burning lungs
- Hemoptysis
- Heaviness in chest
- Non-obstructive sleep apnea
- Lungs sensitive to inhaled particulates, exhaust, fragrances, musty spaces
- Chronic respiratory illnesses
- Fungal lung infection
- Respiratory distress
- Sarcoidosis of lungs

15 STORY | Hay Fever

- Man in 30s, healthy guy, gym rat
- DIY finished basement for home office
- Dev allergy to grass pollen - allergist said prob age
- Allergy medication as recommended
- Soon after, S/T, PND, dry irritated eyes, tinnitus
- Followed by IBS not related to what he ate
- Lack of focus worse when working
- Desired nap rather than exercise
- Hay fever progressed from grass season to any season when it wasn't frozen outdoors
- Allergy medication starting to fail
- Dev a faint wheeze when exercising
- Doc rec asthma Rx - came to see me for alt's

- Errors in basement buildout, mold behind outside walls
- After remediation and tx, all sx's improved, but took longer than he had hoped
- Suspect still being exposed to mycotoxins in belongings
- * * *

16 **Cardiovascular System**

- Lightheaded
- Low or reactive bp
- Increased vascular fragility
- Easy bruising
- Spider veins/cherry angioma
- Small vessel vasculitis
- Vessel atonia
- Varicose veins
- Lower extremity edema
- Heart palpitations
- Irregular heartbeat
- Arrhythmia
- Paroxysmal tachycardia
- Postural tachycardia syndrome (PoTS)
- Chest pain
- Myocarditis
- Hemorrhage into body tissue
- Iron-deficiency anemia
- Clotting issues
- Atriovenous malformation
- Coagulation abnormalities

17 **STORY | Myocarditis**

- Woman, mid-40s

- Palpitations
- Insomnia
- Fatigue
- DOE
- Angina on exertion
- “no pain no gain”
- Self tx - CoQ10 + incr exercise
-
- Angina became unbearable
- Event of MI sxs → ER/referral for CV workup
- Dx myocarditis
-
- Mold discovered in basement below slow leaking refrigerator
-
- After remediation & mold tx, all sxs remitted w occ palpitations after alcohol ingestion
- * * *

18 Digestive System

- Appetite changes/anorexia
- Crave sweets/alcohol
- Food sensitivities
- Peanut allergy
- Abdominal pain
- Gas/bloating
- Constipation/Diarrhea
- Consti-rrhea/IBS
- Nausea
- Reflux
- Ulcer

- SIBO
- Vomiting
- Cyclical vomiting syndrome
- Histamine intolerance
- Intestinal epithelial blunting
- Hematochezia
- Intestinal hemorrhage
- Chemical sensitivity
- Liver pain or congestion
- Hepatocellular carcinoma

19 **STORY | Cook's Dilemma**

- 30yo vegetarian cook & foodie
- Nausea, generalized abd pn, IBS, urgent diarrhea alt w gas/constipation
- Wine - h/a, heartburn
- ROS - neuropathy, poor circ, wt gain, sens skin, rash from fav lotions
- Celiac, B12 tests N
- Upper endoscopy - esophagitis
- Colonoscopy - intestinal lining inflam/degradation wo ulceration
- Suppressive med offered
- Social life involved food and drink, socially isolated
- Elimination-challenge - grains, wine, mushrooms, potatoes
- Reintro only had a problem with nonorganic grains, and organic (yes, organic) wine
- Presentation at wine club about ochratoxin in org wine cracked the code
- Timing of wt gain and dig problems when took a new job
- Leaky ceiling; trash cans to catch water during heavy storms
- No mold seen, but was in ceiling tiles
- * * *

20 **Nervous System**

- Anxiousness*
- Easily overwhelmed
- Low mood
- Depression
- Headache
- Migraine
- Drunken feeling
- Dizziness/vertigo
- Balance issues
- Difficulty walking
- Incoordination
- Delayed reflexes
- Internal vibrations
- Parasthesias
- Nerve pains
- Tremors
- Ataxia
- Dementia
- Atonia - central
- Dysautonomia
- Seizures

21 **STORY | Mold On The Mind**

- Woman mid-50s
- Muscle twitches - sometimes so severe, wake her from sleep
- Past 5 years - brain fog, insomnia, weak/easily fatigued muscles
- Feared brain tumor but scan neg
- PE revealed UMN lesion
- Built their dream home, a log home in the country

- Sxs started right after moving keepsakes from her mother's basement
- Brought to her home for sorting bc her mother's house smelled terribly musty and made her feel strange
- Unwittingly infected her pristine home
- Removed from home, remediated and she started treatment
- Despite a comprehensive plan, she couldn't move home for a very long time.
- At that time, I wasn't aware of sinus colonies or mycotoxins, ∴ no sinus tx
- Required extra time for her brain to rebuild the injured areas to stop the twitching
- * * *

22 Dermatological

- Sensitive skin
- Bothered by tags/seams
- Frequent static shocks
- Flushing
- Hives
- Dermatographism
- Eczema/Rashes
- Desquamation
- Burning sensation
- Pruritic skin
- Photosensitivity
- Recurrent fungal infections
(jock itch, vaginal, athlete's foot, toenail, intertrigo)
- Delayed wound healing
- Skin reaction to antibiotics
- Hair loss/thinning/slow growth
- Raynaud's
- Psoriatic lesions
- Erythema nodosum (coccidioimycosis)

23 STORY | Infant With Eczema

- Infant covered with eczema from head to toe
- So agitated, he couldn't sleep. Agitating autistic sibling
- Cracking > topical steroids with antifungal
- If missed one dose, break out to the point of cracking and bleeding
- Feeling helpless, mom turned to the Internet. She read that other nursing moms noticed improvement with diet changes. She was a very proactive and educated mom. Her devotion to him was unending. She worked for three years to get pregnant. As a parent of another child, a four year old with autism, she understood sacrifice for a child.
- She watched her baby son's reactions carefully and omitted foods that seemed to make things worse. She was down to lamb, rice, homemade organic bone broth, blueberries, and microgreens.
- Other than the antifungal steroid cream, she put nothing on his skin. His clothes were washed in vinegar with an extra rinse, and diapers were organic cotton. There was little I could suggest to improve on this. We added a bath soak of calendula and chamomile tea, which soothed him enough to sleep. I recommended we test his stool for intestinal flora and conduct a full environmental assessment. These proactive parents hired a certified building biologist to check out their lakeside cottage home.
- The indoor air inspector called aghast. There was black mold all over this cottage. It was behind the drywall of almost every wall in the house. The humidity was out of control because the house was essentially built on a bog by a lake. The inspector said the builder should never have been granted a building permit on that land.
- Stool test - excessive yeast overgrowth.
- He had fungus inside and out. With an autistic sibling, he likely had an inherited genetic susceptibility to environmental toxins. It turns out that everyone in the family was sick in their own way. They went to a hotel while remediation occurred and the little boy's skin cleared up.
- Unfortunately in this case, the remediation had to be redone two more times to completely eradicate the mold. Each time they tried to come home, the baby would break out. Thankfully, the parents paid attention.
-
- * * *

24 Reproductive System

- Unexplained menstrual cycle changes
- Recurrent fungal vaginal infxns
- Bacterial vaginosis

- Chronic pelvic pain
- Infertility - both genders
- Low sperm counts
- Immunotoxicity of fetus
- Immune deficiency in surviving children

25 STORY | Infertility

- This story is about the mother of the infant boy with eczema mentioned earlier. She and her husband wanted very badly to get pregnant again. Because I didn't specialize in fertility, I referred her to colleagues. She apparently had a hard time getting pregnant with the little boy with eczema, her second child. Her first son was a four-year old with autism.
- A year since finding the mold in their home, she and her husband still didn't have any luck getting pregnant. They remediated, but the mold didn't seem to want to go away. Their home required a total of three remediations. Each time they moved back, the baby boy, my patient, broke out in a rash. Mold toxins also interfered with the couple's fertility.
- In this case, no one in the family felt well until they moved from the cottage with a moldy history. Even though they did the extra work of clearing mycotoxins and disposing of most of their belongings, they still couldn't get pregnant until they moved. Some people are simply too genetically sensitive to mold. There are times when the best action is to get out.
-
- * * *

26 Urinary System

- Increased thirst
- Frequent urination
- Nocturnal polyuria
- ADH resistance*
- Burning in bladder
- Pressure in bladder
- UTI sxs with no infection
- Hematuria
- Interstitial cystitis
- Electrolyte imbalance

-
- Kidney or low back pain
- Kidney swelling
- Nephrotic syndrome
- Nephritis
-

27 STORY | Nephrotic Syndrome

- This young man of 21 was living at home with his parents and one sibling. He came to see me for deep-seated fatigue, low-back pain, blood in his urine, and some libido challenges. I hadn't seen him in more than five years. I was struck by his appearance. He looked washed out with very dark circles under his eyes. He wasn't just pale, he was vampire pale.
- Dark circles were a clue that he was depleting his health by not getting enough rest, exercise, hydration, or healthy food. He admitted that he wasn't treating his body well. His job and a new relationship consumed his schedule. He was definitely staying up too late zoning out to TV. At that appointment, I recommended lifestyle changes and ordered some labs.
- At his follow-up, he had done a marvelous job adjusting lifestyle factors. He cleaned up his diet, drank water rather than soda, started walking to work, and dedicated himself to a sleep routine—whether he could fall asleep or not. He was motivated to improve his libido. But after a few months, he didn't feel much better and was still pale with dark circles under his eyes. There was an issue on his labs that I was concerned about.
- A more in-depth test showed that his kidneys were in trouble. He was developing something called nephrotic syndrome—at 21! He followed adjustments to his treatment plan and we watched his labs carefully. He was very compliant and had improvements on both his tests and symptoms, but they were only mild. Normally in practice, I would've expected near complete recovery in someone so young, motivated, and otherwise healthy.
- Then his mother came to see me for help with asthma attacks and fatigue. His sibling came in with fatigue, chronic sinusitis, and new food sensitivities. The whole family struggled with insomnia. There were other symptoms that led me to ask about their home environment. It turns out that they had mold in their home.
- This young man chose to move out of the house in order to restore his kidney function. Within a few months, his kidneys recovered, back pain eased up, and energy improved. He no longer needed such a substantial treatment plan. At a follow-up visit, about five years after his move, he looked healthy. Libido issues were gone, and his relationship was going strong. He had no issues with fatigue unless he stayed up too late or worked too many hours—normal stuff.
- Granted, initially he wasn't treating his body very well. But when someone makes positive lifestyle changes and doesn't see the benefits, more investigation is warranted. In his case, it was mold.
-

• * * *

28 Cognitive

- Brain fog
- Brain fatiguability
- Difficulty word finding
- Delayed cognition
- Memory loss
- Confusion
- Difficultly thinking clearly
- Disorientation
- Cognitive impairment

29 STORY | Tremor

- A woman in her early 40s came to see me with her husband. She had a recent diagnosis of essential tremor, a condition similar to Parkinson's Disease. Prospects of recovery were not good. Her tremor was constant, affecting her balance and ability to sleep. She had heart palpitations that made her catch her breath. She also constantly felt like she had a bladder infection, even though no infection was found. The urinary frequency was so bad, she had to leave the appointment to urinate. Family said she'd become more weepy, which everyone understood considering her health issues.
- Her husband seemed overly anxious about her health. While she was visiting the bathroom, he confided that he felt like he was getting more and more impatient and short with her. His sleep was interrupted with worry. This level of irritability didn't fit the kind and empathetic man in front of me.
- On review, she had a tick bite about a year prior to the beginning of her first tremor. The tick was found, removed intact, and sent for testing. It was a Lyme-carrying tick. Even though many people who contract Lyme don't get a rash, she developed a growing red rash where the tick was. It was clear that she needed treatment for Lyme disease. She was given the standard of care at the time, which was later found to be insufficient at eradicating the bacteria.
- It was evident to me that the Lyme bacteria might be persisting and affecting her nervous system. The tremor began in her hand on the same side as the tick bite. We started her on a chronic Lyme protocol. She only had minimal improvement. We tried a few tweaks, and still there wasn't much improvement with her tremor. I consulted with Lyme-literate colleagues to check my protocol or to spur ideas, and one mentioned checking into mold.

- When I brought this idea up to the couple, the expressions on their faces looked as if I had just found them guilty of a crime. They had water damage in their home and with all that was going on with the wife's Lyme disease, they hadn't addressed it. They closed the door to the wet, musty basement to deal with it later. As mold expert Dr. Sandeep Gupta says, "If there's any part of you that you aren't addressing, eventually it will address you."

-

- * * *

30 Immune System

- Fungal overgrowth/infections
- Frequent viral infections
- Tendency toward bacterial sequelae
- Delayed healing infxns
- Increased susceptibility to infxn
- Herpes outbreaks
- Chronic EBV
- Mast cell activation syndrome
- Immune suppression
- Spleen / thymus underactivity
- Previous or current cancer dx

31 STORY | Church Secretary

- Widowed woman, mid-60's
- Dx BV
- Vaginal itching, burning, odor
- Tx'd for yeast infxn but sxs persisted
- Tx'd with 2 rounds of antibiotics, but s/e diarrhea
- Wt gain, indigestion, gas/bloating, overwhelm, "snippy"
- Sxs onset not long after "stressful roofing project" at church

- Mold growing behind the paneling that lined her office from construction error during roofing project
- No resp sxs bc spores were trapped behind paneling
- Mycotoxin-induced dysbiosis & I/S def
- Remediation and mold tx
- BV improved, also wt gain, digestion, bloating, sense of overwhelm, mood
- * * *

32 **Musculoskeletal**

- Decreased muscle mass
- Decreased muscle tone
- Exercise intolerant ~ EMFs, low oxygenation
- Myositis
- Soft-tissue prolapse
- Soft-tissue injury
- Delayed repair

33 **Constitutional**

- Chronic fatigue syndrome
- Insomnia ~ maint > onset
- Wake w anxious thoughts
- Narcoleptic symptoms
- Sxs worse temp extremes

34 **Typical Picture?**

- Many systems
- Many symptoms
- Genetic diversity
- Individualized reactions
- How to know it's mold?

35 **Zoltar?**

- Many systems

- Many symptoms
- Genetic diversity
- Individualized reactions
- How to know it's mold?
- Clues ~
 - New since water event
 - New onset since move/new job
 - Predisposition worsening
 - Not responding as expected
 - Inner unsettle

36  **Crista Mold Questionnaire**

37  **Questionnaire**

38  **Questionnaire**

39  **Questionnaire**

40  **Questionnaire**

41  **Take A Moment**

- What's your score?
- Of your most stuck patient?

42  **Look-Alikes, Comorbidities, Differentials**

43  **Look-Alikes & Comorbidities**

- Tick-borne diseases ~
 - Persists dt immune deficiency
 - Distinguishing characteristic ~ migrating
- SIBO ~
 - Myenteric plexus neurotoxicity interrupts peristalsis
 - Intestinal epithelium blunting
 - Biofilm promoter
- MCAS ~
 - Dysfunctioning mast cells, differently differentiated dep on tissue → many diff sx pictures
 - Inflammation in multiple systems
 - Wax/wane pattern

44 **Differential Diagnoses**

45 **Differential Diagnoses**

- Clue ~ CMQ Category III
- B12 deficiency
- Lyme & co-infections
- Lung CA/Mesothelioma
- GI ~ UC/Crohn's
- Liver/kidney CA
- Other autoimmune dzs
 - Celiac
 - SLE
 - Scleroderma
 - Sjogren's
- MCAS
- Alzheimer's, Parkinson's
- Glaucoma
- Alcoholism

46 **Physical Exam Clues**

47 **Physical Exam Clues**

- Gross ~
hypotonia (rounded shoulders, pronation, pronounced veins), sunken eyes, pale or reddish complexion, "puffy", diffuse lymphadenopathy, sighs through interview, pretzeling, adventitious movements
- Skin ~
rashes, eczema, flushing, dermatographism, ecchymoses, desquamation

48 **Physical Exam Clues**

- Vitals ~
shallow breathing, usu low bp but reactive, usu temp low-N but mb incr temp (infxn), reactive HR (POTS)

-

Orthostatic Intolerance: NASA Lean Test

Lie quietly x5 min beforehand, no talking, no phone. Take baseline HR.

Stand w feet 6-8 in from wall, and lean back against the wall w shoulders touching.

Test at 1, 5, 10 mins.

