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The Bi-Phasic SIBO Protocol

Module 3 “Antimicrobials, Prokinetics, and Biofilm”

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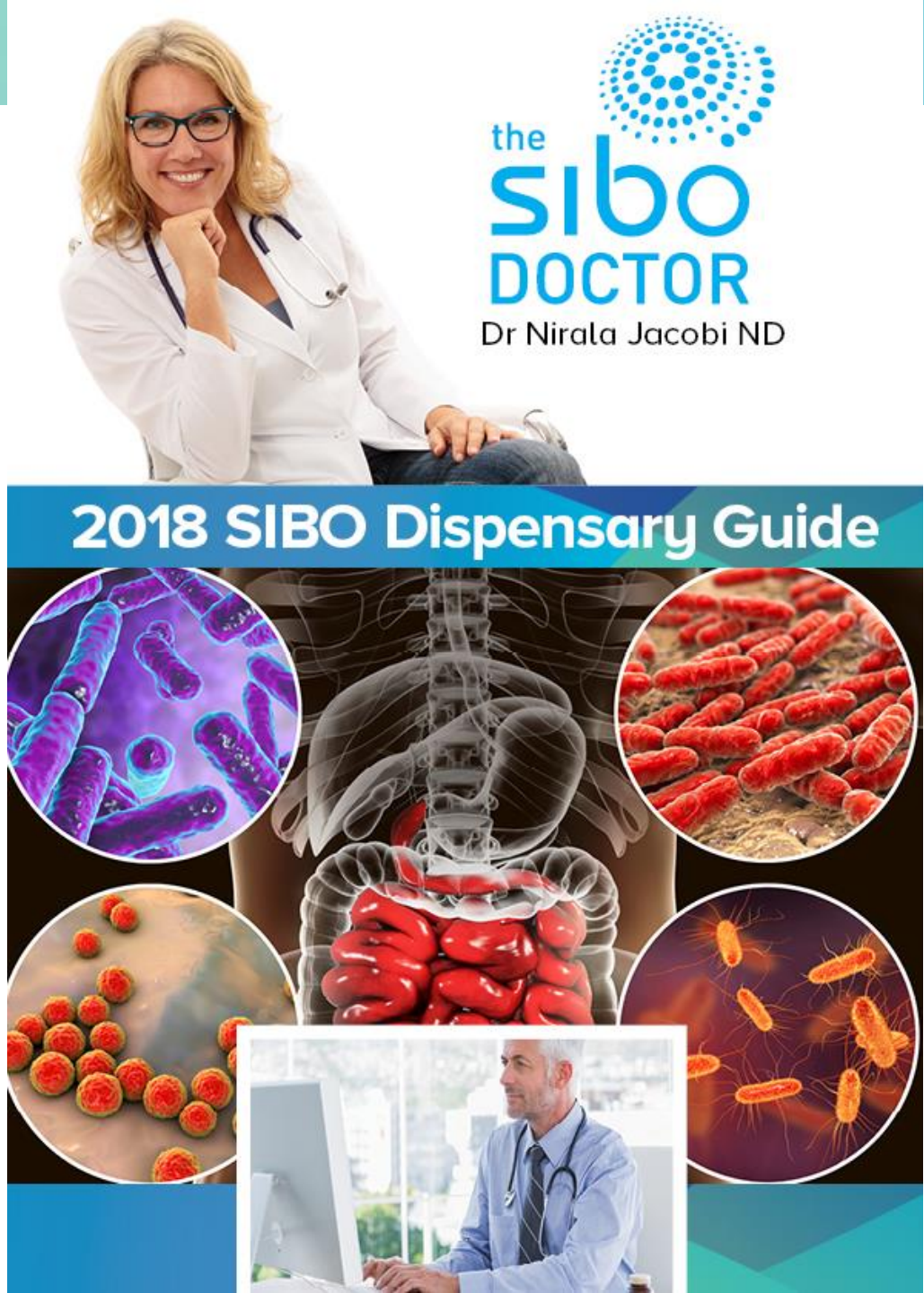
Module 3

- Herbal treatments for SIBO and SIFO
- Conventional Antibiotics
- Special treatment considerations for Methane and Hydrogen sulfide
- Herbal and conventional Prokinetics
- Pregnancy and Pediatrics
- Biofilms

SIBO Dispensary Guide

- **BONUS DOWNLOAD**
- **Dr Jacobi's SIBO Dispensary Guide:** reviews common commercial SIBO products and their doses



Herbal Treatments for SIBO and SIFO

Know your
herbal product ingredients

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Herbal uses in SIBO and SIFO

- Antimicrobials
  - Antibacterial/antifungals/antimethanogen
- Anti-inflammatories, antioxidants, Immune modulators
- Anti-spasmodics/carminatives
- Herbal Prokinetics

Pros and cons of herbal medicines

- Pros ✔
  - Herbs often have multiple effects, ie antibacterial and antifungal, antiinflammatory and antioxidant, etc
  - Mostly cause less damage to the microbiome
  - Have evolved with bacteria and thus have overcome many of their resistance strategies
  - Can be combined to address multiple issues
- Cons 🚫
  - Can be more costly due to length of treatment
  - Patients self medicating with inferior herbal products can be cause for concern due to contamination (heavy metals etc)
  - Allergies, salycilates, oxalates
  - Doses often vary depending on formulation (standardized extract vs whole plant)
  - Limited research in SIBO and SIFO, more research in IBS in general

