HERBAL SOLUTIONS TO
Common Gut Bugs

Compiled by Dr. Jack Tips, Ph.D. C.C.N. The WellnessWiz
Aeromonas hydrophila (Bacteria)

- Colitis
- Gastroenteritis
- Diarrhea
- Myonecrosis (Gangrene)
- Eczema
- Flesh eating bacteria (cellulitis, gangrene)

The Aeromonas hydrophila bacterium is found in fresh and brackish water. It is a Gram-negative rod-form that has polar flagella and is a facultative anaerobe. It is also oxidase-positive and glucose-fermenting. The bacterium was first discovered in 1962 while researchers were looking at the causes of the eel and fish disease “red fin.” In fish and other marine life it has been associated with several diseases: tail rot, fin rot, and hemorrhagic septicemias. In humans, the bacterium is transmitted through fecal-oral transmission, contact with contaminated water, food, soil, feces, and ingestion of contaminated fish or reptiles. The most common way of catching the bacterium is through an open wound in contaminated water. The mild symptoms of the infection include fever and chills. The people that have the infection and it becomes septic, the symptoms include abdominal pain, nausea, vomiting, and diarrhea. There are three different types of wounds that can come from aeromonas hydrophila in human: cellulitis, myonecrosis, and ecthyma gangrenosum. Cellulitis is the most common type and it is the inflammation of the subcutaneous tissue. The other two, myonecrosis and ecthyma gangrenosum, are less common but have worse results. Cellulitis, with the proper medication, will pass with minimal damage while the others cause amputations and sometimes can be fatal. This microbe is resistant to penicillin, ampicillin, carbenicillin and ticarcillin but is susceptible to expanded- and broad-spectrum cephalosporins, aminoglycosides, carbapenems, chloramphenicol, tetracycline, trimethoprim-sulfamethoxazole and the quinolones.

Herbal: Neem, Ocimum, Curcurmin, and others.

- R Harikrishnan, M Nisha Rani, C Balasundaram Hematological and biochemical parameters in common carp, Cyprinus carpio, following herbal treatment for Aeromonas hydrophila infection

The common carp, Cyprinus carpio was injected 10^8 cfu/ml with a strain of the Gram-negative bacterium, Aeromonas hydrophila. After inoculation, the disease signs began on the 7th day as a haemorrhagic spot at the site of injection and the lesion subsequently progressed in size. After this period, the mortality of infected group was 10±5% daily; hence, they were dip treated with an aqueous Azadirachta indica leaf extract at 1 g/l for 10 min daily for 30 days until the lesions healed completely. The hematological and biochemical parameters of the infected and control fishes were monitored on the 10th, 20th and 30th day. The white blood cell (WBCs: 10^4 mm−3) counts significantly increased from 3.15±0.14 in control fish to 3.6±0.20 on the 10th day of treatment (\( P < 0.01 \)) and only in treated fish (\( P < 0.05 \)) on the 30th day. The red blood cell (RBC: 10^6 mm−3) counts also significantly decreased to 1.68±0.12 on the 10th day (\( P = 0.001 \)) when compared to the control fish (2.31±0.16). The hemoglobin (Hb) and hematocrit/packed cell volume (PCV) counts decreased significantly from 10.37±0.61 and 33.60±3.20 in the infected fish to 6.21±0.60 and 20.30±3.6 in the treated fish on the 10th day and this value attained a normal level on the 30th day. On the 10th day of treatment, the serum protein level significantly (\( P < 0.01 \)) increased from 3.34±1.32 in controls compared to 3.61±0.96 in treated fishes. It subsequently remained high but attained near normal (\( P > 0.05 \)) values on the 30th day. In infected fishes the values continued to decrease significantly from 2.76±0.69 on the 10th day to 2.38±0.39 on the 30th day. Serum glucose, cholesterol and serum calcium levels were significantly lower in control fishes (119±18.93, 10.00±1.39 and 4.88±0.34) compared to treated fishes (77.63±15.57, 6.11±1.55 and 3.62±0.39) on the 10th day of treatment. In the infected fishes, the values continued to decrease significantly from the 10th day (64.6 ± 11.97, 4.37 ± 1.39 and 3.30 ± 0.46) and by the 30th day reached 56.10 ± 9.56, 4.31 ± 0.91 and 2.88 ± 0.52, respectively.