HR

>30 bpm from supine to standing (10 min)

If under 18yo >40 bpm from supine

to standing (10 mins)

49 Physical Exam Clues

- Neuro ~

+Rhomberg, +heel-toe, can't toe-stand eyes closed, altered DTRs - usu delayed, but if hyperreflexive screen for UMN lesion (+Rhomberg, +Babinski, clonus, m.weakness w incr tone, rigidity flexors arms, extensors legs), +CN I (anosmia)/III (convergence)/VII (Bell's palsy)/XIV+XII (palate/tongue), parasthesias (h/c, vibration, sharp/dull), twitches, tremors

-

50 Physical Exam Clues

- Eyes ~

sunken eyes, infraorbital darkness medial half, Dennies lines, edema at base of eyelashes, injected conjunctiva, icterus, sensitive to light challenge, convergence insufficiency (eyes drift outward at near vision/while reading), report floaters/white ceiling test, edema around optic nerve, retina-cotton wool spots, VCS fail

- Ears ~

external canal flaking/sloughing/excoriations, poss tragus sign, TM orange-peel consistency &/or retracted, hearing loss, usu (-)Weber (no lateralization, but dulled/req lower tone tuning fork) with (-)Rinne, +Schwabach (b/l sensorineural loss), vestibular eval (caution Dix-Hallpike, alt side-lying head up 45°)

51 Physical Exam Clues

- Nose ~ salute sign, clear or blood-streaked coryza, boggy nasal mucosa, enlarged turbinates, polyps (teardrop/grape), sinuses TTP

- Mouth/Throat ~ dental occlusions w high arched palate (children/allergic facies), palatal petechiae, coated tongue, mouth sores, post pharynx l/a "cobblestoning", hypertrophic/injected tonsils/adenoids, w poss tonsillids/stones, uvula enlarged

- Cervical/tonsillar + cervical chain lymphadenopathy

52 Physical Exam Clues

- LU ~
ausc-harsh bronchial breath sounds, b/l fine crackles in dependent regions not cleared by cough but >leaning fwd (discontinuous high-pitched, low-amplitude, short duration, velcro-like mid-late inspir), expiratory wheeze (continuous high pitched), b/l lower lobe (+)egophony w (-) whispered pectoriloquy
- CV ~
spider veins, cherry angiomas, lower limb veins collapse when elevated, delayed capillary refill, decr intensity of 1st HT sound, isolated S4 (pause bw ventricles)

53 Physical Exam Clues

- GI ~
delayed bowel sounds, doughy abdomen TTP &/or bloated, +GB sign, liver TTP/enlarged/scarred, kidneys TTP
- M/S ~
myopenia (unmatched to age), prolapse, synovitis, ganglions TTP, chiro adjustments don't hold

54 First 3 Rules of Toxic Exposure

55 Review

- It's All About The History
- Symptoms
- Questionnaire
- Look Alikes & Comorbidities
- Differential Diagnoses
- Physical Exam Clues

56 Thank You

-
-
-
- Dr. Jill Crista
- Naturopathic Doctor
- support@drchrista.com

1 **Are You Missing Mold Illness?**

- By proceeding, the viewer agrees that the contents of this site, such as text, graphics, images, video, and other material contained on the Dr. Crista site are for informational purposes only.
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2 **The Testing Conundrum**

- Are You Missing Mold Illness In Your Patients?
- Dr. Jill Crista

3 **Testing Conundrum**

- Diagnostic Assessments
- Mycotoxin Discussion
- Shoemaker Panel Highlights
- Colonization, Allergy, Infection
- Advances In Imaging

4 **Diagnostic Assessments**

5 **Conundrum ~ Which? When? Reliability?**

- Decision points ~
- Info req'd to guide tx
- Baseline
- Pt request
- Buy-in ~ pt/fam
- "Proof" ~ Ins/occup/landlord

- Comfort w existing models
- Accuracy
- Cost
- Reassess tx progress
-

6 **Diagnostics ~ Tier 1**

- Tier 1 purpose - is it mold?
- DIRECT
- Urine mycotoxin - LC/MS
- Comprehensive stool test
- INDIRECT+HIGH CORRELATION
- Visual Contrast Sensitivity (VCS)
- Serum mycotoxin antibody
- Urine mycotoxin - ELISA
- Organic acids test
- NK cell function (diff than total)
Lytic units, <7 abn
Quest
- NK cell total (freq normal)

7

- 2,4,5 ~ Aspergillus
- 4,5 ~ Colonization
- 6 ~ Aspergillus & Candida
- 9 ~ Fusarium

8

- VCStest.com *calibrate screen first!* Technically pass/fail but the higher the score the better.
- The maximum biotoxin score is 18 in each eye and 36 for both eyes.
- Columns A, B, - green is good, red means lack of ability to see the contrast (nutritional, glyphosate, SIBO)

- Columns C, D - blue is good (mold/biotoxin illness, insect venom, cyanobacteria, dinoflagellates-esp Pfiesteria and Ciguatera, Lyme+coinfections, parasites, tobacco use*, some VOCs)
- Column E - green is good (biotoxin, metals, tobacco use*, alcohol, lead, VOCs, age, low socioeconomic status)
- Columns D, E - worse with Herx, detox

9 

- 2,4,5 ~ Aspergillus
- 4,5 ~ Colonization
- 6 ~ Aspergillus & Candida
- 9 ~ Fusarium

10 

- 2,4,5 ~ Aspergillus
- 4,5 ~ Colonization
- 6 ~ Aspergillus & Candida
- 9 ~ Fusarium

11 

- 2,4,5 ~ Aspergillus
- 4,5 ~ Colonization
- 6 ~ Aspergillus & Candida
- 9 ~ Fusarium

12 

- 2,4,5 ~ Aspergillus
- 4,5 ~ Colonization
- 6 ~ Aspergillus & Candida
- 9 ~ Fusarium

13 

- 19, 20, 21 ~ Incr oxalate metabolites - yeast, mold, food
-

14 

- 58 ~ Glutathione status
- 59 ~ Methylation ability
-

15 Diagnostics ~ Tier 2

- Tier 2 purpose - how bad is it?
- CBC
 - Fe-def anemia
 - ↓WBC~relative↓lymph↑neutr↑eos
- CMP
 - ↑ALT, AST, GGT(↓GSH), ↑bilirubin, ↓GFR, ↓albumin, creatinine>1.0
- Vit D (25-OH)↓
- Vit D (1,25)↑ (↓Intracellular GSH?)
- hs-CRP↑
- RBC glutathione↓
- Urinalysis
 - +blood, yellow-brown/yellow-green(bili), (-)leuko, ↑urobilinogen

16 Diagnostics ~ Tier 2

- IgE mold + IgG/M/A candida
 - *not useful for mycotoxins
- IgG/IgA total & subclasses
 - IgG subclass III def
 - potent pro-inflam aby
 - first to respond to viral infxn
 - gliotoxin (disulfide bonds)
- Lymphocyte Subset Panel
 - T- and B-cell total↓
- IL-6↑ → IL-10↑, TNF↑
- ANA↑
- BDG (Fungitell) Quant*↑
- Galactomannan*↑

17 Diagnostics ~ Tier 2

- Food allergy
IgG/IgA (yeasts, peanuts, coffee, mushrooms, corn, potatoes, grains)
- Kidney health
microalbumin/creatinine ratio >30
combo w creatinine >1 = concern
- ADH <1
- Copeptin 4-14
- EKG
2nd-degree AV block, atrial brady, supraventricular extrasystole, ventricular extrasystole
- Genetic mold canary
HLA DR/DQ
DRB1, DQB1, DRB3-5
Detoxification snps

18 Diagnostics ~ Tier 3

- Tier 3 purpose ~ clarification
- Shoemaker labs (next section)
- SIBO breath test
- Ferritin & clotting ~ mixed results
- Venous blood gasses (no tourniquet!)
- MCAS labs
Mayo ~ Urine 24-hr
MUST be chilled to certain temp asap
-Methylhistamine or MIA
-PGD-2
-17-Beta-PGF-2-alpha
Diff to get right, pre-arrange w lab
Not all have this capacity
First r/o mastocytosis w tryptase

19 Diagnostics ~ Differentials

- B12 & MMA (B-12 def)

- Lyme & co-infections*
- Lung CA/Mesothelioma
- GI ~ UC/Crohn's
- Liver/kidney CA
- Other autoimmune dzs
 - Celiac
 - SLE
 - Scleroderma
 - Sjogren's
- MCAS
- Alzheimer's, Parkinson's
- Glaucoma ~ eye exam
- Alcoholism

20 **STORY | Not An Alcoholic**

- Man late 50s
- Dr suspects alcoholism
- Hi GGT, AST/ALT on the rise
- BS on the rise, chol dropping 115
- Onset RUQ pain
- Episodes N/V
- Obese, pre-diabetic
- Worsening lethargy
- No alcohol ingestion, verified by wife
- Wife says lazy after kids moved out & got his man-cave
- Close door & use window air conditioner "always hot"
- Cool sanctuary, often falls asleep at his desk
- Window air conditioner was full of mold
- Mycotoxins mimicked alcohol
-

• * * *

21 **Mycotoxin Discussion**

22 **The Path of the Mycotoxin**

- In WDB exposure ~
Inspiration
Absorption - sinus mucosa to lung alveoli
Carried via blood
Liver & Kidney
Kidney - filtration
Liver - bound to bile and delivered to lumen
Left-over absorbed into lipid-rich tissue for later mgmt
- Why test urine?
Filtrate of blood
- Why test serum?
Blood & serum antibody reactions
- Note 1: Ingested mycotoxins may remain unbound in lumen
- Note 2: No data on mycotoxin secretion in sweat

23 **Mycotoxin Detection Methods**

- The question is not which - it's if, when and how
- Methods currently in use in US ~
Urine ELISA (enzyme-linked immunosorbent assay)
Urine LC-MS (liquid chromatography with mass spectrometry)
Serum antibody (IgE, IgG)
- Considerations ~
Which mycotoxins are tested?
Pt's immune status
Pt's liver & kidney health
Pt's supplementation
Cost, coverage
Compare to previous test
Practitioner comfort
Lab - certifications, ongoing independent validations, and willingness to share validation results

- PMID 32121036

24 **Mycotoxin Controversy**

- Mostly driven by insurance companies
- Source ~
 - Food - studies are mixed
 - Fat stores
 - Lifestyle - ie: smoking, coffee, alcohol
 - Certainly not WDBs
- Except, levels have been shown to decrease with removal from WDB
- Inducible ~
Independent case study
Urinary mycotoxins ↑10 fold, 4-6 hrs after sauna tx
Courtesy Dr. Joseph Brewer
- PMID: 28240164

25 **Urine Mycotoxin Split Sample**

- "Members of three fungal genera, *Aspergillus*, *Fusarium*, and *Penicillium*, are the major mycotoxin producers [in food].
- While over 300 mycotoxins have been identified, six (aflatoxins, trichothecenes, zearalenone, fumonisins, ochratoxins, and patulin) are regularly found in food, posing unpredictable and ongoing food safety problems worldwide.
- In addition to concerns over adverse effects from direct consumption of mycotoxin-contaminated foods and feeds, there is also public health concern over the potential ingestion of animal-derived food products, such as meat, milk, or eggs, containing residues or metabolites of mycotoxins."

26 **Urine Mycotoxin Split Sample**

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27 Mycotoxin Study

- Sample ~
Urine, sputum, tissue biopsy (lung/liver/brain)
- Mycotoxins tested ~
Aflatoxin, Ochratoxin, Trichothecenes, Gliotoxin
- Findings ~
Normal controls ~ no detectable mycotoxins in tissues or fluids
WDB pts ~ detectable mycotoxins, varying degrees in tissues and fluids
- Why urine?
Adequate and reliable method to detect mycotoxins (though may underreport tricothecenes)
Least invasive
Lowest cost
- Study limitation - author's possible conflict of interest
- PMID: 19468319

28 Urine Mycotoxin Split Sample

- "This study was conducted to investigate mycotoxin exposure in 260 rural residents (age 18-66 years; mean age 36.9 years, average BMI was 23.0kg/m²) in Nanjing, China. All participants were healthy and free from chronic diseases.
- Paired plasma and first morning urine samples were analyzed for 26 mycotoxin biomarkers, including 12 parent mycotoxins and 14 mycotoxin metabolites, by an ultra-high-performance liquid chromatography tandem mass spectrometry (UHPLC-MS/MS) method.
- Individuals with previous medical records indicating liver, kidney or other metabolic problems were excluded from this study. "

29 Urine Mycotoxin Split Sample

- "In the plasma samples, [95 out of 260] 36.5% of samples were found to contain mycotoxins.
- OTA was the most prevalent one (incidence of 27.7%) and its concentration ranged from 0.312 to 9.18mg/L.

- AFB1-lysine, FB1, DON, ZEN and ZAN were also detected in plasma with incidences of 19.6%, 2.7%, 2.3%, 6.5% and 1.2%, respectively."

30 **Urine Mycotoxin Split Sample**

- "In the urine samples, one or more mycotoxins were detected in 144 out of 260 (55.4%) participants.
- DON-15-GlcA (incidence of 43.8%), a urinary metabolite of DON, was the most abundant mycotoxin in urine samples; its concentration ranged from 0.828 to 37.7mg/L (0.694e37.3mg/g Cr).
- AFM1, OTA, FB1, T-2, DON, DON-3-GlcA, ZEN and ZAN were detected in 10.4%, 1.2%, 3.1%, 2.3%, 10.0%, 15.8%, 6.9% and 7.7% of the urine samples, respectively.

31 **Does Gender Matter?**

- "42.7% were female and 57.3% were male. There was no significant difference in age and BMI between males and females ($p > 0.05$).
- The incidence and concentration of mycotoxins in males and females were slightly different.
- Compared to females, males presented higher levels of plasma FB1, plasma DON, urinary T-2, urinary DON-3-GlcA, urinary DON-15-GlcA, and urinary ZEN,
- but lower levels of plasma AFB1-lysine, plasma ZEN, urinary OTA, urinary DON and urinary ZAN.
- However, the differences of the mean mycotoxin concentrations between male and female were not significant ($p > 0.05$).

32 **Urine ELISA Mycotoxin**

- Established use for 15 years
- Indirect measure
- The idea - due to the body's ability to modify mycotoxins, antigen detection vs molecular matching will catch more metabolites and give a better view of body burden
- Strengths ~
 Detect both the mycotoxin in pure form and metabolites of mycotoxins due to common antigens on most modified forms
 Levels correlate to symptoms in majority of my patients ("bell-curve")

- Challenges ~
 - Not controlled for creatinine
 - Antigen selection by lab
 - Non-specific reactions (aka background noise) w poss false-positives
 - Varying accuracy for pts w issues detoxing and excreting
 - Doesn't help answer the question of whether currently being exposed
 - Unknown degree of contamination via ingestion

33 **Urine LC-Mass Spect Mycotoxin**

- Gold standard for small molecules
- Direct measure
- The idea - molecular identification as direct detection of the presence in the urine
- Strengths ~
 - Controlled for creatinine
 - Specific metabolites of mycotoxins can be tested and reported as an individual finding, then grouped for a bigger picture
 - Levels correlate to symptoms in majority of my patients ("bell-curve")
- Challenges ~
 - Some of the molecules are similar in structure, peak together, leading to possible cross-reporting
 - May miss metabolites if not specifically identified as a structure to monitor
 - Extraction method to prep sample varies
 - Varying accuracy for pts w issues detoxing and excreting
 - Doesn't help answer the question of whether currently being exposed
 - Unknown degree of contamination via ingestion

34 **Serum Mycotoxin Antibody**

- New kid on the block commercially
- Indirect measure
- The idea - the mere presence of a mycotoxin not as important as knowing what the body thinks about it

- Strengths ~
 - Not an excretion test
 - Detection of metabolites of mycotoxins that share common antigens
 - IgE helps to answer whether it's a current exposure
- Challenges ~
 - Antigen selection by lab
 - May miss metabolites if antigens have been modified
 - Immune status of the pt
 - IgG remains positive for up to 6 months
 - Unknown degree of contamination via ingestion

35 **Urine Mycotoxin Split Sample**

- “Three extraction methods, namely salting-out liquid–liquid extraction (SALLE), miniQuEChERS (quick, easy, cheap, effective, rugged, and safe), and dispersive liquid–liquid microextraction (DLLME), were evaluated and compared based on analytical parameters for the quantitative LC-MS/MS measurement of 11 mycotoxins (AFB1, AFB2, AFG1, AFG2, OTA, ZEA, BEA, EN A, EN B, EN A1 and EN B1) in human urine.
- DLLME was selected as the most appropriate methodology, as it produced better validation results for recovery (79–113%), reproducibility (RSDs < 12%), and repeatability (RSDs < 15%)

36 **Random Urine Adequate?**

-
- Comparison study, in-house
- LC-MS method
- Creatinine controlled
- 3 variations ~
 - First-morning, 6 hour, 24 hour
- Results ~
 - Positives remained positive
 - Negatives remained negative
 - Values not necessarily the same, varied by mycotoxin

37 **Split Sample - Mass Spect vs ELISA**

38 **Split Sample - Mass Spect vs ELISA**

39 **Questions Raised**

- Controlling for creatinine ~
Does this explain the differences in OTA results?
To what degree does creatine supp affect creatinine clearance?
- Sweating/exercise ~
Was twin 2 more detoxed bc of exercise?
Are the results of mass spect falsely lower bc of "detox bolus" the night before when worked out?...OR...
- Glutathione administration ~
Falsely lower the mass spect results?
- Is the bigger issue "normal ranges"? How are these determined?
ie: OTA 1.10 (1.8-2.0) vs 9.19 (1.2-5.0)
ie: OTA 1.51 (1.8-2.0) vs 5.27 (1.2-5.0)
- Is there such a thing as a test with all zeros?
(answer - YES!)

40 **Split Sample - Baseline Twin 1**

41 **Split Sample - Mass Spect Methods**

42 **Split Sample - Mass Spect Methods**

43 **Split Sample - Mass Spect Methods**

44 **Building Test Results**

-
-
- ALL CLEAR currently!
-
- But had moved 4 mo prior from place with Fusarium in HVAC.

45 **Split Sample - Baseline Twin 2**

46 **Split Sample - Mass Spect Methods**

47 **Split Sample - Mass Spect Methods**

48 **Split Sample - Mass Spect Methods**

49 **Building Test Results**

-
- Fusarium in HVAC

-
- Asp/Pen in flooring around bathroom shower

50 **More Questions Raised**

- MPA ~
Not only from Pen. Also from Asp. Reporting on both labs confusing linkage to only Pen.
Why high on one but not the other?
What is the population norm for MPA?
- Is second method catching more because of expanded metabolites?

51 **Urine Mycotoxin Split Sample**

52 **Questions Raised**

- To what degree does Candida overgrowth alter urine mycotoxin labs?
- Gliotoxin also formed from Candida
- Are Candida/Rhodotorula cause or protective effect of mold exposure?
- Which mycotoxins are detoxed with which natural remedies?

53 **Mycotoxin Negative but Mold-Sick**

- Not testing all mycotoxins
- Confounding factors before sample~
Random urine
Exercise
Sauna
Glutathione admin
Acute viral challenge
- Exposure duration too limited
- Intimate contact/parental toxification


54 **Glutathione Pre-Assessment**

55 **Urine Mycotoxin Pre-Testing Guidelines**

- 2 days minimum before test ~
Avoid ingestion of mold/mycotoxin containing foods, bevs, supps, meds
Avoid binders
To provoke or not? If so, how?