Botanical Mechanisms of overcoming Bacterial Resistance

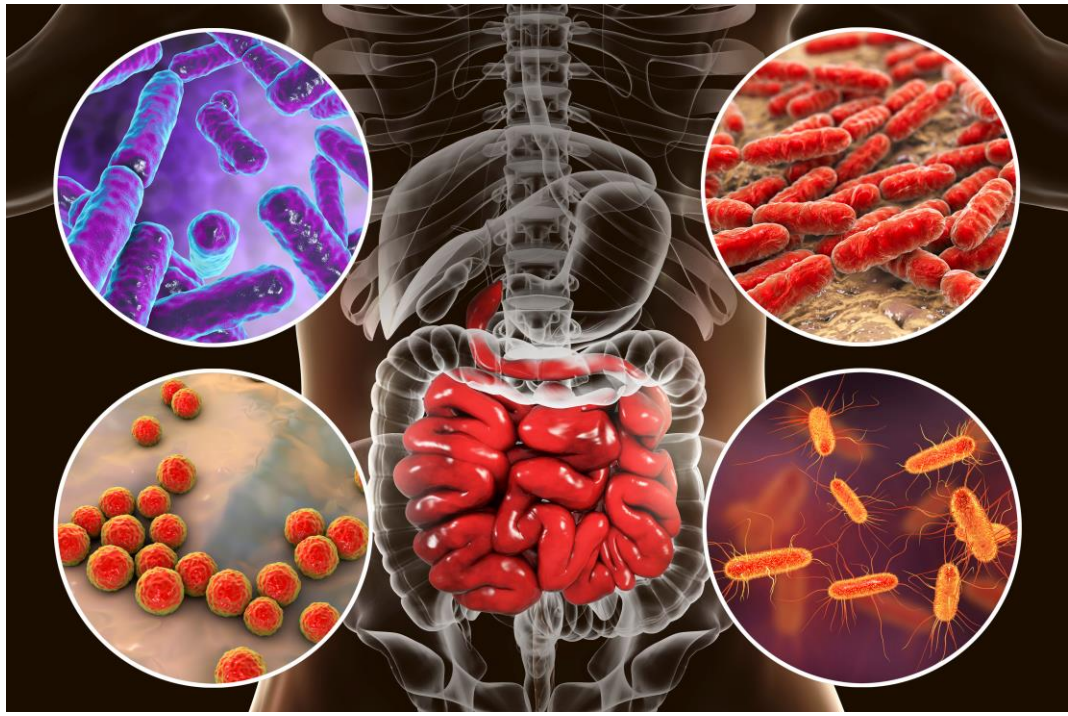
- Bacterial efflux pumps actively remove antibiotics and other substances out of the cell
  - Examples of herbs which inhibit or down regulate these: Berberine containing plants, Thyme, Juniper, Licorice, Green Tea
- Alterations in bacterial cell wall permeability – gram neg bacteria down regulate porin expression which limits antibiotic entry into the cell.
  - Examples of herbs which alter bacterial cell wall: Bearberry, Goldenseal, Usnea
- Plasmids: strains of bacterial DNA that contain resistance information. Highly mobile and passed on to other bacteria
  - Examples of herbs that modulate bacterial DNA: Barberry, Golden Seal, Oregon Grape, Thyme

Molecular mechanisms of antibiotic resistance. Blair et al, Nat Rev Microbiol 2015 Jan;13(1):42-51

Predominant SIBO organisms

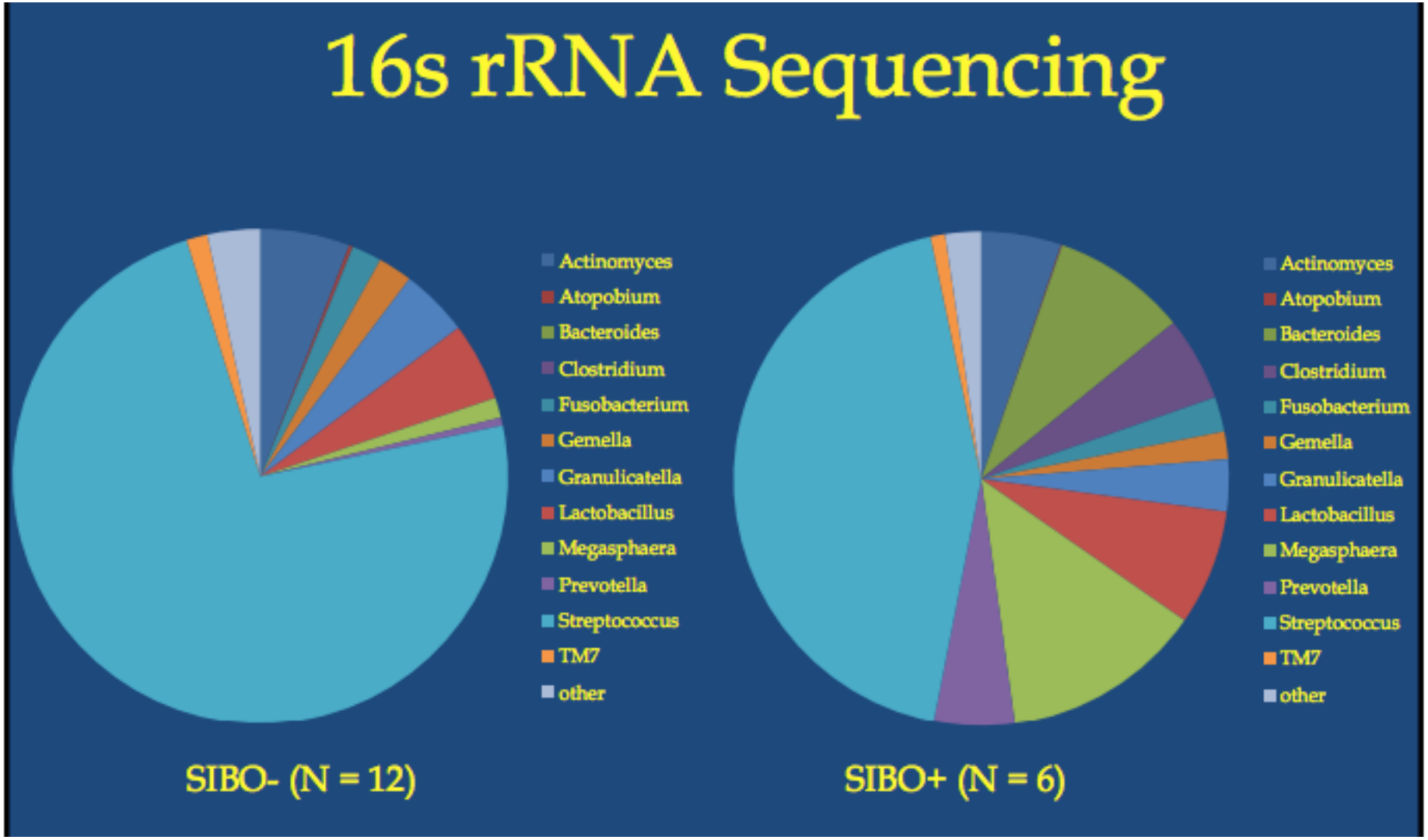
Predominant SIBO bacteria isolated on duodenal aspirate (Pimentel 2015):