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Harikrishnan R1, Balasundaram C, Moon YG, Kim MC, Kim JS, Dhaneenadharen S, Heo MS. Phytotherapy of ulcerative dermatitis induced by Aeromonas hydrophila infection in goldfish (Carassius auratus).
Blastocystis hominis (Protozoa, Stramenopiles)

- Colitis
- Irritable Bowel
- Crohn's
- Frequently Asymptomatic
- Nausea, Vomiting
- Diarrhea
- Fever
- Anorexia
- Abdominal distention
- Often accompanies candida overgrowth

Blastocystis hominis (B. hominis), a protozoal-type microbe, can infect the human digestive tract. Many of those infected are asymptomatic carriers. Once a person or animal has been infected, the parasite lives in the intestine and is passed in feces. Because the parasite is protected by an outer shell, it can survive outside the body and in the environment for long periods in some cases.

These parasites can, however, be associated with a range of gastrointestinal symptoms including diarrhoea/constipation, mushy stools, abdominal discomfort, bloating, gas and pain. Other symptoms may include nausea, vomiting, headaches, dizziness, weight-loss, chronic fatigue, depression, low-grade fever, bloody stools and anal itching. D. fragilis has also been implicated in some cases of indeterminate colitis. Many patients may suffer for years before proper diagnosis is made and are often misdiagnosed as having Irritable Bowel Syndrome (IBS). It is possible to treat these infections with a combination of drugs - after which, most patients report either complete resolution, or a great reduction in symptoms.

Many herbs are useful for killing off parasites. Blastocystis is often resistant to even these, and it can adapt if you use the same remedy for very long. Using a rotation of herbs at four or five days per herb can give you an edge so you can at least relieve yourself of the digestive upset the parasite causes.

Effective herbs: black walnut, wormwood, cloves, oil of oregano, and gentian.

Many people find that after battling blastocystis for months or years, they still test positive for the parasite. According the Centers for Disease Control and Prevention, this parasite is resistant to drugs and other treatments and may never be fully eliminated.

Natural Strategies

Establish support for SIgA production using Saccharomyces Boulardii, also prescribe with any “pathogen purging” therapy, e.g. PACT™ (Probiotic Advanced Colonization Technique) black walnut, artemesinin, berberine sulphate, citrus seed extract, oregano oil; and re-colonization of probiotic species. Botanical therapy also inhibits IL-8 and reduces inflammation.

Restoring the microbial ecology with the use of suitable probiotics and immune supporting nutrients especially Vitamin A for the modification of Treg immune activity and glutamine for barrier integrity.
Candida albicans (Yeast, Fungus) Parapsilosis, geotrichum capitatum

- Fatigue
- Brain Fog
- Bloating from carbohydrate foods
- Colitis
- Myotoxin: gliotoxin
- IgA damaging
- Liquidy stools
- Overgrowth in G.I. tract allows vaginitis
- Allergy to candida = systemic reaction

Candida Albicans is an opportunistic fungus (or form of yeast) that is the cause of many undesirable symptoms ranging from fatigue and weight gain, to joint pain and gas. The yeast is a part of the gut flora. When the population starts getting out of control it weakens the intestinal wall, penetrating through into the bloodstream and releasing its toxic byproducts throughout the body. The major waste product of yeast cell activity is Acetaldehyde, a poisonous toxin that promotes free radical activity in the body. Acetaldehyde is also converted by the liver into ethanol (drinking alcohol). Some people even report feeling a drunk or hung-over feeling along with debilitating fatigue from the high amounts of ethanol is their system.

Candidiasis is a fungal infection. There are over 20 species of Candida yeasts that can cause infection in humans, the most common of which is Candida albicans. Candida yeasts normally live on the skin and mucous membranes without causing infection; however, overgrowth of these organisms can cause symptoms to develop.

Candidiasis that develops in the mouth or throat is called “thrush” or oro-pharyngeal candidiasis. Candidiasis in the vagina is commonly referred to as a “yeast infection.” Invasive candidiasis occurs when species enter the bloodstream and spread throughout the body. Often associated with heavy metals and pesticides which may be used in biofilms. Destruction of C. albicans can thus result in Herxheimer reactions, or die-off reactions, as metals and pesticides are released. The dead fungal forms are toxic, and also contribute to detox reactions, particularly in people with leaky gut.