- Do not fast more than physiological
- Morning of test ~
 - Collect first-morning's urine
 - Avoid food/water prior
 - Avoid exercise
 - Avoid intercourse
 - Avoid sauna and hot shower

56  Serum Mycotoxin Antibody

57  Serum Mycotoxin - Urine Mycotoxin LC-MS

58  Serum Mycotoxin Antibody

59  Serum Mycotoxin Antibody

60  Serum Mycotoxin Antibody

- "HPLC-MS/MS detection was used for the analysis of dried serum spots (DSS) and dried blood spots (DBS).
- Detection of aflatoxins (AFB1, AFB2, AFG1, AFG2, AFM1), trichothecenes (deoxynivalenol, DON; DON-3-glucuronic acid, DON-3-GlcA; T-2; HT-2; and HT-2-4-GlcA), fumonisin B1 (FB1), ochratoxins (OTA and its thermal degradation product 2'R-OTA; OT α ; 10- hydroxyochratoxin A, 10-OH-OTA), citrinin (CIT and its urinary metabolite dihydrocitrinone, DH-CIT), zearalenone and zearalanone (ZEN, ZAN), altenuene (ALT), alternariols (AOH; alternariol monomethyl ether, AME), enniatins (EnA, EnA1, EnB, EnB1) and beauvericin (Bea) was validated for two matrices, serum (DSS), and whole blood (DBS).

61  Serum Mycotoxin Antibody

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62  Serum Mycotoxin Antibody

- For most analytes, LOQs (limit of quantitation) in the lower pg/mL range and excellent recovery rate were achieved using matrix-matched calibration.
- Besides validation of the method, the analyte stability in DBS and DSS was also investigated. Stability is a main issue for some analytes when the dried samples are stored under common conditions at room temperature.
- This methodical study establishes a validated multi-mycotoxin approach for the detection of 27 mycotoxins and metabolites in dried blood/serum spots based on a fast sample preparation followed by sensitive HPLC-MS/MS analysis.

63 Serum Mycotoxin Antibody

- The use of capillary blood from finger-pricks versus venous blood was evaluated. The analyte levels correlate indicating that the less invasive finger-prick sampling gives also reliable results.
- No significant hematocrit effect was observed.
- In this experiment, finger-prick samples typically consist of about 90 μ L blood. Therefore spots of 75, 100 and 125 μ L blood were prepared and analyzed. Similar to the hematocrit effect, no considerable influence was observed.

64 Serum Mycotoxin Antibody

- "The results of this study revealed for the first time a high exposure of coffee consumers to 2'R-OTA, a compound formed from OTA during coffee roasting.
- Since little information is available regarding toxicity and possible carcinogenicity of this compound, further OTA monitoring in blood including 2'R-OTA is advisable."

65 Mycotoxin Testing - Yes? No? How?

- Above all, be mindful of cost ~
If you know it's mold, skip the test and tx
And/or consider methods validated/ins coverage ie: Neuroquant
- ELISA Urine ~
Immune deficient, able to detox, body burden, track tx
- LC-MS Urine ~
Immune deficient, able to detox, body burden, track tx, liv/kidney creatinine clearance
- Serum antibody ~
Excretion/detox-challenged, liv/kidney dz, IgE - is it a "now" issue?
- Be mindful of supplement use ~
Binders, glutathione, creatine
- To provoke or not? Depends more on your pt than agent

- OR...maybe use a clinical questionnaire

66 Shoemaker Highlights

67 Shoemaker ~ Diagnostic Indicators

- Visual Contrast Test at VCStest.com
Convergence disorder
L/R eye visual processing in brain+eye m impairment
- TGF- β 1 (transforming growth factor beta-1) \uparrow
Cytokine
 \uparrow impairs T-reg fxn \rightarrow immune overactivation/asthma
Range <2380 pg/ml
(Quest \rightarrow Cambridge Biomedical)
- MMP-9 (matrix metalloproteinase 9) \uparrow
Tissue repair enzyme induces I/S stim
Range ~ 85-332 ng/ml
Drs. Patel/Farshchian - link to MCAS
(Labcorp)

68 Shoemaker ~ Diagnostic Indicators

- ADH (vasopressin) \downarrow
Range ~ 1.0-13.3 pg/ml;
Test in conjunction with blood osmolality ~ 280-300 mosmol
- VIP (vasoactive intestinal polypeptide) \downarrow
Neuro and cardio-reg hormone with receptors in the hypothalamus
Range 23-63 pg/ml
- MSH (melanocyte stim hormone) \downarrow
Pituitary hormone w neurohormonal and anti-inflammatory actions
Range 35-81 pg/ml

69 Colonization, Allergy, Infection

70 Culture Nares

- 2" depth
- Pediatric swab
- Off all nasal tx for 3 days

- +MRSA/+MARCoNS common
- Consider false neg if positive urine mycotoxins
- Specific lab (MARCoNS)
-

71 Colonization

- Posterior Nasal Culture
 - Req posterior nasal wash
 - Fungus tenaciously adhered
 - Consider false neg if positive urine mycotoxins
 - PCR/DNA better yield
 - +MARCoNS
- Ophthalmology
 - Freq changing vision w sinus colonies (empirical exper)
- BDG (Fungitell) Quantitative (<60 pg/mL)
 - (1,3)-Beta-D-glucan
 - Invasive Fungal Infection (IFI)
 - Note: not present in Mucorales, Cryptococcus, Blastomyces
 - Note: false + if taking Beta-lactam antibiotic
- Galactomannan - (<0.5 index)
 - Less sensitive than BDG (81% vs 49%)
 - Charting tx of known Aspergillosis
 - BDG option if on Beta-lactams

72 Allergy

- Skin Testing
 - RAST limitations
 - Update ~ Intradermal Provocation Neutralization
 - Training req'd
 - Caution: ↑ potential of harm
 - Off all antihistamines* incl supp

73 Infection

- Swab
 - Oral, vaginal/groin, perianal, intertrigo

- Tissue sample
Skin, scalp, toenail
- Biopsy/culture
Culture
Tissue biopsy (sinus, lung) Varying yields
Flexible laryngoscopy ~ sinus
Transthoracic CT ~ fine needle aspirate lung nodules

74 **Advances In Imaging**

75 **Imaging**

- Sinus
 - X-ray
 - CT
- Chest
 - XRay
(may not be abn in pulm fibrosis→CT)
 - High-res CT
 - Fiberoptic bronchoscopy

76 **Imaging**

- Abdomen
 - Upper endoscopy
 - Colonoscopy
- Brain
 - MRI NeuroQuant
 - SPECT - volumetric

77 **First 3 Rules of Toxic Exposure**

78 **Review**

- Diagnostic Assessments
- Mycotoxin Discussion

- Shoemaker Panel Highlights
- Colonization, Allergy, Infection
- Advances In Imaging

79  **Thank You**

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-
-
- Dr. Jill Crista
- Naturopathic Doctor
- support@drchrista.com

1 **Are You Missing Mold Illness?**

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2 **Peel The Orange**

- Are You Missing Mold Illness In Your Patients?
- Dr. Jill Crista

3 **Peel The Orange**

- Avoidance
- Air Filtration
- Food ~ Do's & Dont's
- Beverage ~ Do's & Dont's
- Med/Supp Cautions
- Fundamentals
- Health Hokey Pokey
- Emunctories

4 **How Mold Makes Your Job Harder**

- "Sensitive" patients~minute doses
- Counter-intuitive reactions
- Detox organs~drug clearance
- Immune depletion~chronicity

- Inflammatory reactions
- Sm vessel vasculitis & coagulation abnormalities~remedy delivery
- Cardiac~fatigue
- Neuro~"mold brain"
- Sleep
- ∴ Don't/can't stick to tx plan
- AND spiritually/energetically depleted

5 **How Mold Makes Your Job Harder**

- RESISTANCE!!!
- The MOST resistant of all enviro med pts to accept the cause

6 **Peel The Orange**

- 1 AVOIDANCE~critical/hardest
- 2 FUNDAMENTALS~BTGs
- 3 PROTECT~mycotoxins/die-off
- 4 REPAIR~gene/cell/organ/system
- 5 FIGHT~last step

7 **First 3 Rules of Toxic Exposure**

8 **Avoidance ~ Easy To Say . . .**

9 **First 3 Rules of Toxic Exposure**

10 **Avoidances**

11 **Avoidance of WDB**

- The most difficult part of tx plan
- Sick, fatigued, cognitively impaired, financially strapped
- More questions about this than other parts of tx plan
- Build referral base
- Use online resources/guidance

12 **Get Out & Take Little With You**

- Relocate w open-ended duration

- Usu must leave possessions behind
- Mold toxic patients are the most resistant of all enviro toxic pts to accept that mold is the issue
- Jedi mind trick? neuroinflam?
- The key to my success?

13 **Relocation During Remediation**

- Occupational study - no resp sx improvement after remediation
- Possible contributing factors:
 - Fragment formation
 - Mycotoxin increase
 - Contamination
 - Internal Colonization
- All above!
- PMID: 21413053

14 **Counsel Against DIY**

- ...testing and remediation
- Mold gets more toxic when bugged
- Aspergillus exposed to amphotericin B ↑ Gliotoxin prod
- Too much addt'l toxin burden for already symptomatic pt
- Guaranteed way to have aggrav
- PMID: 15272057

15 **And What About Hobbies?**

- Baker
- Brewmaster
- Cheese connoisseur
- Somelier
- Antiquer
- Historian
- Mushroomer

- Rare book collector
- Love it? or beholden to it?
- *cannabis ~ storage issue

16 Air Filtration

17 STORY | C-PAP Dementia

- Late 70s F, concerned adult kids ~ mom's safety
- Beg signs of dementia, garage door open overnight
- Dev confusion, balance issues, req cane
- HTN, C-PAP for insomnia dt RLS
- Large historic home, "bad about dusting"
- Stopped using C-PAP bc forgetful
- Readded C-PAP, kids dusted, air filter in bedroom
- Husband's insomnia improved. Hers worsened.
- High anxiety, worry, forget where she is, night wandering
- Nap ok in recliner ~ too far from her C-PAP to use
- Tested C-PAP machine ~ high Aspergillus + endotoxins
- Wasn't maintaining adequate cleaning sched
- Replaced tubing, cleaned machine appropriately
- Dementia sx's improved to no longer an issue
- * * *

18 Air Filtration

- Ionizing:
- Sanitizing = ionized oxygen (O₂⁻)
- Not making ozone (O₃)
- Filters mycotoxins at 0.007 microns
- Filtration:
- HyperHEPA
- Ultrafine particles to 0.003 microns

- Traps mycotoxins
- Incineration:
 - In-home Incinerator
 - Incinerates at 400°F, removes 99% airborne microbiological contaminants

19  **Air Filtration**

- NOT a replacement for remediation!!!

20  **Food ~ Do's & Dont's**

21  **Avoidance Foods ~ First Tier**

- Sweets of any kind
 - Dried fruits
 - Leavened bread
 - Yeast
 - Simple carbohydrates
 - Baked goodies
 - Mushrooms
 - Corn
 - Potatoes
 - Pickles & pickled foods
 - Vinegar
 - Soy sauce
 - Cantaloupe
 - Grapes
 - Aged cheese
 - Moldy cheeses
 - Peanuts
 - Peanut butter

22  **Avoidance Foods ~ Second Tier**

- All fruit

- Starchy vegetables
- All grains
- Fermented foods
- Shelled nuts
- Condiments made w vinegar or sugar
- Sour cream
- Soured milk products
- Mass-produced cocoa*
- PMID: 5723973, 24287569

23 **Effects of Cooking**

- Netherlands study 2016
- Pasta infected with ~
Enniatin
Deoxynivalenol (DON)
(tricothecene aka vomitoxin)
- Cooked in duplicate on diff days, under stndized conditions, simulating house-hold preparation
- Tested post-cooking
- 83-100% enniatin retained
- 60% tricothecenes retained
- PMID: 27451245

24 **What To Eat?**

- Rainbow of color
- Veggies rule (veggies>fruit)
- Feed the guts
- Say yes to good fats
- Eat stinky foods
- Adequate protein

- Bioflavonoids (polyphenols)
Inhibition of NF-κB signaling
↓ expression of proinflam markers
- PMID: 21432698

25 **Protective Foods**

- Colorful vegs ~
Beets, artichoke, asparagus, radishes (liver)
Broccoli, Brussel sprouts (sulfurophanes)
Tomatoes (lycopene neutralizes mycotoxins)
Cabbage, okra (enterocytes, mucosa)
Celery, cucumber (kidney fluid balance)
Bitter greens (cholagogue) arugula, broccoli rabe, endive, watercress, kale, dandelion greens
- Colorful fruits (1 serving/d)
- Organic beef liver (choline)
- EFAs
Avocado, olive oil, fresh seeds/nuts (refrig), cage-free eggs, wild fish
- Yogurt (probiotics)
- Butter (butyrate enterocyte)
- Turmeric-curry (liver/kidney/brain anti-inflam)
- Bitter chocolate, artisanal (cholagogue)

26 **Mold Combat Foods/Spices**

- Eat stinky!
Garlic
Onions
Scallions
Chives
Leeks

- Use spices with wild abandon
 - Ginger (hepatoprotective)
 - Clove (mycotoxin neutralizer)
 - Cumin
 - Rosemary
 - Sage
 - Thyme
 - Oregano
 - Basil
 - Bay leaf
- PMID: 28475920

27 Beverage ~ Do's & Dont's

28 Avoidance Beverages

- ANY sweetened beverage
- Fruit juice
- Oolong and black tea
- Moldy coffee
- Mass-produced cocoa
- Alcoholic beverages
 - esp org wine/grain-based
- Fermented cider
- Kombucha*
- Fermented bev avoidance maybe LT
- PMID: 5723973, 24287569, 22372472, 29117141, 19610336

29 What To Drink?

- Spring water
RO w sea salt
bioplasma cell salts
colloidal trace minerals
- Green tea (polyphenols)
anti-inflam
hepatoprotective ~ aflatoxin
cytoprotective ~ fusarium
myoprotective ~ citrinin
glucuronidation ~ MPA
- Coffee
cholagogue
indep verified mycotoxin free
- PMID: 17195249, 23410590, 27539359

30 **Med/Supp Cautions**

31 **Supplement Cautions**

- Are actual fungus ~
Medicinal mushrooms
Nutritional yeast
Sacch B...? (more next)
- Grown on fungus ~
"Aspergillus-activated"
B-vitamins
Digestive enzymes
- Contaminated with mycotoxin ~
Red yeast rice ~ citrinin
Resveratrol
Bee propolis
- Companies that don't test for mycotoxin contamination

32 **Sacch B**

- Literature ~
In vitro 24-hr culture to prevent mycotox during yeast ferm/beer prod/feed additive
Min animal studies
↓ mycotoxin effect on Hgb
No control group/all got Sacch B
- What I see ~
Aggravations
Yeast "control" but incr body burden
Is yeast protective from biofilm?
- Take-away ~
Use it to rebal prn after solidly on antifungals
Use it to prevent C. Diff w ABs
- PMID: 15613821, 30721525

33 Probiotics

- Not "a given" w mold illness
- Gentrification
- Correlation w SIBO
- Empirically ~ start w greens
sm dose of probiotics in presence of chlorophyll

34 Probiotics

- L. plantarum C88/MON03 ~
source fermented tofu
adhesion of aflatoxin in lumen
upreg antiox enzymes
↑GST expression via Nrf2 pathway
protects CYP3A4
- L. rhamnosus GAF01~
binds aflatoxin in solution
counteracts RBC, WBC, lymph immunotox effects
- PMID: 28129335, 24738739, 23030351

35 Probiotics

- L. casei strain Shirota~
strain is imp!t!
some strains control vs cause histamine
source fermented dairy
hepatoprotective
chlorophyllin ↑ efficacy

- *Props Dr. Lauren Tessier ISEAI*
- PMID: 21816119

36 Medication Cautions

- Antibiotics ~
Some are literal mycotoxins
Penicillium~penicillin, amoxicillin
"allergic to penicillin"
Acremonium~cephalosporins
Actinomycetes/actinobacteria~ tetracyclines, macrolides, aminoglycosides, rifamycins
- Antivirals ~
Actinobacteria~Ivermectin
- Antifungals ~
↑aggressive when threatened
Incr mycotoxin formation
Die-off
- DO NOT d/c suppressive meds!

37 Fundamentals

38 Circadian Rhythm

- Wake within the same hour every day
- Go to sleep within the same hour every day
- Adjust sleep/wake time by seasonal variation in light
- Eat meals at nearly the same times every day. Aim to eat most of your food earlier in the day versus later.
- Exercise within the same hour every day—the earlier in the day the better
- Go to bed with a little room left in your tummy

- Allow time every morning for regular bowel evacuation. 10 min minimum. Schedule it.
- BACK TO NATURE, back to health.

39 Health Hokey Pokey

- Air in 🤔
- Air out 🌳
- Air moved all about 🚶
- Water in 💧
- Water out 🚽
- Water moved all about 🦸
- Food in 🥦
- Food out 💩
- Food moved all about 🌀

40 Emunctories

41 Emunctories

- Methods used to excrete waste
- Breath ~ caution contamination of self, others, and "stuff"
- Bowels ~ minimum 2 BMs/d
- Urine ~ caution ADH resistance
- Sweat ~ exercise, FIR Sauna
- Menses ~ clots
- Ejaculate ~ "allergic" to semen

42 Emunctories

- From outside in/large to small
- system → organ/gland → blood → ECM → cell → gene
- If can't exercise:
Lymphatic massage
Peat mud/peloid therapy (my fav!)