- gram positive:
  Enterococcus spp (other studies also identified Streptococcus and Staphylococcus)
- gram negative:
  Proteus mirabilis
  E.coli
  Klebsiella pneumoniae
- Methanobrevibacter smithii (methane)
- Co-morbid SIFO – 24% of SIBO patients candida and other fungal spp



The prevalence of overgrowth by aerobic bacteria in the small intestine by small bowel culture: relationship with irritable bowel syndrome. Pyleris E, Giamerellos-Bourboulis EJ, Pimentel M, et al. Dig Dis Sci 2012 May;57(5):1321-9. doi: 10.1007/s10620-012-2033-7. Epub 2012 Jan 20.

Is SIBO a dysbiosis state rather than just overgrowth?



Bohm, SIBO Con 2018

Anti-microbials

PRIMARY HERBS

- Berberine containing herbs (H)
- Garlic (M)
- Pomegranate (H)
- Oregano (H, M, F)
- Horopito (H, F)

SECONDARY HERBS

- Neem (H, M, F)
- Clove (F, H)
- Artemisia annua (H)
- Usnea (H, F)

H=Hydrogen, M=Methane, F= Fungal

Berberine containing herbs

- Clinically well established for reducing hydrogen
- Phellodendron amurense, Mahonia aquafolium (Oregon grape), Coptis chinensis (Goldthread), Berberis vulgaris (Barberry) , Hydrastis canadensis (Golden Seal)
- Berberine: different berberine alkaloids have different actions
- effective against: E.coli, Klebsiella p., P. aeruginosa, Staphyloccocus spp, Streptococcus spp and candida spp
- interferes with the adhesion of LTA (lipoteidoic acid), a ligand responsible for the adherence of Streptococci to epithelial cells

Berberine - MOA

- Efflux pump inhibition
- Bacterial cell membrane permeability modification
- Inhibition of biofilm formation
- Inhibition of bacterial replication
- Anti-virulence properties via quorum quenching

1.Buhner, S (2012) Herbal Antibiotics, USA; Storey Publishing

2.Goldenseal (Hydrastis canadensis L.) extracts synergistically enhance the antibacterial activity of berberine via efflux pump inhibition. Ettefagh, KH et al. Planta Med 2011 May;77(8):835-40

3.Quorum quenching and antimicrobial activity of goldenseal (Hydrastis canadensis) against methicillin-resistant Staphylococcus aureus (MRSA). Cech NB, et al. Planta Med. 2012 Sep;78(14):1556-61

Berberine containing herbs

- poorly absorbed from GI thus ideal for local infections
- Mucous membrane “tonifying” effect
- Berberine is also
  - Antiinflammatory
  - Antioxidant
- Ingredient in many “gut antimicrobial formulas” – ensure a daily dose of 2-3grams of berberine if included with other strong antimicrobials. Most herbal formulas only deliver around 500mg
- Tincture: standard dose is 30-50ml a week, may have to go much higher than that
- Caution:
  - High berberine can have hypoglycemic effects and also inhibit MOA enzyme

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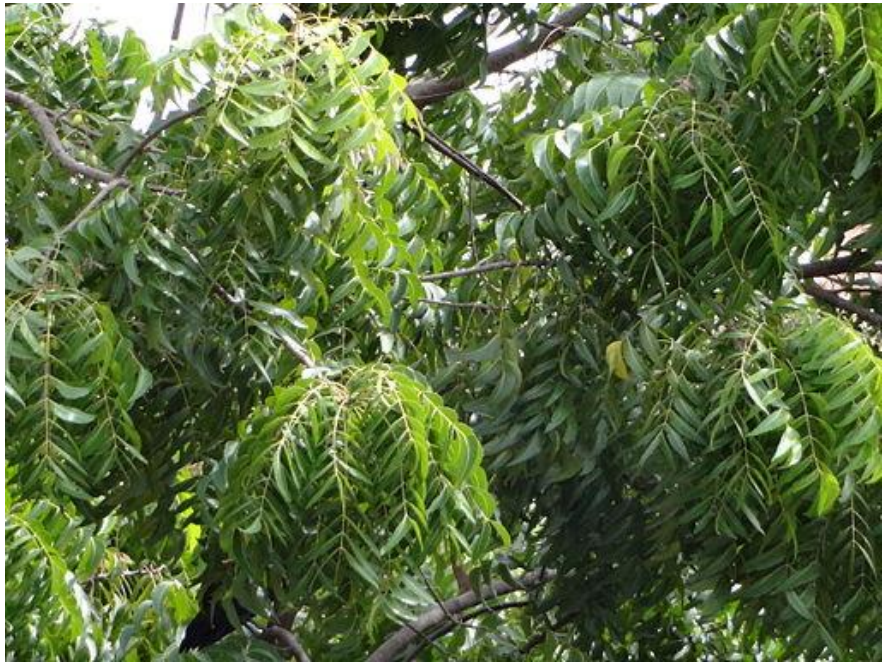
Azadirachta indica (Neem)

