

1 **Are You Missing Mold Illness?**

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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 TGFβ1 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**

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