- To aid detox:
Frequency-specific microcurrent
COPs over the liver/gut
Acupuncture

43 **Review**

- Avoidance
- Air Filtration
- Food ~ Do's & Dont's
- Beverage ~ Do's & Dont's
- Med/Supp Cautions
- Fundamentals
- Health Hokey Pokey
- Emunctories

44 **Thank You**

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2 **Mycotoxins ~ Protect & Repair**

- Are You Missing Mold Illness In Your Patients?
- Dr. Jill Crista

3 **Mycotoxin Protect & Repair**

- Binders
- Homeopathy
- Physical Medicine
- Nutrients
- Botanical Champs
- Mycophenolic Acid
- Endotoxins

4 **Only Mycotoxins?**

- What about spores?
- Almost everything you do to Protect & Repair from mycotoxins treats spore-induced damage...
- ...BUT don't forget to Fight mold...
- ...otherwise eventually, the damage will be irreversible

5 **Peel The Orange**

- 1 AVOIDANCE
- 2 FUNDAMENTALS
- 3 PROTECT
- 4 REPAIR
- 5 FIGHT

6 **Essence of Protect**

- Prevention avoidance
- Mucosal linings (resp/GI/GU)
- Prevent intestinal absorption/bile recirc
- Organs of detoxification
- Lipophilic tissues (brain/nerve/eye)
- Gut/brain barriers
- Membranes cell/mito
- Immune suppression
- Genetic recoding
- Pre-emptive dosing

7 **Essence of Repair**

- Immune modulation (NK, T-cells)
- Inflammation (Nrf-2)
- Neuroinflammation
- Gut repair (epithelium, myenteric plexus)
- Restore detox pathways (glutathione)
- Mitochondrial repair
(core 'economic' recession reducing energy output/power to heal)
- Epigenetic expression, gene repair
- Limbic retraining (fear, biochem sickness behavior pattern reversal)
- Effects from meds (psych/LT steroids)

8 **Mycotoxin Review**

- Immunotoxic, neurotoxic, alimentary, dermatotoxic, nephrotoxic, hepatotoxic, hepatocarcinogenic, genotoxic, teratogenic, carcinogenic
- Reduced ciliary clearance due to small size
- Highly inflammatory to lung tissue
- Modified by multiple enzymes ~
Cyt P450s, glutathione S-transferases, UDP-glucuronosyltransferases, sulfur-transferases
- Deplete glutathione
- Nrf2 (“oxidant thermostat”) activation/depletion
- Cause mitochondrial damage
- Inhibit host defense
- Induce apoptosis of intestinal epithelial cells
- Induce bladder wall irritation/ulceration
- Some cross BBB and reduce its integrity
- Olfactory nerve to hippocampus, frontal lobe
- x-placenta, bioactivate in utero, found in breast milk
- PMID: 26474839, 27178040, 25449202, 12221236, 26600019

9 **Treatment Ideas**

- Not an exclusive list
- And based on my selection bias
- Encourage you to:
Understand mechanisms
Know your patient
Use your reasoning skills to match the remedy to your patient
Teach me & others as you learn

10 **Binders**

11 **A Treatise on Bile**

- A detergent, cleanses fat
- 1° fxn ~ emulsify fats
2° fxn ~ eliminate toxins

- 3° fxn ~ non-liver
- GI: ↑slgA, probiotic adherence, lipase, enterocytes
- Anti-apoptotic for neurodegen dz's
- Reduce prion conversion & neuronal loss
- Protects retinal cells
- ↓ER stress assoc w↑glucose in DM
ongoing studies re: anti-apoptosis ~ obesity, stroke, acute MI, spinal cord injury
- PMID: 24891994, 25972546

12 **A Treatise on Bile**

- Stimulated by secretin, which is stim'd by acidic chyme (hypochlorhydria)
- Produce ~1L/d, 95% water (dehydration)
- ~93% is recycled via hepatic portal vein (alcoholism/cirrhosis)
- 10:1 PC:cholesterol (methylation snps)
- Bile salts ~ bile acids conjugated by glycine & taurine
- Courier of detoxed/pkg'd mycotoxins in micelles

13 **Understanding Bile Emulsification**

- Amphipathic ~ hydrophobic/philic poles
Bile breaks up lipids to ↑exp to colonic lipase

14 **Bile & Binders**

- Lipase shown to degrade mycotoxins* (pancreatic insufficiency)
- Micelles transport contents to intestinal epithelium, unbind and resorb
- Occurs at terminal ileum (motility/SIBO)
- Excretes slgA & stim innate I/S in lumen
- Sequestered by "binders" to interrupt bile recirc
- Liver & bile duct forced to make new, clean bile IF nec components avail
- Adsorption = !! Weak bond !!
- PMID: 29686653

15 **Thoughts on Binders**

- What are we binding? Bile or toxin or both?
Bile-laden toxin - insoluble fiber
Mycotoxin contamination of food-toxin dependent
- Based on my selection bias ~
Over-emphasis on binders in tx
Biases vs data, dt lack of human studies
(incl myself!)
Mycotoxins are morphologically diff
Most studies in vitro
Done to find feed additives, not bioremediation of human bodies
Big Ag trying to convince us to use ag by-products (biomass) as binders
- Real solutions ~
Better building practices
Better farming/storage practices

16 Binder Cautions

- LT use → nutrient depletion
PC (membranes, <"snp rich")
Cholesterol (hormones, HDL:VLDL)
Fat-soluble nut's (CoQ, A, E, D, K)
Glycine (component of GSH, NTs)
Taurine (retina, CNS, osmoreg)
- Constipation ~ intestinal epithelial damage when bond breaks
- Necessary component of tx?
Or should focus be dilution?
Or both?

17 Pre-Binders

- Cholaretics ~
Stimulate production of bile in hepatocytes
Regulate metabolism of hepatocytes

- Cholagogues ~
Stimulate bile secretion & flow
↑sIgA
↑probiotic mucosal adherence
Trigger pancreatic lipase secretion
Protect against intestinal barrier bkdwn
by promoting enterocyte migration
via bile acids
- *AND both induce peristalsis
- Lipase ~ can supplement
- PMID: 29672156

18 "Cholagogues"

- Botanicals ~
Matricaria, Taraxacum, Inula, Solidago, Curcuma, Chelidonium, Gentiana, Ceanothus, Bitter orange peel e.o.
(usu mix w carminatives, demulcents)
- Forms ~
liquid > pill (open 1 cap in bottle)
tincture, glycerite, liposomal
- Bitters ~
5 drops on tongue 10-15 min ac
- Nutrients ~
Choline, taurine, glycine
- Bile salts ~
Cholecystectomy, cholelithiasis
200mg Ox bile extract with meals
Caution: bile duct blockage

19 Rx Cholagogue Options

- Ursodeoxycholic acid (Actigall, Ursodiol) ~
 - ↓absorption of chol
 - Rx'd to dissolve chol-based gallstones
 - First line alternative to surgery
 - Dose: 300mg bid-tid cc
 - S/E: GI upset
 - Cautions: bile duct blockage
- Tauroursodeoxycholic acid (TUDCA generic) ~
 - Taurine conjugate of ursodeoxycholic acid
 - Internationally avail
- Deoxycholic Acid (Kybella) ~
 - "For improvement in appearance of mod-severe fullness [from] submental fat."
 - Injectable to submentum, double chin
 - Thought question: clearing fat or toxin?
- Taurochenodeoxycholic acid, glycochenodeoxycholic acid ~
 - Bile salts currently only avail for research

20 ☐ Coffee Enema

- Concept ~
 - Induces bile release
 - Unique action on lacteals
- Overview ~
 - First trial with water enema
 - Tepid temp retention enema
 - Left-side lying <15 min
 - (Gerson says right-side)
 - Strengths vary ~ 1-3 Tbsp/quart distilled
- Cautions ~
 - Sensitive to caffeine
 - Colon/ileocecal valve laxity
 - Used as detox, not for daily use
 - Use only organic coffee
 - Some debate over bag material

21 ☐ Botanical Binders

- Advice for cholecystectomy pts ~
Steamed > raw veg bind more easily to bile acids
- Kale study (*in vitro) ~
Verified mycotoxin binder
Steamed > raw
Binding effect > lettuce, so not nec any greens will do
- Okra ~
Adsorption of chol (micelles?)
Flavonoid donor - the bigger contributor to efficacy?
Both effects stronger after superfine grinding
- Aloe ~ discussed later
- PMID: 30187492, 19083431, 26359588

22 Fiber Binders

- Insoluble fiber ~ proven toxin removers
- Rice bran fiber ~ high in insoluble fiber (Clean, Green & Lean; Dr. Walter Crinnion) 2-5gm/d
- Empirically ~
Best success with blends
Least→most constip ~
Flax
Chia
Rice
Oat
Psyllium
- Dose ~
Start low & go slow
1/8 tsp qd with largest meal
Titrate up to 2-5gm/day

23 Binders

- Activated charcoal ~
Trichothecenes adsorption
In vivo/pigs "superactivated" effective - all exposure routes (1985, Buck)
In vivo/pigs - no transfer to plasma detection when fed DON bolus
In vivo/chks - minimal benefit 21-day feed exp
Dose: 500-1000mg bid-tid
- Bentonite clay ~
Effective binder - aflatoxin enterosorbent
Human study - LT use didn't deplete A,E, most mins
Poss heavy metal contamination, incr strontium
- Zeolite ~
Aflatoxin - simulated GI in vitro
- Chlorella ~ mixed results
- On the horizon ~
Carbon-based nanomaterials (Graphene)
Polymeric nanoparticles
- PMID: 2590872, 25337799, 18569006, 9276881, 30469366, 30223519

24 **Taurine - A Binder?**

- Cytoprotective amino acid
- "Master osmolyte in the body" (IIVNTP)
- Plays an important role as a basic factor for maintaining cellular integrity homeostasis
- Nephroprotective, neuroprotective, retinal component
- Decreases OTA-induced cytotoxicity + attenuates apoptosis in kidney
- Blocks ROS-dependent autophagy via inhibiting AMPK/mTOR signaling pathway
- Acts as a "pre-binder"
If on a high fat diet (the dilute pollutants solution diet), taurine inhibits bile acid absorption in the colon.
-
- PMID: 32371067, 30332612, 19239159

25 **Rx Binders ~ Colesevelam**

- Rarely need to use IF...
Avoidance & Pre-Binders

- Welchol ~ generic avail
- Uses: hyperlipidemia, DM2
- Dose: 625mg tab, 2-3 po q12 hrs
With meals + plenty of liquid
Oral suspension avail for peds, but contains phenylalanine, caution PKU
Chewable bar: 3.75 g (1 bar) po qd (PKU)
- S/E: constip, dyspepsia, h/a, nasopharyngitis
- Interactions:
"Monitor closely" drugs for DM, warfarin, seizure
Impacts absorption of co-admin therapies - diuretics, CVD, Abx
- Admin 4 hrs prior to colesevelam:
Rxs w known intrxns/narrow therapeutic index
Fat-soluble vitamins
Oral HRT & contraception
- Pregnancy category: "no adequate and well-controlled studies of colesevelam HCl use in pregnant women"

26 Rx Binders ~ Cholestyramine

- Questran ~ generic avail
- *Compounded, excipient-free
- 4 gms of anhydrous cholestyramine resin in:
 - 9 gms of Questran powder
 - 5 gms Questran Light powder (PKU)
 Dosing based on resin not powder
- Dose: 4-8 gm po q12 hrs
Start at 2 gm qd and titrate
Not over 24 gms over 24 hours
CIRS 4 gm qid
- Admin 4 hrs prior to colesevelam:
Rxs w known intrxns/narrow therapeutic index
Fat-soluble vitamins
Oral HRT & contraception

- Uses, S/Es, Interactions, Cautions, Pregnancy risk ~ all the same as Colesevelam, plus:
 - (+) also binds endotoxins
 - (-) slight increased risk intestinal tumors, alimentary system cancers

27 Homeopathy

28 Nosodes & Isopathics

- Isopathy ~ "myco" formulas
 - Homeopathic prep of various mycotoxins
 - Esp useful for hypersensitive pts
 - Start - 1 drop in water daily
- Isopathy ~ "mold" formulas
 - Homeopathic prep of mold itself
 - Caution early in tx & if/when still exposed
- Nosode ~
 - Homeopathic prep of affected tissue
 - Consider for deep lung remodeling/asthma, bladder, brain, nerve plexus
- Homeopathic vasopressin ~
 - Tinnitus
 - PoTS
 - CHF w pulmonary HTN

29 Common Rubrics

- Anxiety ~
 - Mind, Anxiety/Restlessness, Dyspnea, in
 - Mind Forgetful/Confusion
 - Sleep, Sleeplessness, Liver complaints, during
- Allergy/Sinusitis/Asthma ~
 - Nose, Catarrh/Coryza, Extending to frontal sinuses
 - Nose, fullness, Sensation, from inflammation
 - Eye pain, Extending to frontal sinuses
 - Respiration, Difficult/Impeded
 - Respiration, Wheezing

- Skin ~
Skin, Eruptions, Eczema
Skin, Itching
- Liver ~
Abdomen, Liver, Affections of
Abdomen, Inflammation/Enlarged, Liver
- Bladder ~
Bladder, Pain, Burning/Stitching, Urination, before, during, after

30 **Physical Medicine**

31 **Physical Medicine**

- Topical castor oil
- Lymphatic massage
- Peloid therapy
- Frequency-Specific Microcurrent
- Sauna
- Cold laser*

32 **Topical Castor Oil**

- Application ~
Packs, rubs - *organic source
Timing varies 5-45 min
- MOA ~
Lymphagogue
Liver - lacteals
Upper cervicals -glymphatics
- Cautions/Reactions ~
Abd cramping, nausea, diarrhea
h/a

- PMID: 21168117

33 **Lymphatic Massage**

- Patient education ~
Different than deep tissue
Pressure of a nickel
Ok to stop to use bathroom
- Cautions ~
Cardiac insufficiency
All kidney diseases
Start with one limb and observe

34 **Peloid Therapy**

- Moor mud ~
"dirty water bath"
Kept liquid to retain enz activity
Source is critical for purity
- Concept ~
Nourishing detoxification
Exchange of enzymes/probiotics
- How to ~
Fill bath comfortably warm, temp will rise
Fully mush & mix mud into bath
Submerge up to 20 mins
Cool rinse <1min
Lie down loosely wrapped, no drafts
- Safe for septic ~
Not clay
Rinse down the drain, sponge wipe

35 **Peloid Therapy**

- Patient prep ~
Well hydrated
Empty stomach
If light-headed, ice on chest, get out
- Plan ahead ~
Ice pack near bath for first
Assistance getting out of bath
Lie down for 1 hour after
Copious sweating*
Hydrate - tepid electrolytes by bed
- Cautions ~
Open skin wound
Cardiac - hypotension, CHF
All kidney diseases, urolithiasis
Not while pregnant

36 Frequency-Specific Microcurrent

- Concept ~
Each tissue has unique, innate "beat"
Morbid influences derange tissue's beat
Restore innate beat via specific balancing/countering frequencies
Tissue-specific balancing
Morbid influence-specific countering
Tissue gets back on beat
- The art ~
Picking the right frequencies
- Cautions ~
Metal implants
Pace-maker
Any active cancer
Pregnancy
- *Different than TENS

37 Frequency-Specific Microcurrent

- Set-up ~
FSM machine - no contact with metal, wood/plastic ok
- Patient Prep ~
No contact with metal
No electronic devices
Remove watches, metal jewelry
Well hydrated
- Observe ~
Needed freq - sleepy, softening
- Tissue resistance ~
Towels not wet enough
Not the right freq
Right freq but need cofactors

38 Frequency-Specific Microcurrent

- *WAIT to use mold frequencies (23,95)
It's too much in the early phases
- Target Conditions ~ "A" frequencies
 - 9 Allergy reactions
 - 18 Hemorrhage, leaking
 - 40, 284 Inflammation
 - 87 Active toxins
 - 57, 920, 900* Toxicity
 - 115 Skin eruptions
 - 49 Vitality
-

39 Frequency-Specific Microcurrent

- Target tissues ~ "B" frequencies
 - 132 Mucous membrane
 - 25, 75 Sinuses
 - 44 Inner ear
 - 17 Lungs
 - 22 Small Intestine
 - 35 Liver
 - 23 Kidney
 - 37 Bladder
 - 21 Heart muscle
 - 396 Nerves
 - 116 Immune system
 - 985 Deep Limbic system
- Combinations ~
 - 880/7.4 Hypoxia
 - 40/00 General inflammation

40 Sauna

- Sweat content vs radiator effect
- Dry heat ~
 - Temp: 150-175°F / 75-100°C
 - Duration: 30-45 min
 - Follow w short, cold rinse <1min
- Far Infrared (FIR) ~
 - Temp: 125-130°F / 52-55°C
 - Duration: 25-30 min
 - Wrap up after until sweating stops, then rinse w short, cold <1min
- Cautions ~
 - Saunas that emit EMFs
 - Mold in sauna if steam used
 - Dehydration
 - HTN, CHF
 - All kidney diseases

41 Nutrients

42 Immune Modulation - Vitamin D3

- Role in both innate & adaptive immunity
 - T-cell regulator
 - Upregulates monocyte genes
- Vit D receptor in intestine & kidney significantly down-modulated after aflatoxin exp
- Promote LU tissue repair in *particle-induced pulmonary injury* ~
 - Repress TGF β 1 signaling pathway
 - Upreg MMP9 expression
 - Activation of Nrf2 transcription factor
- Dose ~ to lab levels
 - Goal 25-OH Vit D >60 ng/mL
 - Emulsified best, esp if cholecystectomy
 - Oral (daily-weekly), IM
- PMID: 30698894, 25483621, 25912039, 26404359,18569389

43 Mold Is A Big FAT Problem

- The solution to pollution is dilution!
- Mycotoxins are lipophilic
- ∴ dilute toxins with Copious Clean Correct fats

44 Mycotoxin Nutrients - DHA

- ω -3 fatty acid
- 1° structural component in brain
- Neuroprotective
- Protects against aflatoxin-induced hepatocellular carcinoma
- Attenuates mycotoxin-induced IgA nephropathy
- Suppresses MMP-9
- Potentiates effects of cerebral VEGF-repair BBB
- Dose ~
 - Acute/rescue: 6-10gm/d
 - Chronic: 2gm/d

- Mouse study - 30g/kg safe w no AE
Translation to humans? Empirically 10gm/d safe LT
- PMID: 27513579, 27435775, 15570035, 24794156

45 **Mycotoxin Nutrients - EFAs**

- Multiple biochem fxns ~
Synthesis of inflammatory mediators
Cell membrane fluidity
Intracellular signaling
Gene expression
- Modulate aspects of inflam, immunity, cell growth and tissue repair
- CNS inflam modulation ~
Direct impact on neuronal membrane fluidity and receptor fxn
- Restore mitochondrial function
- Dose: 1gm/d mixed EFAs: EPA (350mg), DHA (300mg), 6's: GLA (100mg), 9's: OA (150mg)
- PMID: 27651257, 22248591