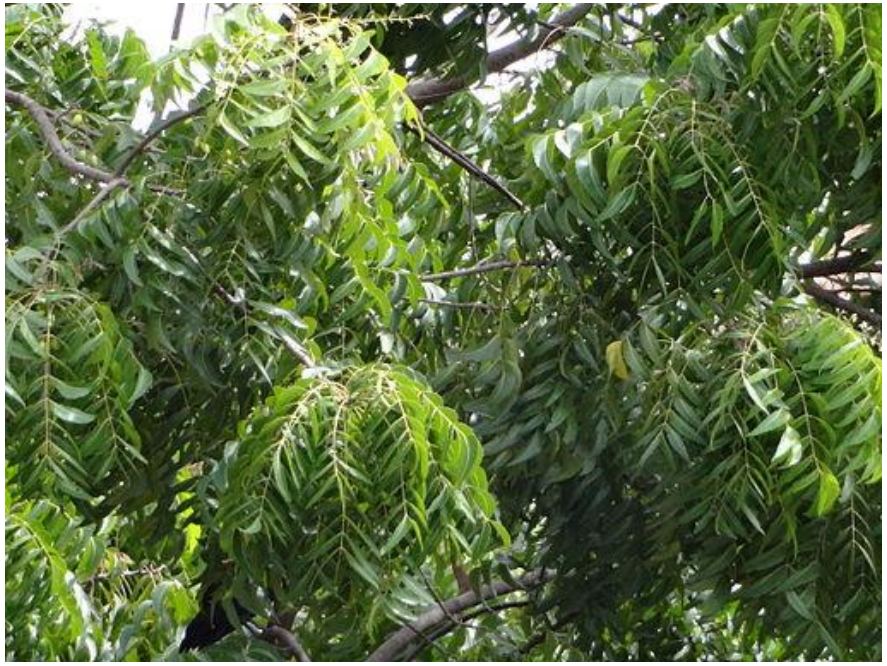
- “The village pharmacy” – wide variety of uses
- Antibacterial
- Antiviral
- Immune modulating (blocks TNFa)
- Anti-parasitic
- Neem is generally accepted in the ayurvedic medical tradition as a therapy for ulcers and other types of gastric discomfort. “Neem promotes a healthy digestive system by protecting the stomach, aiding in elimination and removing toxins and harmful bacteria”.



Azadirachta indica (Neem)

- Leaves and bark extract used internally
- Oil is very useful topically for skin disorders

- DOSE
  - Capsules 500mg BID- TID



Allium sativum (Garlic)

- Allium sativum is antifungal, antibacterial, antiviral
- Allicin (diallyl thiosulphinate)– widely studied constituent of Garlic
- Highly volatile compound (unstable)
- Main MOA –
  - inhibition of thiol containing enzymes which maintain intracellular redox state within bacterial cells.
  - Disrupts electrochemical potential of yeast cells – causes apoptosis
- Do not use “aged garlic” or fresh garlic extracts– not as effective and contain Fructans (high FODMAP)
- Allisure 360mg BID- TID
- clinically proven to lower methane

Clove *Syzygium aromaticum*

- 15-20% of clove is essential oil, primarily Eugenol.
- Anti-proliferative, antiinflammatory
- Active against a wide variety of gram (-) and (+) bacteria, including K.pneumoniae, E.coli, Proteus mirabilis, Streptoccoccus, Staphyloccocus, Bacillus cereus, and H.pylori
- Broad spectrum anti-fungal – candida spp, Aspergillus, Dermatophytes (trichophyton etc)
- Anti-histamine: inhibits mast cell degranulation and reduction of mesenteric Mast cell infiltration

Antimicrobial agents from plants: antibacterial activity of plant volatile oils. Doorman HJ. J Appl Microbiol 2000 Feb;88(2):308-16.

Antimicrobial activity of five herbal extracts against multi drug resistant (MDR) strains of bacteria and fungus of clinical origin. Khan et al. Molecules. 2009 Feb 4;14(2):586-97

Antiproliferative and Molecular Mechanism of Eugenol-Induced Apoptosis in Cancer Cells. Jaganathan, SK et al. Molecules. 2012 May 25;17(6):6290-304.

Clove *Syzygium aromaticum*

Gastroprotective:

- stimulates gastric mucous production
- Antibacterial against H.pylori

Motility

- Helpful in IBS-C
- Increase gastrointestinal muscle propulsion similar to metoclopramide and carbachol- cholinergic activity

Dose

- 10-15ml per week of a 1:2 extract
- Caution – excess doses can increase bleeding time, some evidence of CYP3A4 inhibition

Gastroprotective activity of essential oil of the Syzygium aromaticum and its major component eugenol in different animal models**.** Sein SK et al. Naunyn Schmiedebergs Arch Pharmacol 2011 Feb;383(2):149-58
.
Gastrointestinal effects of Syzigium aromaticum (L) Merr. & Perry (Myrtaceae) in animal models. Agbaje EO. Nig Q J Med Hosp 2008 Jul-Sep;18(3):137-41.

Pomegranate *Punica granatum*

- Juice, rind and seed used
- Active constituents: ellagic acid glycosides and ellagitannins, other tannins, flavonoids
- **Gram –positive bacteria** : Staphylococcus aureus, Streptococcus, spp, and Bacillus spp
- **Gram-negative bacteria**: E.coli, Campylobacter jejuni, Salmonella spp, Shigella spp, Vibrio spp, Klebsiella pneumonia, Pseudomonas aeruginosa, Yersinia enterocolitica, H.pylori
- **Fungal**: candida spp
- **Parasitic infections**: Giardia spp, Blastocystis spp, Entamoeba h., Cryptosporidium parvum, and more..

Pomegranate *Punica granatum*

- “Significantly enhances growth of Lactobacillus spp, Bifidobacterium breve and Bifidobacterium infantis while inhibiting the growth of pathogenic clostridia and Staphylococcus aureus”
- Therapeutic Dose: 40-80ml/week (10ml daily) of a 1:2 tincture

Evaluation of antimicrobial activity of Punica granatum peel against enteric pathogens: an in vitro study. Pai V, et al Asian Journal of Plant Science and Research 1(2), 57-62

The Pomegranate: Effects on Bacteria and Viruses That Influence Human Health. Howel A, D’Souza D. Evid Based Complement Alternat Med. 2013; 2013: 606212.

The effect of pomegranate (Punica granatum L.) byproducts and ellagitannins on the growth of human gut bacteria. Bialonska D, Kasimsetty SG, Schrader KK, Ferreira DJ Agric Food Chem. 2009 Sep 23; 57(18):8344-9.