Invasive candidiasis is a fungal infection that can occur when Candida yeasts enter the bloodstream. Candidemia (a bloodstream infection with Candida), is extremely rare in people without risk factors, but it is the fourth most common bloodstream infection among hospitalized patients in the United States.

Herbs:
- Oregano Oil
- Pau D’Arco
- Olive Leaf extract
- Garlic
- Neem
- Apple Cider Vinegar
- Echinacea
- Black Walnut
- Coconut Oil
- Golden Seal
- Echinacea, many others:

The best time to do this test is the first thing in the morning as soon as you wake up. Before you rinse, spit, or put anything in your mouth, go get a glass of water (in a clear glass). Now build up a bunch of saliva (just mouth saliva, do not cough up anything) and spit it into the glass of water. Observe what happens.

The saliva will float. That is OK and normal. If within 15 minutes you see thin projections extending downward into the water, it is a positive sign for candida. The projections may look like hair, or small strings, like a jelly fish or spider legs, moving down into the water from the saliva floating on the top. Other positive indications might be very “cloudy” saliva that will sink to the bottom of the glass within a few minutes or particles that slowly sink or suspend below the saliva glob. What you are seeing are colonies of yeast which band together to form the strings.
Citrobacter freundii (Bacteria)

Citrobacter rodentium

- **Gastroenteritis**
- **Ulcerative Colitis**
- **Inflammatory Bowel Syndrome**
- **Rheumatoid Arthritis**
- **Hydrogen Sulfide (H₂S) producer (mitochondrial disruptor)**
- **Systemic Inflammation**

The Citrobacter species, including Citrobacter freundii, are aerobic gram-negative bacilli. Citrobacter freundii are long rod-shaped bacteria. Most C. freundii cells are surrounded by many flagella used to move about, but a few are non-motile. Its habitat includes the environment (soil, water, sewage), food, and the intestinal tracts of animals and humans. It belongs to the family of Enterobacteriaceae.

As an opportunistic pathogen, C. freundii is responsible for a number of significant opportunistic infections. It is known to be the cause of a variety of nosocomial infections of the respiratory tract, urinary tract, blood and several other normally sterile sites in patients. C. freundii represents approximately 29% of all opportunistic infections. Therefore, one of the chief reasons many different strains and plasmids of the C. freundii genome are being sequenced is in order to find antibiotics that can fight these opportunistic infections.

Surprisingly, this infectious microbe in humans plays a positive role in the environment. C. freundii is responsible for reducing nitrate to nitrite in the environment. This crucial conversion is an important stage in the nitrogen cycle. And recycling nitrogen is very essential because the earth’s atmosphere is about 85% nitrogen. Therefore, due to its important contribution to the environment is another motivation for sequencing the genome of C. freundii.

**Herbs:** Garlic, Aloe vera, Citrus Seed Extract, Caprylic Acid, Oregano Oil, Uva Ursi

*Citrobacter freundii Invades and Replicates in Human Brain Microvascular Endothelial Cells*

Neonatal bacterial meningitis remains a disease with unacceptable rates of morbidity and mortality despite the availability of effective antimicrobial therapy. *Citrobacter* spp. cause neonatal meningitis but are unique in their frequent association with brain abscess formation. The pathogenesis of *Citrobacter* spp. causing meningitis and brain abscess is not well characterized; however, as with other meningitis-causing bacteria (e.g., *Escherichia coli* K1 and group B streptococci), penetration of the blood-brain barrier must occur. In an effort to understand the pathogenesis of *Citrobacter* spp. causing meningitis, we have used the in vitro blood-brain barrier model of human brain microvascular endothelial cells (HBMEC) to study the interaction between *C. freundii* and HBMEC. In this study, we show that *C. freundii* is capable of invading and trancytosing HBMEC in vitro. Invasion of HBMEC by *C. freundii* was determined to be dependent on microfilaments, microtubules, endosome acidification, and de novo protein synthesis. Immunofluorescence microscopy studies revealed that microtubules aggregated after HBMEC came in contact with *C. freundii*; furthermore, the microtubule aggregation was time dependent and seen with *C. freundii* but not with noninvasive *E. coli* HB101 and meningitic *E. coli* K1. Also in contrast to other meningitis-causing bacteria, *C. freundii* is able to replicate within HBMEC. This is the first demonstration of a meningitis-causing bacterium capable of intracellular replication within BMEC. The important determinants of the pathogenesis of *C. freundii* causing meningitis and brain abscess may relate to invasion of and intracellular replication in HBMEC.
Clostridium difficile