46 **Mycotoxin Nutrients - Phospholipids**

- Phosphatidyl choline/serine ~
Lipid raft constituent (cell/mito)
Membrane stability/integrity
Major component of pulmonary surfactant
Bile component
- Optimal PC membrane ratio→
Inhibits cell proliferation
Induction of apoptosis
Implications for cancer promotion
- Fumosinin ↓PC ratio of hepatocyte lipid rafts
- Stachybotrys "spore extract" alters surfactant-related phospholipid synthesis

- Dose ~
Oral liposomal 1-3gms daily
Lipid Resuscitation (Dr. Rea)
PTC-IV
Patricia Kane protocol
- PMID: 15574675, 29510220

47 **Mycotoxin Nutrients - Bioflavonoids**

- Pigmenting plant compounds with wide ranging biological & pharmacological actions
- Cytoprotective via Nrf2, ↓TGF-β1
- Protective against Aflatoxin-induced cell injury
- Counteract Ochratoxin-induced toxic ox stress on renal cells
- Preserve GSH, SOD after Ochra exp
- Daily Dose ~
Eat 5-7 servings of colorful vegs
NO SUPP TOPS REAL FOOD
- PMID: 27279697, 26798045, 17195249, 26571153

48 **Mycotoxin Nutrients - Quercetin**

- Polyphenolic compound
- Potent antiox, anti-inflam, antigenotoxic
- Pretreatment before mycotoxin exp cytoprotective
- Modulates Ochratoxin-induced ox stress via Nrf2 expression, NF-kB and COX-2
- Protects peripheral blood PMNs from OTA-induced ox stress, genotoxicity & inflam
- Reduces Alternaria mycotoxin damage to human adenocarcinoma cells
- Protects cells from Zearalenone-induced (Fusarium) apoptosis
- Dose: 300-600mg bid-tid, consider liposomal
- PMID: 24161694, 25532488, 26802676, 26134454

49 **Mycotoxin Nutrients - Lycopene**

- "Vitamin Red" - carotenoid
- Protection against Aflatoxin-induced nephrotoxicity and cardiotoxicity

- ↓Aflatoxin-induced kidney lesions via attenuation of ox stress, GSH
- Restores trace element levels in ochratoxin-exposed rats
- Pretreatment preserves Nrf2+ downstream target gene translation/protein expression
- Dose ~
5mg/kg/day x 15d in rat myco study. Humans?
Dose-response study 30mg/d x 8 weeks
Signif ↓ DNA damage (p = 0.007)
Signif ↓ urinary 8-OHdG (ox stress biomarker)
- PMID: 30059796, 28665799, 30462120, 18689558

50 **Mycotoxin Nutrients - Melatonin**

- BioFlavonoids
- Pigmenting plant compounds with wide ranging biological and pharmacological actions.
- Cytoprotective via Nrf2.
- Protective against Aflatoxin-induced cell injury.
- Dose: Eat colorful plants! Drink green tea.
- PMID: 27279697, 26798045, 17195249

51 **Mycotoxin Nutrients - CoQ10**

- BioFlavonoids
- Pigmenting plant compounds with wide ranging biological and pharmacological actions.
- Cytoprotective via Nrf2.
- Protective against Aflatoxin-induced cell injury.
- Dose: Eat colorful plants! Drink green tea.
- PMID: 27279697, 26798045, 17195249

52 **Mycotoxin Nutrients - Vitamin E**

- Tocopherols/tocotrienols
- Hepatoprotective, nephroprotective
- Cytoprotective against Trichothecenes
- Attenuates Aflatoxin-induced toxicity & ox stress
- Preservation of renal cell viability & tight junctions

- Preservation of G6PD *IVC implications
- Protective effect on hepatocytes not seen with alpha-tocopherol alone
- Dose ~
Mixed tocopherols/tocotrienols
400mg qd-bid
- PMID: 29068590, 28251704, 9266532, 16008110

53 **Mycotoxin Nutrients - Alpha-Lipoic Acid**

- Hepatoprotective, anti-inflammatory, genoprotective
- Engages molecular mechanisms against liver oxidative damage & inflam responses after aflatoxin exp
- Inhibits NF-κB expression after aflatoxin exp
- Alleviates Aflatoxin-induced ox stress & immune changes
- Modulates inflam response partly through changes in the expression of proinflam cytokines such as IL6 and TNFα
- Dose ~
Oral 300mg bid, R+ allele
Take with food reduces reflux SE
Also consider IV administration
- PMID: 26694462, 24699046, 20390578

54 **Mycotoxin Nutrients - Selenium**

- Protective effects on aflatoxin-induced mitochondrial permeability and DNA damage
- Protects against T-2 toxin-induced cytotoxicity and oxidative stress
- Exhibited protective effects on aflatoxin-induced kidney toxicity
- Critical component of glutathione-peroxidase enzyme
- Supp as Selenomethionine
Activated w yeast, test myco-free
- Dose: 200mcg bid
- PMID: 25431300, 26371027, 30261313

55 **One Antioxidant To Rule Them All**

56 **Glutathione**

- Pros ~
 - Straight to the end game
 - Brain fog
 - Lung function
 - Kidney sparing
- Cons ~
 - Too intense for many
 - Cofactor/coenzyme depletion
- Dosing ~
 - Form matters & is very individual
 - Start low & titrate
 - Dose to lab values
 - Schedule - debate daily vs pulsed
- PMID: 1676780, 10852775

57 **Glutathione**

- Oral ~
 - Liposomal only*
 - Dose 210-420mg qd-bid
 - Caution - tastes like rotten eggs
- Nebulized ~
 - Compounding pharmacy
 - Idiopathic Pulm Fibrosis study
 - 600mg bid x 3d
 - Best responses 600mg qd or greater
- Freq - begin 1-2x/week for 4-6 weeks, working towards a maintenance treatment plan of 1-2x/mo
- Caution - active asthmatic, can increase bronchoconstriction
- PMID: 1676780, 10852775

58 **Glutathione**

- Rectal suppositories ~
Bypass first-pass effect
Target brain, lung (asthmatic)
Prev radiated renal CA
"Skin lightening"
- Pharmacokinetics ~
Hydrolysis in the ECM
2 metabolites: γ -glutamylcysteine, glycine
- Dose ~
225, 450, 500, 1500mg per suppository
Up to 2000mg liposomal - skin
Add NAC, taurine, C
Start low, hs x 14d, then pulse 2-3x/wk
- Cautions ~
Rectal irritation
Easily dose too high
Ship on ice
- PMID: 11409324

59 **Glutathione**

- Intravenous Push ~
Most direct delivery to liver/kidney
'May deactivate Gliotoxin' per research
Amelioration of resp sx's noted as incidental finding - Parkinson's study
- Caution ~
Sulfite sens, nasal swab before IV admin
Don't mix w other nut's in same bag
- Lower dose~
5cc of 200mg in 10cc HNS; total 1000mg
- Higher dose ~
6.5cc of 300mg in 23.5 HNS; total~2000mg
- Up to 3000mg given safely
- Push rate ~ 1mL/30 seconds

- S/E ~
light-headed, nausea, diarrhea, anxiety
- PMID: 1676780, 10852775

60 Which To Choose?

- Use all for greater effect?
- No!
- Burdened systems
- Start w food, fill in cracks
- Treat specific deficiencies/sxs

61 Botanical Champs

62 Mycotoxin Botanicals - Milk Thistle

- Silybum marinarum (silymarin, silybinin)
- Strengthens & stabilizes cell membranes
- Blocks penetration into hepatocytes
- Protects from free rad ox by ↑SOD enzyme activity & intracellular glutathione
- Inhibits synth of prostaglandins assoc w lipid peroxidation
- Promotes regen of liver via stim of protein synthesis
- Significant reduction in liver-related mortality
- Amel of Ochratoxin-induced immunotoxic effects
- ↓genotoxic effect of Aflatoxin w pre- and simultaneous exposure
- PMID: 23243923, 22734832, 20032005, 19156713, 19841158, 19303273

63 Mycotoxin Botanicals - Milk Thistle

- Dose ~
Min therapeutic-700mg, up to 1500mg seed powder/extract, best divided
<2.1 gms/day in Hep C study well tolerated w no AE
- Cautions ~
Inhibits cytP450*
- *A heme-based enzyme!
So already impaired by mold

- PMID: 23243923, 22734832, 20032005, 19156713, 19841158, 19303273

64 **Mycotoxin Botanicals - Green Tea**

- Camellia sinensis
- Polyphenols ~ postharvest inactivation of phenol oxidases via steaming & drying prevents ox of catechins vs fermented tea prods
- Antifungal, antibacterial, antiviral, antitoxin
- Protective against aflatoxin-induced cell injury
- Protects against ochratoxin-induced cytotoxicity in kidney
- Cytoprotective to macrophages against DON (Fusarium) in a dose-response manner
- Daily Dose ~
4-6 cups green tea
Double steep to extract polyphenols
- Cautions ~ cytp450 inhibitor
- PMID: 23410590, 23605930, 17195249, 17548142, 27518169

65 

66 **Mycotoxin Botanicals - Turmeric**

- Curcuma longa
- Antioxidant, hepatoprotective, nephroprotective, epigenetic protection
- Amel of aflatoxin-induced effects via ~
Up-reg of antiox enzyme gene expression
Activation of the expressed genes
Increase in the availability of GSH
- Provides protection against toxic effects of aflatoxin on liver & kidney
- In study on chickens, protective dose was 5mg/kg, translational dose?
- Dose: 350mg qd-tid, start low, titrate slowly
- Cautions: inhibits cytp450
- PMID: 25639897, 26450181

67 **Mycotoxin Botanicals - Artichoke**

- Cynara scolymus
- Polyphenol-rich antiox, hepatoprotective, nephroprotective, immunoprotective, prevents lipid peroxidation, choleric
- Reduces N/V, flatulence, abd pn
- Prevents swelling & granular degen in epithelium (more than skin - eyes, organ coverings/linings, etc)
- Genoprotective to endothelium via eNOS (antithrombotic, anti-atherosclerotic)
- Protects against mycotoxin-induced oncogenic effects in liver & kidney (angiogenesis & mononuclear cell proliferation)
- Prevents ochratoxin-induced degen changes & depletion of lymphoid cells in lymphoid organs (thymus, spleen)
- PMID: 9194411, 15123766, 15609872, 12738088

68 Mycotoxin Botanicals - Artichoke

- Cynara scolymus
- Dose ~
500-750 leaf extract bid-tid (extract highest in phenolics)
- Cautions ~
Mixed activity on cytp450 (in vitro slight inhib CYP3A4, GGT, GPX2, GSR and GST, mild stim CYP1A2)
- SOURCE: LOHR, Gesine; DETERS, Alexandra and HENSEL, Andreas. In vitro investigations of Cynara scolymus L. extract on cell physiology of HepG2 liver cells. Braz. J. Pharm. Sci. [online]. 2009, vol.45, n.2 [cited 2019-07-07], pp.201-208. Available from: <http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1984-82502009000200003&lng=en&nrm=iso>. ISSN 2175-9790. <http://dx.doi.org/10.1590/S1984-82502009000200003>.

69 Mycotoxin Botanicals

- Would any "liver herb" do?
- Maybe!
- Limited budget/supply
- Consider ~
Taraxacum
Arctium
Rumex
Raphenus
Corydalis

70 **Mycotoxin Botanicals - Resveratrol**

- Nrf2 restorative, nephroprotective, neuroprotective, anti-oxidant, reduces TGF- β 1
- Anti-cancer effect on Ochratoxin affected cells
- Dose: Repeated daily doses of 1g/d trans-resveratrol yielded the desired plasma concentration 25microM
- 150mg extract trans-resveratrol = 60 bottles red wine
- Caution: Most Resveratrol extracted by fermenting Japanese Knotweed (plant source) *with Aspergillus*
- Better to take Japanese Knotweed?
- PMID: 26095584, 24089405, 30901941

71 **Mycotoxin Botanicals - Japanese Knotweed**

- Polygonum cuspidatum
- Tenacious 'invasive' hedge row plant
- Potent anti-oxidant, antimicrobial, antiinflammatory, neuroprotective, multiple CV benefits
- Dose ~
CVD clinical trial 5.33mg/kg extract
Alcohol tincture - 1tsp tid
- Cautions ~
Resveratrol & Japanese knotweed inhibit cytp450
- PMID: 24956862, 26968677

72 **Mycotoxin Botanicals - Aloe**

- Aloe vera barbedensis (*usu)
- Anti-inflam to mucosa
- Boosts humoral immunity
- Adsorptive binding of aflatoxin

- Dose ~
Low daily dose most effective vs “chase the burn”
- *Note: earthworms (*Alma millsoni*) matched aloe’s efficacy, plus helps anemia, biofilm
- PMID: 26648773, 30469366

73 **Mycotoxin Botanicals - Chromolaena**

- *Chromolaena odorata* (synonym *Eupatorium odoratum* L.)
- East-Asia/Africa as nature’s wound healer, historical use for gastric ulcers
- Antipyretic, analgesic, antimicrobial, hemostatic
- Anti-ox & anti-inflam against aflatoxin-induced alterations in pro-inflam cytokines
- Mitigated rise in serum IL-1 β , correlated with hemorrhages of intestines & liver
- Reduced intestinal leukocytic & lymphocytic infiltration induced by aflatoxin exp
- Protects against epithelial apoptosis
- Suppresses MMP-9
- Dose ~
Tea 1/2 cup bid. Tincture 10-15 drops bid.
- Caution ~ liver damage in high doses (pyrrolizidine alkaloids), photophobia
- PMID: 26798045, 23984087, 23535395, 28112383

74 **Mycotoxin Botanicals - CBD**

- CBD (Cannabinadiol) Oil:
 - .
 - EFAs:
 - dose
 - Botanicals:
 - *Stephania*, jap knot weed?
 -
 -
 - PMC

75 **Mycotoxin Botanicals - Hawthorn**

- Crataegus spp (oxyacantha*)
- Cardiotonic MOA ~
 - +inotropic/-chronotropic
 - ↑ coronary blood flow and exercise tolerance
 - Enzyme inhibition (ACE + phosphodiesterase)
 - Anti-inflamm, improves status of antiox enzymes
 - Antihyperlipidemic effects
- Est cardiac uses ~
 - CHF Stages I&II-NY HT Assoc classification
 - Angina pectoris, HTN w myocardial insuff,
 - mild alt's of cardiac rhythm, atherosclerosis
- Hepatoprotective ~
 - Reduces elev liver enz + ox stress on liver
 - Improves NAFLD
- Attenuates airway inflam by modulation of MMP-9 induced asthma
- Dose ~
 - Active sx: 1000mg qid
 - Maintenance: 500mg bid
 - Solid extract - 1/2-1 tsp bid-qid
 - Tincture 4:1 - 1 tsp tid-qid
- PMID: 27655074, 30058501, 29719880, 23029210

76 Mycotoxins - Bee Pollen

- Protects against immunotoxicological aspects of Aflatoxin ~
 - Restores normal neut/lymphocyte ratio
 - ↑neutrophil phagocytic activity
 - ↑lymphocyte proliferative capacity
 - Induced lymphocytic hyperplasia after Aflatoxin-induced lymphocyte depletion
- Helps maintain protein and globulin levels during Aflatoxin exposure
- Increases glutathione

- Cautions ~
Commonly contains mycotoxins
Ask for independent testing
Sustainability issues
- Dose: 500mg qd-bid
- PMID: 26930797

77 **Mycophenolic Acid**

78 **MPA - Mycophenolic Acid**

- Quickly absorbed & excreted in bile within first few hours of exp so use small freq doses
- Intestinal lining damage
- Phenolic substances detoxed/excreted in Phase II as glucuronides
- Tx focus on glucuronidation
- EGCG from green tea ~
500mg bid green tea (~75%EGCG)
- Calcium-D-glucarate ~
150mg qd-bid
- Curcumin, Quercetin, Resveratrol
- Don't forget co-factors/substrates (grape seed extract, glutathione)
- PMID: 21049395

79 **Endotoxins**

80 **Endotoxins**

- Smilax glabra (Sarsaparilla) ~
Anti-inflam polysaccharides
Signif ↓NO, TNF-α, IL-6 via:
-suppression of release from
LPS-induced macrophages
-downreg mRNA expression
Effect not observed w isolated extracts
∴ use whole root
Dose: whole root extract-100mg cc
"Tincture forte" 1:2/1:3 - 1/2 tsp cc

- Green tea ~
protection against virulent bacterial protein toxins
- PMID: 25817687, 25569518, 17195249

81 **Review**

- Binders
- Homeopathy
- Physical Medicine
- Nutrients
- Botanicals
- Mycophenolic Acid
- Endotoxins

82 **Thank You**

-
-
-
- Dr. Jill Crista
- Naturopathic Doctor
- support@drchrista.com

1 **Are You Missing Mold Illness?**

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2 **Fight**

- Are You Missing Mold Illness In Your Patients?
- Dr. Jill Crista

3 **Fight**

- Fighting Spirit
- Systemic Antifungals
- Herb-Rx Combinations
- Intranasal Antifungals
- Essential Oils & Hydrosols
- Ozone
- Intranasal Biofilm
- Topical Antifungals
- Pregnancy & Ped's

4 **Fighting Spirit**

5 **Energetics of the Moldie**

- Conquer mold first on the inside
- Energetic trend - unsafe/involuting

- Fill with light
- Guide mold to compost pile
- Thank and release it

6 **First 3 Rules of Toxic Exposure**

7 **Systemic Antifungals**

8 **Peel The Orange**

- 1 AVOIDANCE
- 2 FUNDAMENTALS
- 3 PROTECT
- 4 REPAIR
- 5 FIGHT

9 **Systemic + Intranasal Antifungals**

- Reduces recalcitrance
- Reduces drug resistance
- Systemic treatment factors ~
 - Health status of patient
 - Infection vs colonization
 - Location
- Botanical medicines can offer effective but less harmful systemic treatment options
- BUT don't be afraid to combine

10 **Yeast vs Mold**

- Do antifungal tx's work for mold?
- Fungal burden
- Many/most ~ yeast biofilm
- ↑mycotoxin production