Artemisia annua (Qing Hao)

- Active constituents: essential oils and sesquiterpenoids (artemisinins)
- Classically used for parasites, malaria
- Antimicrobial activity against
  - Gram –positive bacteria : Staphylococcus aureus, Streptococcus, spp, and Bacillus spp
  - Gram-negative bacteria: E.coli, Salmonella spp, Klebsiella pneumonia, Pseudomonas aeruginosa, Proteus spp
- Antiparasitic against: Toxoplasma gondii, Schistosoma (blood fluke), Fasciola hepatica (liver fluke), Plasmodium f.

Artemisia annua (Qing Hao)

- Immunomodulation- inhibits NO, iNO and NF-kB
- Therapeutic Dose: 20-50ml/week 1:2 extract

Artemisinin Attenuates Lipopolysaccharide-Stimulated Proinflammatory Responses by Inhibiting NF-κB Pathway in Microglia Cells.Cansheng Zhu, et al. PLoS One. 2012; 7(4): e35125.Published online 2012 Ap13. doi:

Essential Oil of Artemisia annua L.: An Extraordinary Component with Numerous Antimicrobial Properties. Bilia AR, et al. Evid Based Complement Alternat Med. 2014; 2014: 159819.

Antibacterial Activity of Essential Oils and Plant Extracts of Artemisia (Artemisia annua L.) In Vitro. Massiha A, et al. Zahedan Journal of research in Medical Sciences, 15(6), 14-18

Usnea spp (Old Man's Beard)

- Over 600 Usnea spp – found on every continent
- Primary active constituent: usnic acid
- Primarily active against gram positive bacteria:
  - Bacillus spp, Clostridium spp, Enterococcus spp, Listeria monocytogenes, Staphylococcus spp, Streptococcus spp, etc
- Some gram negatives: H.pylori, E. coli, Yersinia enterocolitica, Proteus mirabilis
- Antiparasitic
- Candida spp

Usnea spp (Old Man's Beard)

- Anti-inflammatory- in one study as or more effective as NSAID and hydrocortisone
- Anti-oxidant: activates superoxide dismutase (SOD) and glutathione s-transferase (GST) enzymes, protects against damage in mucosal cells
- Therapeutic Dose 10-15ml daily 1:2 extract

Buhner, SH (2012) Herbal Antibiotics: Natural Alternatives for treating Drug-Resistant Bacteria, 2nd ed, Massachusetts, USA : Storey Publishing, p.197

Contributions to the complex study of some lichens-Usnea genus. Pharmacological studies on Usnea barbata and Usnea hirta species. Dobrescu D, et al. Rom J Physiol. 1993 Jan-Jun;30(1-2):101-7

Effects of water extract of Usnea longissima on antioxidant enzyme activity and mucosal damage caused by indomethacin in rats. Halici, M, et al. Phytomedicine 2005 Sep;12(9):656-62.

SIFO – small intestinal fungal overgrowth

- Large intestinal fungal overgrowth also very common
- Issues with candida spp:
  - Often cause similar symptoms to SIBO
  - Commonly forms biofilm
  - Overgrowth easily evades detection
- Dr Rao study
- SIFO co-morbid with SIBO in 20%
- SIFO found in 26% of patients with “unexplained GI symptoms”

Small intestinal fungal overgrowth. Erdogan A, Rao SS. Curr Gastroenterol Report. 2015 Apr;17(4):16

Antifungal herbs

- Many of the herbs discussed also exhibit antifungal properties
- Classic antifungal herbs include Pau D'Arco, Uva Ursi, Berberine herbs
- Essential oils of clove, oregano, and thyme are particularily useful
- Oregano
- Horopito

Oreganum vulgare (Oregano)

- Traditionally used for digestive, urinary, and respiratory disorders.
- Carvacrol main active antimicrobial constituent (mainly antifungal)
- Active against candida spp, but also S. aureus, Pseudomonas a., and Blastocystis hominis
- Clinically shown to be effective for SIFO and methanogens
- Effective against candida biofilm
- antioxidant
- Usually dosed as oil of oregano (50-100mg 2x daily)