11 **Botanical Antifungals - Holy Basil**

- Ocimum sanctum/basilicum
- Ayurvedic - Tulsi, taken traditionally as tea
- Antifungal, antibiotic, antioxidant, antiparasitic

- Affinity for lungs & mind*
- Signif inhibited cell adhesion/invasion
- Shown to detox aflatoxin
- Signif inhibited activities of MMP-9
- Action against fluconazole resistance
- Dose ~
Tea: 4 cups daily
Steep covered to retain e.o.'s
Extract: 550mg leaf extract qd-bid
- PMID: 20233602, 27471501, 20161958, 27274752

12 **Botanical Antifungals - Pau D'Arco**

- Hydroanthus impetiginous/Tabebuia spp
- Central/S. America forest tree known as lapacho
- Taheebo tea - traditional tea from inner bark
- Antifungal ~ MICs similar to those of amphotericin B
- Antimicrobial ~ activity against MRSA
- Immunomodulator, antitumor, adaptogen
- Expectorant to deeply embedded mucous & contaminants
- Not cytotoxic to normal cells at concentrations that were active against fungi and bacteria
- Dose ~
Tea: 2-4 cups, simmer 10 min
Capsule: 1gm qd-bid
Tincture: 1 tsp bid-qid
- *Avoid during pregnancy
- PMID: 9517956, 23778660, 16553949

13 **Botanical Antifungals - Thyme**

- Thymus vulgaris
- Reliable broad-spectrum antifungal, antibacterial
- Down-reg effect on growth, gene expr in Fusarium

- Action against fluconazole resistance
(*A. fumigatus*, *Trichophyton rubrum*/athlete's foot, *Candida* spp)
Effective against both the macro and arthroconidia growth (MIC 72 µg/mL) in fluconazole-resistant fungi
>80% reduction in elastase activity
- Inhibitory effects on Aflatoxin prod found at lower doses than required for antifungal activity
- High safety profile - nontoxic even up to concentration 2x higher than their respective MFCs
- Dose ~
Capsule (oil extract) - up to 50mg bid
Tincture - 1/4-1/2 tsp bid-tid
Essential oil - 10 drops in water, per 24 hours
- PMID: 25466118, 28062283, 25242937, 31359292

14 Botanical Antifungals - Garlic

- *Allium sativum*
- Bioactive sulfur-containing compounds (allicin, alliin)
- Antifungal - *Aspergillus* & *Penicillium* species
Mouse study-Efficacy against *Candida* slightly less than fluconazole (fungal burden reduction, host survival time at 1mg/kg/d)
- Ethanol prep effective against MDR candida (fluconazole, clotrimazole, Amphotericin B, itraconazole, ketoconazole, miconazole, nystatin)
- Antimicrobial - *Staph aureus*, *E coli*, *Pseudomonas*, *Bacillus*
- Antiox, anti-inflam, immunomod, CV protective, anticancer, hepatoprotective, nephroprotective, neuroprotective, GI protective, anti-diabetic, anti-obesity
- Dose ~
Eat it! Goal 4 cloves daily
Tincture: 1/8-1/4 tsp bid-tid
- Cautions ~
Gastritis
Co-admin with antithrombotics (delays aPTT)
- PMID: 27259073, 31284512, 30345234, 28584446, 30319862

15 Botanical Antifungals - Neem

- *Azadirachta indica*

- Antifungal - Aspergillus spp, Candida, Microsporium
- Antimicrobial, antiviral, antiparasitic (malaria/Babesia)
- Ethanol prep effective against MDR candida (fluconazole, clotrimazole, Amphotericin B, itraconazole, ketoconazole, miconazole, nystatin)
- Antiox, anti-inflam, immunomod, hepato/nephroprotective, neuroprotective, antidiabetic, anticancer, vulnerary
- ↓ Nf-kB, VEGF, c-Myc(oncogene)
- Dose ~
Capsules: 500mg qd-bid, pulsed
Tincture: 1tsp qd-bid
Use whole plant, nimonol extract alone not effective
- Cautions ~
"Strong" antifungal
Nontoxic at low doses, poss lymphocyte suppression at high doses (in vitro)
- PMID: 28584446, 27034694, 24031718, 26491309

16 Botanical Antifungals - Olive Leaf

- Olea europaea, O. africana
- Oleuropein - biophenol, bitter
- Antifungal, antiviral, antibacterial
- Antifungal ~
Potency against Aspergillus niger, A. fumigatus
(MIC: 12.5-25 mg/ml)
Activity against Candida albicans (MIC of 24 mg/ml, MFC of 48 mg/ml)
- Antiox ~
Radical scavenging activity >2x that of Green tea
- Anti-inflam, immunomodulatory, anticonvulsant, gastroprotective, cardioprotective, hypocholesterolemic, hypoglycemic
- Antiviral - virucidal effect in dose-dep manner (VHSV, rotavirus) so consider for concom EBV
- Mild activity against Pseudomonas aeruginosa
- Dose ~
Extract/tincture most effective
500mg bid-qid

- PMID: 28681004, 28681003, 27383889, 26577343, 25802541, 15869811, 30897691

17 Botanical Antifungals - Oil of Oregano

- Origanum vulgare
- Volatile oil extract
- Antifungal - Candida spp, Aspergillus, Penicillium
- Antimycotoxic - Aflatoxin
- Antibiotic - E.Coli, Staph aureus, Enterococcus
- Antioxidant, antiproliferative
- Combine safely w fluconazole & cipro ~
 - ↓drug resistance
 - ↓free-rad formation+S/E
- Dose ~
 - 150mg of 10:1 extract (equiv to 1500mg oregano)
- Cautions ~
 - Dyspepsia (tx's & causes)
- PMID: 27222835, 28176439, 29402621, 29846575, 29987237, 25364204, 25952773

18 Botanical Antifungals - Old Man's Beard

- Usnea spp
- Lichen
- Antifungal - Aspergillus, Trichophyton rubrum, Candida spp
- Antibacterial - Staph aureus
- Antiviral, anticancer, antiox, anti-inflam, antithrombosis
- Dose ~
 - Tea: 2 Tbsp C/S in 2-3 c boiled water daily
 - Tincture: 1/2-1 tsp qd-tid, pulsed x 3-5 days

- Cautions ~
Poss hepatotoxicity if LT use of isolated extracts
2001-liver tox assoc w LipoKinetix supp
Usnea blamed
2008-"At present, a toxicological evaluation of usnic acid is being conducted by the Nat'l Toxicology Program"
Results still pending? Yet patent pending for CA tx
- PMID: 30676068, 27186821, 29718734, 23713280, 19034791

19 Systemic Antifungals - Triazoles

- Fluconazole, Itraconazole, Voriconazole, Posaconazole, Isavuconazole
 - Available oral and IV
 - Tolerated reasonably well but there are AE
 - Documented success with clinical infections (invasive aspergillosis)
- Above courtesy of Dr. Joseph Brewer
- Pros ~
Favorable safety profiles
- Cons ~
Spectrum of activity somewhat limited
Increasing resistance

20 Systemic Antifungals

- Fluconazole ~ (Diflucan)
Fungistatic w dose-dep fungicidal activity
Candida albicans, Cryptococcus neoformans
Dose: 100-200mg qd
200mg Day 1, then 100mg x 14d
S/E: diarrhea, h/a, QT prolongation
Cautions: potent inhibitor cytP450
-
- PMID: 29393017, 16278744

21 Systemic Antifungals

- Itraconazole ~ (Sporanox, Onmel, Tolsura)
Most effective against Aspergillus & resistant Candida strains
Blastomycosis, pulmonary + extrapulmonary
Histoplasmosis, incl chronic cavitary pulmonary dz and disseminated, non-meningeal histoplasmosis
Expensive!
Dose: 200mg qd-bid x
Loading dose common 200mg tid
S/E: diarrhea, h/a, QT prolongation, hepatotoxicity
Cautions: CI in pregnancy, inhibits cytP450
- PMID: 29393017, 16278744

22 Systemic Antifungals

- Voriconazole ~
Structure related to Fluconazole
Spectrum of activity comparable to Itraconazole
Invasive aspergillosis
Refractory Scedosporium apiospermum & Fusarium spp
Dose: 200mg q12h, ic
Duration: min 14d + for at least 7d following resolution of sx
S/E: N/V, h/a, QT prolongation, hepatotoxicity
Cautions: inhibits cytP450, many Rx-Rx interactions, CI in pregnancy
- PMID: 19029318

23 Systemic Antifungals

- Nystatin ~
Fungistatic
Cutaneous/mucocutaneous Candidal infxns
Not absorbed systemically
- Dose: Oral tablets: 500,000-1,000,000 units every 8 hours until infxn clears+48h
- S/E: N/V, diarrhea, ab pn
- *Use w caution in pregnancy

24 Systemic Antifungals

- Ecchinocandins ~
Micafungin, Caspofungin
 - IV only
 - Generally well tolerated
 - Documented success with clinical infections
- Above courtesy of Dr. Joseph Brewer
- Amphotericin B ~
 - IV only
 - Fungistatic
 - Tx of progressive and potentially life-threatening fungal infxns
 - High incidence of toxicity

25 **Herb-Rx Antifungal Combos**

26 **Herb-Rx Antifungal Combos**

- Herbs to reduce Rx resistance ~
 - Holy Basil
 - Thyme
 - Garlic
 - Neem
 - Oil of Oregano
- Choose at least 1 of these and combine w other botanical antifungals for best efficacy

27 **How Long To Tx?**

- Until ALL of the following:
 - Nasal treatment is complete
 - Resolution of sx's*
 - Negative mycotoxins
- Fungi are tenacious!
- Fumes can restart the issue

28 **Herb-Rx Antifungal Combo Example**

- Step 1:
Thyme tincture ~
Loading dose x 1 week before Rx
1 tsp tincture bid
- Step 2:
Add pulsed Fluconazole ~
200mg x 3d/wk
- Step 3:
Add pulsed antifungal botanical on alt days (ie Pau D'Arco)
- Step 4:
Finish with botanicals x 1 addtnl mo
Thyme tincture ~ 1 tsp qd
Pau D'Arco ~ 500mg caps qd-bid

29 Intranasal Antifungals

30 Sinus Treatment

- 6mo's MINIMUM - diff compliance
- SIG min qd, up to qid
- Treat both nostrils
- Prevent swallowing w positioning
- Rinse mouth with water after use
- Warn epistaxis common, esp when add chelating agent
- Temporarily d/c chelator if severe nasal reactions
- Test mycotoxins at 3mo's. If no ↓ in mycotoxins, change Rx

31 Sinus Treatment

- Devices ~
- Hand-held atomizing nasal device
- Nasal ("vertical") sprays
- Neti pots
- Clean device/tip after each use with essential oils to prevent biofilm
- Use 15% H2O2 or blend of essential oils:

- E.O. Sterilizer Solution - 15 drops each of 3-4 e.o. in 1 oz purified water. Spray after each use. Air dry.

32 **DIY Sinus Treatments**

- Essential oils*
- Ozone*
- NAC*
- Xylitol
- Probiotics - open cap & snuff
- Manuka honey - 1/16-1/8 tsp per 100mL
- Propolis
- Colloidal silver
- Lauricidin/monolaurin - 10% solution
- Allicin - 8 drops in 100mL
- CYA - mix with sterile water ONLY
(per pharmacist)
- PMID: 24999540,

33 **Intranasal Antifungal Rx Combos**

- Amphotericin B (5mg)/3mL sterile water (NOT saline)
- Levofloxacin(100mg)+Itraconazole(40mg)+Budesonide(0.6mg)/5ml saline
- Ceftriaxone(500mg)+Itraconazole(40mg)+Budesonide(0.6mg)/5ml saline
- Nystatin(50,000IU)/10mL saline bid (per Dr. Brewer-reduced AE)
- Nystatin(50,000IU)+Tobramycin(100mg)/10mL (Klebsiella)
- Tobramycin(100mg)+Fluticasone(3mg)/10mL saline
- *NOTE: Off-label use of above med's*

34 **Intranasal Multi-Targeted**

- Nasal Spray Application ~
 - 0.1% Amphoterecin B
 - 0.2% Fluconazole
 - 0.2% Mupirocin
 - 0.03% Triamcinolone
 - #30mL
 - SIG: 1 nasal instillation each nostril qid
 - *with permission -
 - Dr. Paul Anderson of ConsultDrAnderson.com*
- Compounding ~
 - Sterile water, saline
 - Loxasperse powder
 - XyliFos
 - MucoLox (polymer-oral,rectal,vag)

35 Essential Oils & Hydrosols

36 Essential Oils

- Shown to reduce fungal growth, reduce mycotoxin production, and safe to inhale long-term:
 - Cedar leaf (*Thuja plicata*) - broad spectrum antimicrobial
 - Rosemary leaf (*Rosmarinus officinalis*)
 - Ajwain seed (*Trachyspermum copticum* L.) thyme-anise-oregano
 - Holy Basil leaf (*Ocimum sanctum*, *O. basilicum*)
 - Cumin seed (*Cuminum cyminum* L.)
 - Tea tree (*Maleleuca alternifolia*)
 - Thyme leaf (*Thymus vulgaris*)
 - Black cumin (*Nigella sativa*)
 - Clove (*Syzygium aromaticum*)
 - **Use ONLY inhalation grade**
- PMID: 22408584,18190993, 27275253, 24624154, 27211664, 17209812, 31006459, 15856529, 26042369, 28811611

37 Essential Oils - Rx Resistance

- Thyme ~
Inhibitory effects on Aflatoxin prod found at lower doses than needed for antifungal activity
Action against fluconazole-resistant fungi and Candida spp
- Ajwain ~
Caraway, can be used interchangeably with Thyme (recipes)
Action against fluconazole-resistant fungi
- PMID: 28584446

38 Essential Oils - Safety

- Safety ~
- Oregano, Thyme, Clove, Thuja
- Very strong activity against Chaetomium globosum, Penicillium chrysogenum, Cladosporium cladosporoides, Alternaria alternata, and Aspergillus fumigatus, also Pseudomonas
- Effective at full strength & reduced conc
- Genotoxic effect eval on human embryo lung cells showed none of the oils induced significant DNA damage in vitro after 24 h
- *But they do contain aldehydes
- PMID: 28811611

39 Essential Oils - How To

- Titrate ~
From 1 drop per 1 ounce liquid
To 25 drops per 1 ounce liquid
-
- How-To Video ~

40 Hydrosols

- Aka aromatic waters, floral waters, distillates
- Water-soluble volatile components
- Vital essence of medicinal plants
- Formed in the distillation process of e.o.
- Safe to use LT, less harsh than e.o.
- More than 50 marketed in Iran

- Persian hydrosols for hyperlipidemia ~
Thyme, Holy Basil, Artemisia, Garlic, Barberry, Aloe, Dill
- Drink, spritz, nasal spray, bathe
- Caution ~ many mixed w sweeteners
- PMID: 29228785
-

41 **Ozone**

42 **Intranasal Ozone**

- In-office 'cold corona discharge' ozone generator, fill capped syringe
- Carefully insufflate directly into sinus - DO NOT inhale
- Hold for 20-30 seconds, then blow out through nose
- CAUTION—prevent inhalation into the lungs
- Dose: 2cc of 11 gamma per nostril, can incr by 1cc up to 10cc
- Frequency: 1-2 times/week
- Normal reaction - increased mucous production in 15 min, self-lt

43 **Intranasal Ozone**

- Oil-trap - "safer" method
- Ozone discharged through oil bubbler, 35 gamma through 15 mL olive oil at 125 cc/min
- Nasal cannula - 10 minutes max
- 89% of the irrigated patients recovered faster than conventionally treated controls. Study of 102 chronic purulent frontal sinusitis pts
- Be in a clean space! Co-exposure of airway toxicants with ozone significantly amplifies the damage of those toxicants
- PMID: 12501776, 9163213, 555470, 12773774

44 **Intranasal Biofilm**

45 **Intranasal Biofilm**

- EDTA 15mg/2mLs
- EDTA + Polysorbate 80 (surfactant)

- 2mL of solution (2mL vials)
Polysorbate 80
Glacial acetic acid
Benzalkonium chloride
0.9% sterile sodium chloride
- Xylitol
- Mupirocin (S.aureus)
- NAC (next slide)
- *Must use something to break up biofilm for complete resolution*

46 **Intranasal NAC**

- Compounded NAC (N-Acetyl Cysteine)
- 200mg qd-bid
- Similar to the idea of Mucomyst, mucolytic
- Can add 1 drop inhalation-grade mint e.o. to mask sulfur smell
-
-
- PMID: 25843257, 23307410, 24799199, 26386189

47 **Treatment Caution**

- Be mindful of Herx "die-off" sxs
- In vitro Aspergillus exposed to amphotericin B increased Gliotoxin production - a possible explanation
- PMID: 15272057

48 **Topical Antifungals**

49 **Topicals**

- Mycotoxins ~
Plantain (Plantago lanceolata)
Yarrow (Achillea millifolium pannonica*)
Anti-aflatoxin in vitro

- Antifungal ~
 - Clove - oil, oral, analgesic
 - Pau D'Arco - non-irritant dermal application for fungal/MRSA
 - Thyme - oral, intertrigo. Can irritate
 - Coconut - shell extract (MIC>3Rx)
- Artemisinin cream for rashes of undetermined cause
- PMID: 30127827, 23015356, 16553949, 28930122, 22290952

50 Pregnancy & Peds

51 Pregnancy & Nursing

- AVOIDANCE!!!
- Stability and reduction of myco's vs "win the fight"
- Focus on protective things, esp in 1st trimester
 - DHA
 - Bioflavonoids
 - Fiber
- May use gentle nasal treatments to prevent fungus in the sinuses - esp since sinus congestion so common in pregnancy
 - Eucalyptus essential oil is a nice option
- For systemics, "fungistatic" vs fungicidal
 - Avoids excess spillage of mycotoxins
- Daily garlic bid, either as food or tincture if adding it to food is too hit-and-miss or upsets the stomach
- Add oregano, thyme, rosemary, and sage to cooking
- Tincture of sage + thyme
 - Dose at a very low daily dose in the 2nd/3rd trimester
- Holy Basil, Pau D'arco, and Oregano Oil are NOT recommended in pregnancy
-

52 Breastfed Infant

- Challenge - administration

- Via mom & skin
- Mom-good fats, bioflavonoids, bitters, fiber
- Systemic antifungals, via mom ~
holy basil, rosemary, thyme
(Avoid garlic+oregano oil if gas, pau d'arco not proven safe)
- Intranasal antifungal ~
breastmilk
- Calendula Bath ~
Flower infusion: emolient vulnerary, soothing antiinflam/flavonoids, lymphagogue
Leaf tincture: antifungal
Boil 32 oz water, add 1 cup flowers, steep x 10 mins. Strain, cool to tepid. Add to bath.
AND add 1 tsp tincture to 8 oz water, bring to boil to burn off alcohol. Remove from heat, let cool to tepid. Add to bath.
Soak baby 10 min's minimum.
- Coconut milk/oil rubs
- PMID: 29484986

53 Ped's

- Challenge - taste, texture
- Prep 2-3 different things that work in case of refusal
- Good fats, bioflavonoids
- Insoluble fiber *if doesn't cause constipation*
If it does, work on liver/bile sluggishness
Curcuma - nice option bc is a bitter, anti-inflammatory, and protective against mycotoxins
Golden Milk, or liposomal mixed w resveratrol
Then try adding fiber (flax seed powder)
- Definitely tx intranasal plus systemic antifungals
Propolis good option for ped's (antifungal and neutralizes mycotoxins) *health food stores
- For systemic, pau d'arco, holy basil, thyme
Ok daily and LT with peds
-

54 Adolescent

- Challenge - compliance, added toxicants, circ rhythm

- Clean body care - perfumes, lotions, acne txs, mouthwashes (tip for parental adulteration)
- Stinky foods reduce stinky body. Molybdenum for garlic intolerance.
- Circ rhythm enforce w supps ~
 Vit D - early am
 Melatonin - at dinner time
 *caution dose <3mg dt ability to delay puberty
- Detox ~
 Consider plants vs specific nutrients
 Caution your effect on puberty - monitor carefully, esp if using glutathione
- Intranasal ~
 Options for compliance issue w nasal spray:
 e.o. diffuser in bedroom running all night
- For systemic ~
 Ok daily and LT: olive leaf, thyme, spilanthus, pau d'arco
 Pulse: neem, oil of oregano, usnea
 Discuss with parents about use of alcohol tinctures, CBD

55 Review

- Fighting Spirit
- Systemic Antifungals
- Herb-Rx Combinations
- Intranasal Antifungals
- Essential Oils
- Ozone
- Intranasal Biofilm
- Topical Antifungals
- Pregnancy & Ped's

56 Thank You

-
-
-

- Dr. Jill Crista
- Naturopathic Doctor
- support@drchrista.com

1 **Are You Missing Mold Illness?**

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2 **When Things Go Sideways**

- Are You Missing Mold Illness In Your Patients?
- Dr. Jill Crista

3 **When Things Go Sideways**

- Herx
- Exposure plan
- Travel tips
- Reintroduction
- Fortification
- What If's
- Cases

4 **How Mold Makes Your Job Harder**

- "Sensitive" patients~minute doses
- Counter-intuitive reactions
- Drug clearance~detox organs
- Immune depletion~chronicity
- Inflammatory reactions

- Sm vessel vasculitis & coagulation abnormalities~remedy delivery
- Cardiac~fatigue
- Neuro~"mold brain"
- Sleep
- ∴ Don't/can't stick to tx plan
- AND spiritually/energetically depleted

5 **Peel The Orange**

- 1 AVOIDANCE
- 2 FUNDAMENTALS
- 3 PROTECT
- 4 REPAIR
- 5 FIGHT

6 **Orange Half Peeled?**

7 **Herx**

8 **The True Herx**

- Jarisch-Herxheimer reaction
- Described over a century ago re: syphilis, induced by antibiotic tx
- Transient immunological phenomenon seen commonly in pts tx'd for spirochetal infxns
- Considered an adverse effect from antibiotic treatment
- Rarely fatal: neonates, LBW pregnancy
- "Complex interplay of its underlying patho-physiological mechanisms continues to elude modern medicine."
- PMID: 23632012, 28077740

9 **The True Herx**

- "Experimental evidence indicates it is caused by nonendotoxin pyrogen and spirochetal lipoproteins."
- Pro-inflam cytokines: TNF, IL-6, IL-8
- Accel phagocytosis of spirochetes by PMN leukocytes before rise in cytokines, but after antibiotic initiation

- Sxs ~
Onset 24-hrs after initiating Abx
Constitutional sxs resolve within hours
Fever, chills, h/a, myalgias, exacerbation of existing cutaneous lesions
- PMID: 23632012, 28077740

10 Today's "Herx"

- Loosely defined & broadly applied
- Sx onset anywhere from hrs to days after initiating tx
- Self-resolves in 2-5 days
- Sxs ~
Fatigue, h/a, cognitive/neuro, myalgias, n/v/d, exacerbation of existing skin sxs, rarely low-grade fever
- If longer than 2-3 days ~
Tx too aggressive for pt
Something else is going on

11 Mold "Herx"

- Induced by antifungals vs antibiotics
- Inhibit fungal sterol synth (impt fungal cell membrane component) vs intracellular Abs
- ↓ accel of phagocytosis → slower onset rxn
- ↑ ROS
- ↑ MC (metacaspases) - "executioners"
Apoptosis, cytokine maturation
Neurodegen & autoinflammatory disorders
- If mold senses ↑ threat → ↑ mycotoxin prod
- Mycotoxin vs nonendotoxin pyrogen
- ∴ think toxicity > microbial "guts"
- ∴ tx target is detox
- PMID: 10515900, 28983298, 18298652, 24415839

12 Herx Helpers

- 1st: Ask if tx needs adjusting
Most common cause is iatrogenic

- 2nd: Fast
- 3rd: Take a salt bath
- 4th: Mega bioflavonoids
- 5th: Bamboo binding
- 6th: Consider fats & alkalization
- 7th: Consider enzymes
- Prep the tools and plan ahead
- Executive fxn during Herx = ☹

13 **Fasting**

- 12-24hrs minimum
- Fuel switch to fat-derived ketone bodies & free fatty acids
- “Induces adaptive cellular responses~
Reduce ox damage & inflam
Optimize energy metabolism
Bolster cellular protection”
- ↓inflammasomes in steroid-naïve asthmatics, diminish airway epithelial cell cytokine prod
- Start immed at first sign of Herx
- During first 2-3 days of antifungal therapy for unstable pts or if need antifungals before you can fully peel the orange
- PMID: 24440038, 30021766

14 **Epsom salts**

- Prep by the tub, pre-arrange at supportive helper’s home w/tub
- Bath ~
2-4 cups per bath x 20-30 min
End w cool shower
Caution: dehydration, abd cramping, bile duct spasm

- Poultice ~
Mix 1 cup per 2 qts warm water
Apply soaked towel to entire abdomen
Cover w heat x 30 min
End w cold scrub
- Practice before begin antifungals

15 **Bioflavonoids**

- ROS ~
Less activity in mammals than plants, but still shown to be effective
- Protein kinases ~
Substrates of active caspases
Bioflavs inhibit
- SO pick a color, any color, make it liquid
- Lemon juice ~
REAL lemons, squeezed & bluntly smash peel in container
- Tart dark cherry juice
- Carrot juice
- Wheat grass juice
- Onion soup broth
- Beiler's broth
- PMID: 23580885, 23434657

16 **Beiler's Broth**

- Recipe and additions

17 **Beiler's Broth**

- Recipe and additions

18 **Carbonized Bamboo**

- Well known in Japan

- Mild antifungal + antibacterial
- Porous nature ~ thirsty absorber (up to 10x more so than wood treated similarly)
- Research from Japan claims it emits ~
FIR rays (thus improving circulation)
Negative ions (shields from EMF's)
- Natural source of minerals (macro and trace) ∴ alkalizing
- Aborts the reaction, quicker return to normal
- Shown to be effective at binding aflatoxins* (poss heavy metals)
- Contraindications ~
Variegate porphyria
- PMID: 25014194

19 **Fats, Alkalizers & Enzymes**

- Lipid Rescue ~
DHA 5-10 grams
GLA 3 grams
- Alkalizers ~
Alka-Seltzer Gold
Tonic water
- Enzymes ~
Lipase, protease
Take away from meals
- Try any and all until better

20 **Herx or New Exposure?**

- Watch for signature trends
- Determine effect on ultimate survival of the being
- Hering's Law of Cure ~
Revisit old symptoms
- Herx ~
Better deep, worse surface
Better mental, worse physical

- New exposure ~
May look similar to Herx, BUT
doesn't clear w Herx tx &/or reduction or d/c of tx

21 **Doc, What's Happening?**

-
- Developed a terrible rash & sinus congestion, but anxiety is a little better.
- Is your patient getting better or was there a new exposure?

22 **Rationale**

-
- What is the "deeper" issue, or the one which is more detrimental to wellbeing...
- skin rash or anxiety?
sinus infection or anxiety?

23 **Anxiety!**

- May see skin rash or sinus infection at the resolution of deep-seated anxiety
- Most likely a "Herx"

24 **Exposure Plan**

25 **Exposures Will Happen**

- Cars, restaurants, shopping, school, church, travel
-
- What to have along ~
Nasal spray
Bioflavonoid of choice
Cholagogue
Antifungal (if pt strong enough)
Posse ready to support
-

26 Travel Tips

27 Travel Tips

- Rental cars ~
A/C - turn on, off, on, watch for reaction, then don't use if poss
Take time to be in car w closed windows before driving away
- Hotel ~
Tell them mold sensitive at check-in
Room inspection - water stains on ceiling, below A/C unit, below sink
Request new filter for your room, BE THERE to avoid deodorizer
Then don't use HVAC if poss

28 Reintroduction

29 Reintroduction

- Yes, you can get your life back after mold!
-
-
- Typical timeframe (selection bias) is 2 years to pre-mold norm
-

30 Diet Reintroduction

- All foods tolerated before mold
s/b tolerated after mold
- Add back slowly, q4-7 days
- 1st: Begin with Tier II foods if removed
- 2nd: Fermented foods/bevs
- 3rd: Foods that get moldy from growing/storing techniques
- 4th: Foods/bevs that promote yeast overgrowth
- 5th: Foods that are actual fungus

31 Fortification

32 Fortification

- Myco-Remediation ~
Agarikon, Maitake, Shitake, Reishi, Ganoderma, Hericium, Trametes, Cordyceps (rebirth), etc...

- Paul Stamets, Mycologist
- Mycelium hyper-accum Se
- “Mycelial networks are the foundation of the food web, the interface organisms between life and death, and build soil.”
Interview on WPR’s To The Best of Our Knowledge
- Imagine what they do for our soil

33 Immune Modulation

- Many well-researched immune modulating botanicals which also have anti-fungal action ~
Pau D’arco, Garlic, Holy Basil, Cordyceps
- Botanical immune modulators ~
Astragalus, Codonopsis, Eleutherococcus, Ligustrum, Panax ginseng, P. quinquefolius, Rhodiola, Schisandra, Withania
- PMC3915757, PMC3874089, PMC3909570

34 What If’s

35 What If... Can’t Leave the Mold?

- Is it even worth treating?
- YES!
- Protect tissues/cellular invasion ~
DHA
Bioflavonoids
Milk thistle, turmeric, artichoke
Green tea
- Protect genes ~
[CoQ10 + L-carnitine + α -tocopherol + Se]
- Minimize colonization ~
Nasal spray

36 What If... Only MPA + But Symptomatic

- Key points, pt is symptomatic + not testing every mycotoxin
- Variables to note - duration of WDB exp & sx level/type
- Taking glutathione? ~

- May create false neg myco's
(does exactly what we want it to do - detox)
- Neg test doesn't confirm no myco's bc symptomatic
(note that MPA alone can still make pt sick - usually GI)
- If no glutathione ~
- 1st: still being exposed?
Remediation didn't address "stuff" contamination
- 2nd: pt too toxic to detox myco's & dump in urine
- 3rd: processed myco's well, but has genetic snp impairing MPA clearance (Green tea & ECGC)
BUT that's only probable if pt feeling overall much better
- Plan ~
- Proceed with the full mold tx until improvement in sxs, including systemic + nasal txs
- Don't be surprised on subsequent myco testing, start spilling mycotoxins

37 What If... Reaction to Antifungals

- Question your tx ~
Too much?
Too soon?
Wrong choice?
- Prep done aka "peel the orange"?
- Still being exposed?
- Plan ~
Impress on pt - no exposure!
Reduce or pause antifungals
Support weak system
-
-
-

38 What If... Can't Tolerate Binders?

- What do you mean by binders?
 - Pharmaceutical
 - Fiber
 - Clay/charcoal
 - Food
- Why can't tolerate?
- Provoking bile?
- Plan ~
 - Start with steamed kale & bitters
 - Add 5-7 servings veg
 - Try charcoal
 - Try rice bran fiber
 - *Binders are not necessary to getting better

39 **What If... Can't Tolerate Glutathione?**

- Not uncommon!
- Unsupported detox ~
 - Not pooping
 - Need cofactors/coenzymes
- Other ways to boost GSH ~
 - NAD, B-vitamins
 - Selenium
 - ALA
 - Milk thistle
 - Turmeric

40 **What If... Not Better Despite Full Avoidance?**

- Are you sure there's 100% avoidance???
- Consider viral load
 - EBV, HHV-6, Coxsackie
- Consider opportunists
 - Lyme, co-infections
- Consider other enviro toxins
- Consider food sensitivities

- Mitochondrial dysfunction
- Genetic snp support

41 **Cases**

42 **Aspects of a Comprehensive Plan**

- Avoidance avoidance avoidance
- Diet diet diet
- Bioflavonoids
- Good fats
- Bile movement
- Fiber binding
- Detox + mito support
- Immune support
- Antifungals

43 **CASE | CPAP Dementia**

- Late 70s F, LT pt
- Concerned adult kids ~ mom's safety
- Beg signs of dementia, garage door open overnight
- Progressing confusion, balance issues, requiring cane
- HTN, constipation, C-PAP for RLS insomnia
- Sinusy voice normal for her
- Large historic home, "bad about dusting"
- Stopped using C-PAP "bc forgetful"

44 **CASE | CPAP Dementia**

- Kid intervention - Monitor (aka force) C-PAP use, major dust/declutter & air filter in bedroom, found a little mold in basement - cleaned with bleach
- Husband's insomnia improved. Hers worsened, but naps ok in recliner ~ too far from her C-PAP to use
- Worsening sx's overall: High anxiety, fears, worry, night wandering, personality change, worsening confusion, forgetful
- Having new food reactions, so "forgets"/avoids eating

- BP on the rise, takes at home in am
- Kids have scheduled another sleep study, long wait time

45  **CASE | CPAP Dementia**

- P/E ~
- Vitals - bp 158/90, HR 104, RR 16, temp N
Eczematous rash b/l ear canal, b/l pedal onychomycosis
Arthritis - ankles, fingers/toes
Blepharitis, anosmia, enlarged turbinates, pharyngeal cobblestoning
Delayed capillary refill, dermatographism
LU - harsh bronchial breath sounds
- HT - RRR, no adventitious sounds
Abd - delayed BSAQ, bloating
Neuro - all wnl
- Labs ~
↑hs-CRP if not taking B-complex, B-12
↑LDL
Vit D 25-OH - 23

46  **CASE | CPAP Dementia**

- P/E ~
- bp
- Toenail fungus
- * * *

47  **CASE | CPAP Dementia**

- P/E ~
- bp
- Toenail fungus
- * * *

48  **CASE | CPAP Dementia**

- P/E ~
- bp

- Toenail fungus

• * * *

49  **CASE | CPAP Dementia**

- P/E ~

- bp

- Toenail fungus

• * * *

50  **CASE | CPAP Dementia**

- P/E ~

- bp

- Toenail fungus

• * * *

51  **CASE | CPAP Dementia**

- NeuroQuant

Triage Brain Atrophy Report (TBAR)

- Compressed 3rd ventricle

surrounded by inflamed thalamus

- Assymetry

- Thalamus inflam

Site of mast cells MCAS

Limbic activation

52  **CASE | CPAP Dementia**

- NeuroQuant

Triage Brain Atrophy Report (TBAR)

- Cingulate inflammation

- Frontal atrophy

53  **CASE | CPAP Dementia**

- NeuroQuant

Triage Brain Atrophy Report (TBAR)

- Ventricular asymmetry (TBI?)
- Patchy asymmetry
Inflammation, infection

54 **CASE | CPAP Dementia**

- “Oh yeah, mom had a fall” - many years prior
- Mold inspector ~ Minor fragments in basement. No obvious water intrusion. Issues with clutter, cardboard storage, humidity, dust.
- Recommended remediation - HEPA vac + wipe down surfaces, air filtration, replace all cardboard storage containers, better dust & humidity mgmt, duct cleaning
- Tested C-PAP machine ~ extremely high Aspergillus, +Endotoxins
- Wasn’t maintaining adequate cleaning schedule or replacing tubing

55 **CASE | CPAP Dementia**

- Tx ~
- CPAP: Cleaned machine appropriately, replaced tubing, SoClean ozone system. Home changes took a little longer, done by kids.
- Nat sulph 200c
- DHA 3gms daily, divided
- GLA 1 gm daily, divided
- Liposomal phosphatidyl choline 500mg bid
- Melatonin 3mg hs + 3mg sustained release
- Green drink - bid
- Resveratrol - 1gm divided
- Liposomal curcuma/resveratrol 400mg/150mg bid
- F/U in 3-4 weeks

56 **CASE | CPAP Dementia**

- 1st F/U ~
Improved sleep, anxiety, confusion, joint pain

- Worsened constipation, food reactions
- Sinuses cleared at first, now congesting again
- Reduce DHA 2gms daily, divided
- Reduce GLA 500mg daily
- D/C added resveratrol, replaced with quercetin 600mg tid
- Cont greens, PC, curcuma/resveratrol, melatonin
- Add: Garlic tincture with Thymus & Holy Basil alternating 1 tsp bid-tid
- Intranasal ozone daily x 1 week, then 3-4x/week
- F/U 6 weeks, sooner if poor reaction to antifungals

57 **CASE | CPAP Dementia**

- 2nd F/U ~
Marked improvement in RLS, sleep maintenance, sinus congestion, BMs, food rxns
- Improvement in all dementia sx's, bp
- Anxiety still an issue, desires easier nasal tx
- Continue DHA, GLA (found a combo prod) - 2 gms divided
- Reduce PC 500mg daily
- Cont curcuma/resv, greens
- Reduce quercetin 600mg bid
- Cont melatonin 3mg hs, but d/c added 3mg sustained release
- Cont Garlic tincture with Thymus & Holy Basil alternating 1 tsp bid
- Replace Intranasal ozone with propolis nasal spray
- Limbic retraining via FSM
- F/U 3 months

58 **CASE | CPAP Dementia**

- 3rd F/U ~
Sustained improvement in dementia sx's, RLS, sleep maintenance, sinus congestion, BMs, food rxns, bp
- Anxiety - reducing but not as fast as desired
- Alternate DHA/GLA with PC

- Reduce quercetin 400mg bid, over time wean, watch sinus congestion
- Cont greens, curcuma/resv (may wean over time, watch joints)
- Use melatonin 3mg hs prn
- Cont Garlic tincture with Thymus & Holy Basil alternating
1/2 tsp bid (wean over time)
- Cont nasal spray hs
- Limbic retraining via DNRS
- F/U 3 months
- Over time, dementia sxs continued to improve & now no longer an issue. Anxiety improved.
Better about managing dust/humidity

59 **CASE | Breathless & Anxious**

- Early 50s M, outwardly calm, conscientious, but suppressed
- Executive, accustomed to high pace & high functioning
- Remodeled a Frank Lloyd Wright home in "choice" neighborhood
- Relationship problems "this house killed my marriage", divorce
- Beginning breathing troubles around same time
- Describes "broken heart pain"
- Anxiety, insomnia, weeping
- Dx allergies, asthma, anxiety
- Rx steroid nebulizer, rescue inhaler, anxiolytic
-

60 **CASE | Breathless & Anxious**

- Worsening resp sxs
- Various specialists, no answers
- Worsening insomnia, new onset reflux, jock itch
- Allergist confirms mold allergy
- Rx antifungal cream w steroids, proton-pump inhibitors, statins*
- * * *

- All sxs worsening esp breathing issues, very distressing
- New onset tinnitus, pelvic pain, constip, jock itch wakes from sleep
- * * *
- In desperation, comes to see the woo-woo doctor in town

61  **CASE | Breathless & Anxious**

-
- ?