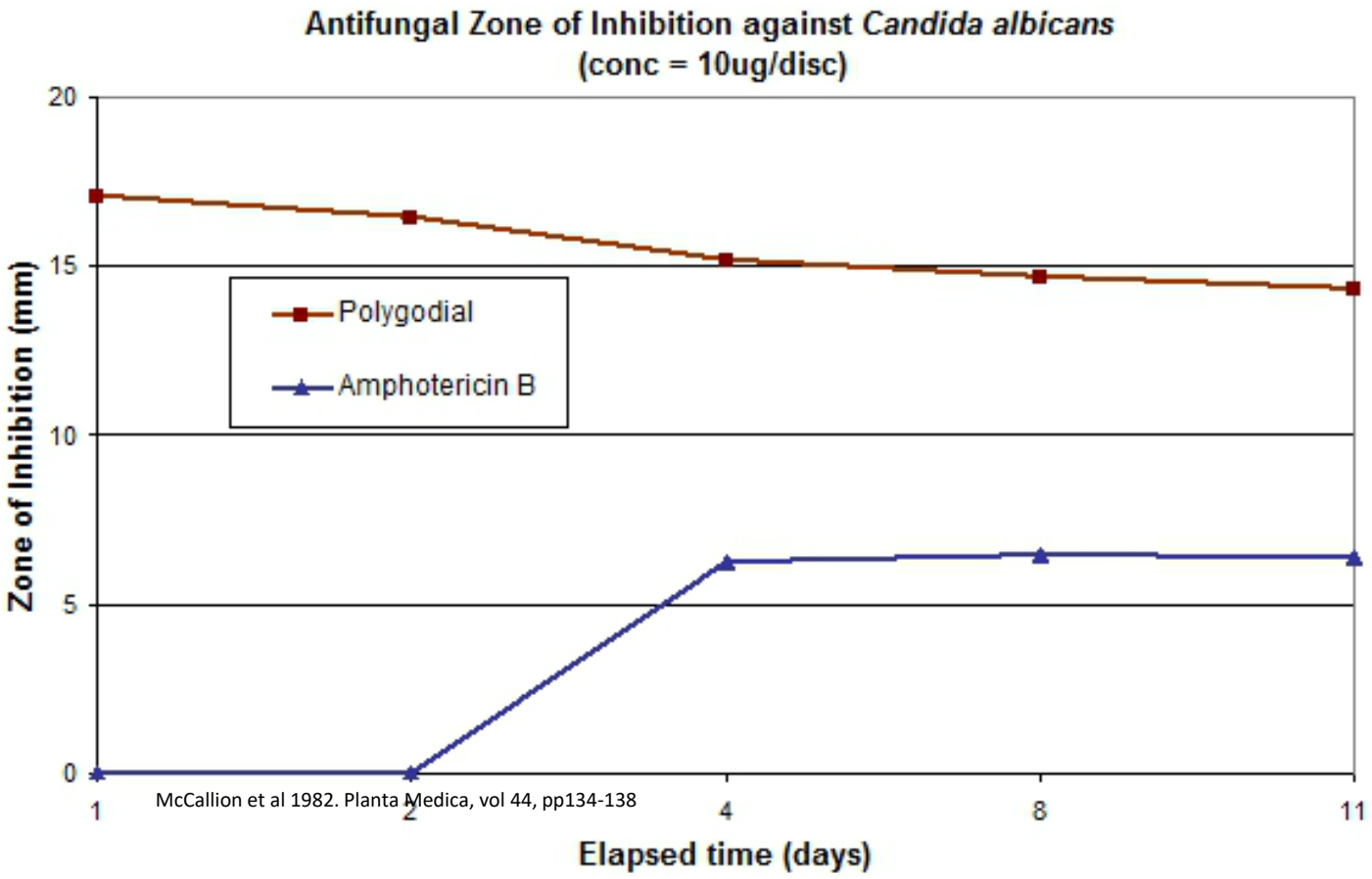
Mechanism of Antifungal Activity of Terpenoid Phenols Resembles Calcium Stress and Inhibition of the TOR Pathway. Rao A, et al. Antimicrob. Agents Chemother.December 2010 vol. 54 no. 125062-5069

Pseudowintera colorata (Horopito)

- Native to New Zealand
- Active constituent: Polygodial
- strong antifungal activity against the yeast like fungi C. albicans, C. utilis, C. krusei, Cryptococcus neoformans, S. cerevisiae and also filamentous fungi including T. mentagrophytes, T. ruburum and Penicillium marneffei
- moderate antibacterial activity against both gram positive bacteria (including Bacillus subtilis and Staphylococcus aureus) and gram negative bacteria (including Escherichia coli and Salmonella)
- MOA: polygodial is a nonionic surfactant that damages the permeability barrier of yeast cells.

Mode of Action of Polygodial, an Antifungal Sesquiterpene Dialdehyde. Taniguchi, M, et al. Agricultural and Biological Chemistry, 52(61), 1409–1414.

Polygodial



McCallion et al 1982. Planta Medica, vol 44, pp134-138

Other antifungal substances

01

Undecenoic acid

02

Caprylic acid

03

Candida ”enzymes”

04

Nystatin/Nilstat

Liquid antimicrobial formula

SIBO formula- 7.5ml 2 x daily

In 100ml (1 week supply):

- Oregon grape (or Coptis/Goldenseal) 40ml
- Pomegranate 40ml
- Clove 20ml

- SIBO/SIFO formula – 7.5 ml 2 x daily – equal parts
  - Pomegranate
  - Usnea
  - Horopito
  - Oregon grape (or Coptis/Goldenseal)

Curcumin: anti inflammatory and antioxidant

- Curcumin is one of the active constituents of Turmeric
- Widely studied herb with multiple applications
- Anti-inflammatory effect very well established, both in research and clinically
  - Inhibits NFkb, COX2, LOX, MMP, TNFa, PGE2
  - stimulates the gallbladder to produce bile.
  - The German Commission E, which determines which herbs can be safely prescribed in Germany, has approved turmeric for digestive problems. And one double-blind, placebo-controlled study found that turmeric reduced symptoms of bloating and gas in people suffering from indigestion.

Curcumin in IBS

- 2004 study of 207 randomized patients received either 1.8g or 3.6g of dried turmeric daily for 8 weeks
- “IBS prevalence decreased significantly in both groups between screening and baseline (41% and 57%), with a further significant drop of 53% and 60% between baseline and after treatment, in the one- and two-tablet groups respectively ($p < 0.001$). A post-study analysis revealed abdominal pain/discomfort score reduced significantly by 22% and 25% in the one- and two-tablet group respectively, the difference tending toward significance ($p = 0.071$).
- **There were significant improvements in all bar one of the IBSQOL scales of between 5% and 36% in both groups, approximately two thirds of all subjects reported an improvement in symptoms after treatment, and there was a favorable shift in self-reported bowel pattern.** There were no significant differences between groups”

Turmeric extract may improve irritable bowel syndrome symptomology in otherwise healthy adults: a pilot study. J Alt Complement Med. Bundy R, et al. 2004 Dec;10(6):1015-8.

GI Antispasmodics and Carminatives

- Spasmolytics help with regulating motility and abdominal hypersensitivity
- Chamomile – also anxiolytic
  - a- bisabolol reduces visceral nociception
  - Apigenin - mild anxiolytic via benzodiazepine receptors, anti-inflammatory – inhibits IL-6 and TNF-a
  - Traditionally used for nervous diarrhea - binds to 5HT 4 receptors
  - 2-3 tsp of flowers per cup of tea to be taken TID ic
  - Tincture- 1-2ml TID pc

Carminatives: gas removal from GI tract

- Caraway seed – very effective carminative and spasmolytic
  - Active constituents: Carvol and d-limonene (carvene)
  - Relaxant effect on smooth muscle response to acetyl choline
  - Used as tea or in tincture
- Fennel
  - Fenchone and anethol
- **Carminative Tea** - In equal parts:
  - Caraway seeds
  - Fennel seeds
  - Anise seeds
- 1 teaspoon, crush seeds and steep for 20 minutes in 1 cup of water
- Drink after each meal

Relaxant effect of ethanol extract of Carum carvi on dispersed intestinal smooth muscle cells of the guinea pig. Al-Essa, MK et al.Pharm Biol 2010 Jan;48(1):76-80.