62  **CASE | Breathless & Anxious**

-
- ?

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- Rx proton-pump inhibitors, statins
- All sxs worsening, new tinnitus, pelvic pain, jock itch wakes from sleep
- Home inspection revealed mold covered over by remodelers
- * * *

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66 **CASE | Breathless & Anxious**

- Labs ~
 Fe-def anemia, ↓WBC, ↑IgE, rising liver enzymes,
 ↓Vit D 25-OH
 Stool test - +Candida, (-)SIBO
 Nares Culture +MRSA

- Tx ~ (pt request - "give me everything")
 - Home mold inspection
 - Already pristine diet, organic veggies, low animal protein
 - EVOO 1 Tbsp qid
 - Quercetin 600mg qid
 - Hawthorn solid extract 1/2 tsp tid
 - Lung tincture blend 1/2 tsp tid (Symplocarpus, Asafoedita, Eriodictyon, Verbascum)
 - Aloe juice 1 cup tid before meals
 - Bile salts with dinner, trial Betaine HCl
 - Emulsified vit D - 10,000 IU daily
 - Allicin swab nares bid
 - F/U 3 weeks after home report available

67 CASE | Breathless & Anxious

- 1st F/U ~
 - Home loaded with mold, covered over by remodelers
 - Mild improvement in asthma, reflux, constipation. HCl too burny.
 - Excited, first sign of possibility of improvement
 - Request retest and antimicrobials
 - Tx ~
 - Move out while home remediated
 - Cont EVOO, Quercetin, Hawthorn, Lung formula, Aloe, Bile salts, D
 - Add psyllium husk fiber 1 Tbsp daily
 - Add Nebulized GSH (compounded) bid
 - Intranasal allicin bid
 - D/C statin
 - F/U 3 months, unless downturn, retest 2.5mo
- Antifungal combo as follows...

68 CASE | Breathless & Anxious

- Step 1:
Thyme tincture ~
Loading dose x 1 week before Rx
1 tsp tincture bid
- Step 2:
Add pulsed Fluconazole - 200mg x 3-4d/wk
- Step 3:
Add pulsed antifungal botanical on alt days (ie Pau D'Arco,
Oil of Oregano)
- Step 4:
Continue with botanicals x 1 addtnl mo, d/c fluconazole
Thyme tincture ~ 1 tsp qd
Pau D'Arco ~ 500mg caps qd-bid, pulsed varied (Neem, Monolaurin)
- Step 5:
Continue pulsed rotating antifungals x 6-12mo or until neg mycotoxins

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70 CASE | Breathless & Anxious

- 2nd F/U ~
Marked improvement resp, GI, HT, jock itch
Anxiety, mood issues, bloating, sweet cravings persist
- Tx ~
Stay the course on supps, neb, intranasal
Increase animal protein
- Replace steroid-containing antifungal w pure antifungal
Alternate nostril breathing qd
- Retest mycotoxins, OAT, nares in time for appt
F/U 3-4 mo unless downturn

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- * * *

75 CASE | Breathless & Anxious

- 3rd F/U ~
Persistent MRSA, Candida on labs but asx
Flaring when home, better work travel
- Tx ~
Retest home, more to remediate?
Cut all oral supps in half, one at a time, divided by 1-2 weeks, watch sxs
Reduce nebulized GSH to qd
Replace Intranasal allicin with e.o. blend, add intranasal xylitol
- Wean lung tincture, add NAC
- Cont antifungal combo plan, slow wean after neg mycotoxins
- Cont rotating biofilm txs, watch reactions
- Talk to gastroenterologist for plan to wean PPI

76 CASE | Breathless & Anxious

- Resolved ~
Acute breathing issues, allergies, "heart pain", weeping, reflux, jock itch
- Improved anxiety, insomnia, asthma
- D/c'd steroid nebulizer, proton-pump inhibitors, statins
- Retaining rescue inhaler
- Anxiolytic prn for occasional insomnia
- Residual tinnitus, pelvic pain lasted up to 2 additional years
- Asthma eventually resolved but keeps rescue inhaler on my request
- Remediation took 3 tries
- * * *

77 **Review**

- Herx
- Exposure plan
- Travel tips
- Reintroduction
- Fortification
- What If's
- Cases

78 **Thank You**

-
-
-
- Dr. Jill Crista
- Naturopathic Doctor
- support@drchrista.com

1 **Are You Missing Mold Illness?**

- By proceeding, the viewer agrees that the contents of this site, such as text, graphics, images, video, and other material contained on the Dr. Crista site are for informational purposes only.
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2 **And The Environment**

- Are You Missing Mold Illness In Your Patients?
- Dr. Jill Crista

3 **And The Environment**

- Canaries ~ Just Don't
- Inspectors & Remediators
- Building Assessment Basics
- Endotoxins
- Remediation Tips
- What To Do About "Stuff"
- Prevention

4 **Canaries ~ Just Don't**

5 **Who Should Keep Out**

- Ok, EVERYONE!

- But certainly, people who are ~
 - Pregnant
 - Breastfeeding
 - Young children
 - Respiratory conditions
 - Liver disease
 - Kidney disease
 - Immune deficiency
 - Cancer
 - Genetically mold sensitive (canaries)

6 **Dorks Stay Healthy**

- Protective gear ~
 - Disposable Tyvek suit with hood
 - Toss after each exposure
 - Safety glasses
 - Clean with bleach after each use
 - Silicone respirator w disposable filters
 - Clean with bleach after each use
 - P100 respirator filters
 - Toss after each exposure
 - Double gloves
 - Toss after each exposure
 - Shoe booties
 - Toss after each exposure

7 **Inspectors & Remediators**

8 **Inspectors**


- Why need?
 - More than mold
 - Advocacy
 - Select remediators
 - Guide remediation plan
 - Post inspection

- Inspector Qualifications ~
Sensitive pts
- Certifying organizations ~
BBEC (Building Biology Institute)
ACAC certified
IICRC certified

9 **Inspectors**

- Questions to vet inspectors ~
-
- Patient handout courtesy of
Corey Levy, CMI, CIE, WELL AP
YesWeInspect.com

10 **Conflicts of Interest**

- Inspectors test
- Remediators remediate
-  - remediation co that says they'll do the post-test instead of inspector
(illegal in some states)
- Post-rem testing by remediators is done ~
For internal QC
Usu only air sampling
*Not a thorough inspection

11 **Remediators**

- Chosen by inspector
- Know how & be willing
to work w sensitive ppl
- Understand inspector will post-test

- Provide written plan in detail, costs itemized, meet, sign-off
- Is the norm to find more as they open up (water source, more mold)
- Make sure any alterations are in writing and cost estimate given, agreed upon before proceeding

12 **Building Assessment Basics**

13 **Know Your Lane**

- Are you a building expert?
Plumbing, roofing, attics, crawl spaces, grading, partial pressures, etc
- Even experienced, certified inspectors miss mold on occasion
- Costly mistakes ~
False sense of security
Ruin the chances of getting ins coverage
- Chain of Custody
By Certified Inspector
Submit w any sampling
Must have in place legally, ins
Dr can submit *but must be the sampler/defend in court*

14 **Purpose Of This Section**

- Know enough to protect your pt from bad actors & guide them through the process
- NOT to take this part on
- You're their body Dr not bldg Dr
- Highly recommend doing the work to find your go-to inspectors in your area, then REFER
- But if you're itching for more ~
Mold Masterclass by Brian Karr

15 **Inspections**

- Goals ~
- 1) Determine the sources of the contamination
W/o eliminating the sources
the problem will persist

- 2) Determine how the sources have impacted the occupied living spaces & HVAC system
- Allows inspector to provide a holistic & comprehensive remediation strategy

16 Inspections

- Thorough history ~
Not only about areas that are currently wet
Hx of water events very important!
Water-impacted areas that are now dry have a significant impact on contamination
Dried colonies easily break apart into ultra-fine fragments & particulate
- Time ~
Should last >2hrs, typical is 4hrs
Attic, crawlspaces, outdoor, roof

17 Sampling Limitations

- Just like testing bodies ~
Each method has strengths & weaknesses
- Goal ~
Maximize strengths
Minimize weaknesses
- Solution ~
Multiple testing strategies
- Looking for ~
Moisture, staining, rusting, spores, fragments, DNA, mycotoxins

18 Sampling Tools & Methods

- Tools ~
 - Eyes - visual inspection* most important
 - Infrared camera (moisture)
 - Moisture meter, humidistat
 - Sterile swabs
 - Spore trap vacuum
 - On-location microscope
- Methods ~
 - Plates (controversial)
 - Air sampling (cavities/isolated spaces)
 - Spore trap (cavity)
 - Dust sampling
 - Tape lift
 - Bulk (textile, carved sill plate, filter, etc)
 - On-location microscopy

19 **ERMI/EMMA**

- Environmental Relative Mold Index
- EPA std: DNA-based MSqPCR method. ID & quantify spore/fragment DNA
- 26 mold species known to thrive in WDB + 10 species "found in all homes, with or without water damage"***
- Dust sample using HEPA filter trap. Vacuum specific area of a carpet (or other material) in LR + main BR
- Compare to national database of US homes. Reported as percentiles, then scored via algorithm, with EPA's opinion that "every home in US has mold" (bc of improper selection criteria imho)
- Don't go by the "score" only!
- Per certified inspectors - flawed scoring system
- Look at species & quantitative findings. Can still be high mold burden with a "normal" ERMI score.
- Some species indicative of long-standing issue
- EMMA adds mycotoxins

20 **HERTSMI-2**

- Health Effects Roster of Type Specific Formers of Mycotoxins and Inflammagens - 2nd Version
- DNA-based MSqPCR method. Score based on qty detected.
- Swiffer or vacuum collection

- The big 5 - the bad actors
 - Aspergillus Penicilloides
 - Aspergillus Versicolor
 - Chaetomium Globosum
 - Stachybotrys Chartarum
 - Wallemia Sebi
- "Indicator" species correlated both w WDB & MARCoNS incidence
- Score <10
- Cost savings

21 Spore Trap

- Specific, focused air sample
- Cavities
- Disrupt then let dust settle
- Specialized HEPA vacuum
- Vacuum for 5 min, no less

22 Mycotoxin

- Current or forensic, no surety
- Furnace filter - 3" square after 3 mo continuous use
- Aggregated dust sample from tops of ~
 - picture frames
 - tall shelves
 - books
 - kitchen cabinets
 - trim around closets
- Avoid sampling near windows/doors to the outside

23 Bulk

- My clinical experience
- Kitchen ceiling ~
 - Spore trap: mild Aspergillus
 - Bulk: mod Chaetomium

- Bathroom subfloor ~
Swab: mod Asp & Pen
Bulk: mild Stachy
- Lessons ~
There are no perfect tests
Toxic species are gooey
Test everything that is removed

24 Other Sources

- CPAPs
- Keurig
- Refrigerator: coils, water filter
- Bath toys
- Mattresses
- Dehumidifiers
- Saunas
- Car cabin filters
- Furnace coils!

25 Endotoxins

26 Endotoxins

- Usu where there's mold, there's bacteria
- Story of the vegetative framing member
- Humidifiers/CPAPs ~
Tap water: bacterial count
Causes aerated endotoxins
Only use distilled water

27 What To Do About "Stuff"

28 What To Take

- Depends on extent
- First ~ GET YOURSELF OUT!
- “The best things in life are not things” Hawaiian Rules To Live By
- Take only the bare minimum
- The primary reason for chronicity
-

29 Storage Solutions

- Buys time/space for better decision-making
- Plastic bins, sealed w tape
- Caution: many storage units are also toxic ~
 - Rat poison
 - Pesticides
 - Critters, feces
 - Neighboring units
 - Many are moldy (roof leaks)

30 Cross-Contamination Risk

- Caution ~ car contamination
- Wipe down everything 3x before it leaves sick envir w new cloths~
 - First at the front door/garage
 - Second midway to car
 - Third just before place in car
- My story ~ 2x not enough

31 What Might Be Remediated

- Metal & glass
- Maybe 100% real wood furniture, BUT many many asterisks****
 - *how hard is the wood?
 - *how close to mold?
 - *how long?
 - *how old is the piece?
 - *how well maintained?
 - *how many crevices?

32 What About Clothing?

- Reminder abt research re: pasta cooking - mycotoxins retained despite heat
- Posited solution (no data!) ~
 - High heat wash
 - 100 drops e.o. per load
 - High heat dry
 - Sunshine exposure daily x 1 wk every surface
 - Borax
- Cautions ~
 - False sense of security
 - Dermal absorption
 - Contaminated washer

33 Remediation Tips

34 Remediation Pressures

- Remediators ~
 - Least force options
- Building owner ~
 - Rush to rebuild
- Insurance company ~
 - Mitigate losses

35 Remediation Tips

- 1 No spray & pray
- 2 No seal & deal
- 3 When in doubt, cut it out
- 4 Take out more than you think

36 Remediation Formulas

- All-Purpose Cleaning Formula ~
Non-porous - glass/metal
Real wood - witch hazel>water
*Essential oils theoretical workhorse
- Peroxide 15% or Bleach ~
Concrete
- Carpet cleaner ~
*Essential oils theoretical workhorse
- Ozone & Enzyme treatments ~
What happens in pathogenic biofilm envir?
- WE REALLY DON'T KNOW!
Must post-test!
Only keep what's worth testing

37 **Mycotoxins & Particulate**

- Foggers ~
Not considered remediation, but rather cleanup
May use as a final step to control ultra-fine particulate
- Air filters ~
Also not remediation!
-HyperHEPA (mycotoxins= $0.1\mu m$)
-Sanitizing
-Incinerating
- *Change filters early to avoid pass-through effect

38 **Prevention**

39 **Mold's Weaknesses**

- Dryness
- Sunlight
- Air movement
- Dust-free spaces
- Lack of clutter
- Mold-killing essential oils

40 Preventive Measures

- Don't water it
Manage humidity ~
Indoor humidity <50%
Humidistat in each room
Run fans before steam
- Don't feed it
Manage dust ~
Dust with gusto!
Reduce clutter
No cardboard box storage
Central vacuum system
- Don't help it find a new home
Change filters regularly ~
Home at least 2x/year
Car at least annually
Air filters maintain as rec
CPAP as rec

41 Prevention Tips

- Dry every moist thing
- Quantify humidity in each room
- Dehumidify if needed, by location
- No water to refrigerator
- Drain/pan under washing machine
- Reduce carpeting
- No finished basements
- Cabinets with feet
- Air movement indoors
- Air out closets, e.o. cotton balls
- Showers/windows vinegar
- Manage cracked grout

- Paper towel test toilets routinely
- Check attic after big rain or snow melt

42 **Before Buying/Renting**

- Always test in advance
- Offer must allow to buyer to completely w/d from offer
- No “right to cure” - seller/lessor will cover up the problem rather than remediate
- Unfortunately most sellers/lessors will demand notification of testing methods, some will adulterate
- Mycotoxin dust sampling often adequate - inside ductwork

43 **Other Air Quality Considerations**

- VOCs and microbial VOCs
- Dander
- Allergens
- Gas leaks
- Formaldehyde (‘new’ smell)
- Fiberglass
- Fragrances
- PCBs (candles)
- EMFs - WiFi, smart meters
- Endotoxins
- Heavy metals (hobbyists-lead solder)

44 **First 3 Rules of Toxic Exposure**

45 **Review**

- Canaries ~ Just Don’t
- Inspectors & Remediators
- Building Assessment Basics
- Endotoxins
- Remediation Tips
- What To Do About “Stuff”

46



- Prevention
- Survey
- DrCrista.com
 - Patient resources
 - Short video blogs
- Break The Mold
- Mentorship
- Stay in the light ✨