Antibiotics for SIBO:

- Long term damage to the microbiome with repeated antibiotic courses

> *"The fecal microbiome was severely affected by most antibiotics: for months, health-associated butyrate-producing species became strongly underrepresented. Additionally, there was an enrichment of genes associated with antibiotic resistance*. ***Clearly, even a single antibiotic treatment in healthy individuals contributes to the risk of resistance development and leads to long-lasting detrimental shifts in the gut microbiome."***

Same Exposure but Two Radically Different Responses to Antibiotics: Resilience of the Salivary Microbiome versus Long-Term Microbial Shifts in Feces Egija Zaura,a Bernd W. Brandt,a M. et al. Mbio November/December 2015 Volume 6 Issue 6 e01693-15

Rifaximin (Xifaxan)

- Bile soluble
- Considered a “eubiotic” antibiotic though recent research showed ‘temporary’ alterations in LI microbiome
- Mostly effective for Hydrogen
- TIP: use the following along with Rifaxmin
  - cholagogues or bile product
  - PHGG
  - Antifungal herb or product

Conventional Antibiotics

Hydrogen only:

- Rifaximin 550 mg TID (1650 mg per day) x 14 days. (Pimentel)
  - 500mg TID compounded is MUCH cheaper (Australia)

Methane and Hydrogen positive:

- Rifaximin 1600 mg per day + Neomycin 500mg BID x 10 days

Other conventional antibiotics are also often used

- Metronidazole 250mg TID

Special treatment consideration for H_2S and Methane

Both can cause constipation

Hydrogen sulfide:

- Zinc acetate 30mg BID or more
- Bismuth 200-300mg 2x daily
- Soy Isoflavones
- Berberine plants?

Methane

- Soy Isoflavones
- Product “ATL” proprietary formula

Considerations

- Use herbs before microbiome-disrupting antibiotics.
- Refer to someone who has experience with herbal extracts if you don’t
- Only use herbal medicines from reputable manufacturers who test batches frequently
- Rotate antimicrobial herbs maintain effectiveness

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Prokinetics

- Aid in resetting the proper motility of the SI
- Indicated for all SIBO patients but mostly for those whose SIBO was triggered by Gastroenteritis or who have damaged vagus nerve
- May have to stay on prokinetics long term
- Every motility SIBO patient has different relapse rates – may only need antimicrobials 1-2 x year. Weigh this up with long term prokinetics ?

Natural Prokinetics

- Bitter Herbs
- Serotonin and acetylcholine precursors – 5HTP, acetyl L-carnitine
- Melatonin
- Bitter orange, D-Limonene
- Iberogast- has been studied

Herbal Prokinetics

Dr. J's Herbal Bitters formula:

Oregon grape/Gentian/Baical Skullcap/Dandelion root: 2-3 whole droppers in water 15 min before meals

- Dandelion root: cholagogue
- Gentian, Oregon Grape: bitters stimulate HCL secretion, possibly motility
- Baical skullcap: anti-inflammatory, antioxidant

Popular formulas:

1. **Iberogast** Iberis amara, Angelica archangelica, carum carvi, Silybum marianum, Melissa officinalis, chelidonium majus, Mentha piperitae, Glycerrhiza
20 drops 3 x daily before meals and before bed. Or 60 drops at bed time

2. **Motilpro** Ginger, 5HTP, acetyl L carnitine, P5P, dose 3 caps morning and night

Clove extract?

Special Mention: Lion's Mane
(Hericium erinaceus)

- Multiple active constituents from fruiting body and mycelia: including polysaccharides, meroterpenoids (i.e. hericenones), cyathane diterpenoids (i.e. erinacines), steroids, alkaloids and lactones
- Anti-bacterial: Bacillus cereus, Bacillus subtilis, Staphylococcus aureus, Enterococcus faecalis, Salmonella spp, Salmonella Typhimurium, Shigella spp., Pseudomonas aeruginosa, Escherichia coli. anti-inflammatory, anti-oxidant
- Gastroprotective- used regularly in TCM clinical practice, either alone or combined with other remedies, for the treatment of ulcers, inflammation and tumors of the digestive system

Thongbai, B., Rapior, S., Hyde, K. D., Wittstein, K., & Stadler, M. (2015). Hericium erinaceus, an amazing medicinal mushroom. Mycological Progress, 14(10), 1-23

Special Mention: Hericium erinaceus (Lion's Mane)

- Protective effect against LPS-induced inflammation by suppressing the generation of excessive active pro-inflammatory mediators, including NO, ROS, prostaglandin E2, IL-1β, and TNFa
- Extracts of Lion's Mane have demonstrated the ability to induce neurite outgrowth of neuronal cells, including those from the brain, spinal cord and retina, as well as promote the regeneration of peripheral nerve damage in animal models of nerve injury. Ericenones and erinacines have been found to stimulate nerve growth factor synthesis
- Available as freeze dried extracts, tinctures, teas

Mori, K., Ouchi, K., & Hirasawa, N. (2015). The Anti-Inflammatory Effects of Lion's Mane Culinary-Medicinal Mushroom, Hericium erinaceus (Higher Basidiomycetes) in a Coculture System of 3T3-L1 Adipocytes and RAW264 Macrophages. International Journal of Medicinal Mushrooms, 17(7), 609-618

Lai, P-L., Naidu, M., Sabaratnam, V., Wong, K. H., David, R. P., Kuppusamy, U. R., Abdullah, N., & Malek, S. N. A. (2013). Neurotrophic properties of the Lion's Mane medicinal mushroom, Hericium erinaceus (higher Basidiomycetes) from Malaysia. International Journal of Medicinal Mushrooms, 15(6), 539-554

Conventional Prokinetics

- LDE- low dose Erythromycin 50mg hs
- Prucalopride (Resotrans)
- LDN – low dose naltrexone
- Domperidone

Pregnancy

- Safe for pregnancy: Allicin, Low Dose Naltrexone (LDN), Iberogast, Ginger (up to 2,000mg) ›
- Not recommended (per label): Berberine, Oregano, Neem, Cinnamon, Motil Pro
- Category B: Metronidazole, Prucalopride, Erythromycin- at Antibiotic Dose (a 15x higher dose vs Prokinetic Dose) "Animal reproduction studies have failed to demonstrate a risk to the fetus and there are no adequate and well controlled studies in pregnant women."
- Category C: Rifaximin "Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.")
- Category D: Neomycin "There is positive evidence of human fetal risk based on adverse reaction data from investigational or marketing experience or studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks."

Credit Dr Allison Siebecker, SIBOinfo.com

Lactation

- Safest antimicrobials: Allicin, Rifaximin, Neomycin
- Safest Prokinetics: LDN, Iberogast, Ginger (NJ: I've used bitters at 6+ months lactation safely)
- Safe: Allicin, Iberogast, Ginger (AS used Berberine & Oregano at 8+ months lactation safely) ›
- Not Recommended (per label): Berberine, Oregano, Neem, Cinnamon, Motil Pro ›
- Low Secretion in Milk: Rifaximin, Neomycin (clinically insignificant/ very low), Erythromycin
- Unknown: Prucalopride (no anticipated effects, lack of human data)
- Secreted In Milk: Metronidazole

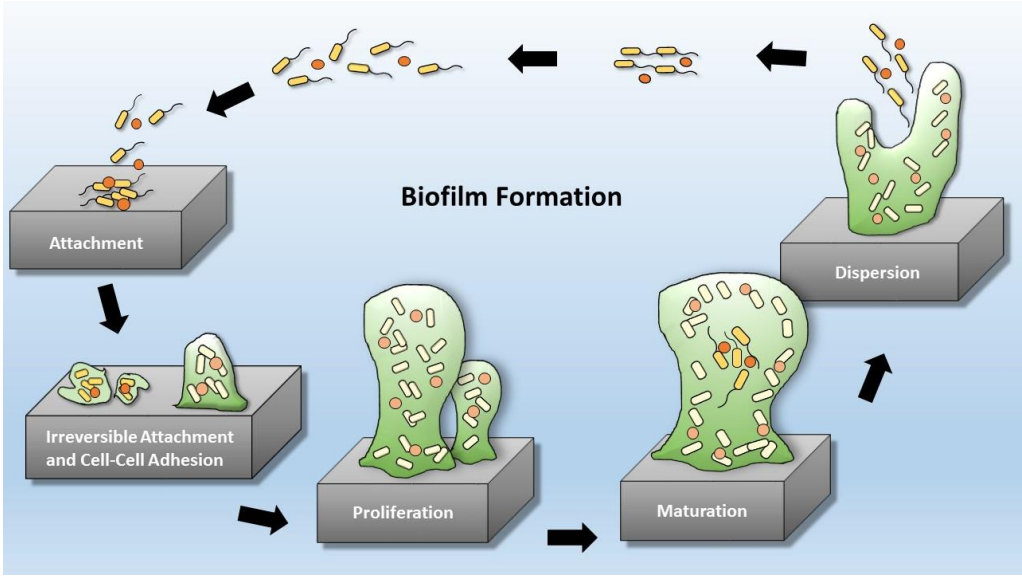
Credit Dr Allison Siebecker, SIBOinfo.com

Pediatrics

- Rifaximin: 10-30mg/kg x 7-14 days (30mg showed better results), or 200mg 3xday
- Neomycin: ½ adult dose- 250mg 2xd x14 days, or 50mg/kg 3xd
- Metronidazole: 30 to 50 mg/kg/day orally in 3 divided doses, Maximum dose: 2.25 g/day (AS hasn't used it)
- Herbs- Allicin, Berberine, (NJ: Oregon Grape, Pomegranate, Burr Marigold) : ½ adult dose (or ¼ dose if very young/low weight)
- Prucalopride: 0.01mg/kg, if > 50kg use adult dose of 0.5mg/night
- Low Dose Erythromycin: 1-3mg/kg body weight, typically 25mg/night
- Iberogast: 10-30 drops/night
- Safety Unknown: Oregano, Neem Powder (Neem Oil is unsafe), Cinnamon, Motil Pro (AS has used at ¼-½ Neem Powder capsules adult dose in 7+yo safely)

Credit Dr Allison Siebecker, SIBOinfo.com

Biofilms



- Considered the rule, rather than the exception in most infections
- Many, if not most, microorganisms form and persist in cohesive community structures termed biofilms.
- Biofilms are groups of organisms which have a protective matrix of metallo-mineral and organic molecule coating.
- This ’super-organism’ can evade even the most powerful antibiotics

When to use biofilm treatments?

- Any chronically ill patient (ie SIBO “for years”)
- Typically I start it a few days before the second round of antimicrobial (if needed) in Phase 2
- With conventional antibiotics
- SIFO
- No need for special timing of dosing
- Can intensify sxs

Biofilm treatment

1. Prevention of biofilm formation: eg xylitol, enzymes eg Serrapeptase, Nigella
2. Active treatment (usually required in chronically ill patients)
    - Antimicrobials (eg Nigella sativa
    - Direct Biofilm disruption:

      Bismuth subnitrate 200-300mg daily (usually with a thiol)

      EDTA
    - Thiols: ALA (300-500 mg BID), NAC 500-1000 mg BID) GSH 300mg BID-TID

      (also DMSA, DMPS)
    - Silver nano particles 15ml QID

Credit Dr Paul Anderson

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Final thoughts on Antimicrobial treatments

- You may need to use multiple formulas
- If you get partial improvement or chronic relapsing– consider biofilm treatment
- Red Flag– if patient is on round after round of herbal treatments and still symptomatic

Thank you

Module 4:

Pre and Probiotic prescriptions

Retraining a sluggish colon

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