- Watery Diarrhea
- Colitis
- Fever
- Loss of appetite
- Nausea
- Abdominal tenderness, pain

Clostridium (C. difficile) is a bacterium that causes inflammation of the colon, known as colitis. People who have other illnesses or conditions requiring prolonged use of antibiotics, and the elderly, are at greater risk of acquiring this disease. The bacteria are found in the feces. People can become infected if they touch items or surfaces that are contaminated with feces and then touch their mouth or mucous membranes. Healthcare workers can spread the bacteria to patients or contaminate surfaces through hand contact.

Clostridium difficile is shed in feces. Any surface, device, or material (e.g., toilets, bathing tubs, and electronic rectal thermometers) that becomes contaminated with feces may serve as a reservoir for the Clostridium difficile spores. Clostridium difficile spores are transferred to patients mainly via the hands of healthcare personnel who have touched a contaminated surface or item. Clostridium difficile can live for long periods on surfaces.

Antibiotics should be discontinued; in a small number of patients, diarrhea may go away when other antibiotics are stopped. Treatment of primary infection caused by C. difficile is an antibiotic such as metronidazole, vancomycin, or fidaxomicin.

One problem with antibiotics used to treat primary C. difficile infection is that the infection returns in about 20 percent of patients. In a small number of these patients, the infection returns over and over and can be quite debilitating. While a first return of a C. difficile infection is usually treated with the same antibiotic used for primary infection, all future infections should be managed with oral vancomycin or fidaxomicin.

Lab Tests: C. difficile Toxin, A and B; C. difficile Cytotoxin Assay; Glutamate Dehydrogenase Test detects an antigen. A relatively new molecular PCR (polymerase chain reaction) test can rapidly detect the C. difficile toxin B gene (tcdB) in a stool sample. This test is sensitive but is not widely available. Toxigenic stool culture, which requires growing the bacteria in a culture and detecting the presence of the toxins, is the most sensitive test for C. difficile, and it is still considered to be the gold standard. However, it can take 2 to 3 days for results. A culture will also not distinguish between C. difficile colonization and overgrowth/infection.

Transplanting stool from a healthy person to the colon of a patient with repeat C. difficile infections has been shown to successfully treat C. difficile. These “fecal transplants” appear to be the most effective method for helping patients with repeat C. difficile infections. This procedure may not be widely available and its long-term safety has not been established.

Herbs: Paeony decoction, Pulsatilla Root, Scutellaria, Coptis, Zao Xin Tu and Zhen Ren, Yang Zang Tang (traditional Chinese solutions), also Atractylodis root and Diascorea root, Charcoal.
Dientamoeba fragilis (Protozoa)

- Anorexia
- Colitis
- Diarrhea, Gas
- Nausea, Vomiting
- Abdominal Pain
- Fatigue, Malaise
- Eosinophilia (Enteritis)
- Skin Rash, Hives, Itching (Puritis)
- Irritability
- Dizziness
- Headache
- Often co-infective with pinworms.

Dientamoeba fragilis is a parasite that lives in the large intestine. This protozoan produces trophozoites and has been recently found in the cyst form. The intestinal infection may be either asymptomatic or symptomatic. The lifecycle of this parasite has not yet been completely determined, but some assumptions have been made based on clinical data. Recently, a cyst stage has been reported, although it is yet to be independently confirmed. If true, D. fragilis is probably transmitted by the fecal-oral route. Prior to the report of this cyst stage in the lifecycle of Dientamoeba, transmission was postulated to occur by helminth egg (Ascaris, Enterobius). The rationale for this suggestion was that D. fragilis is closely related to the turkey parasite Histomonas, which is known to be transmitted by the eggs of the helminth, Heterakis.

*D. fragilis* infections are often associated with other intestinal parasites. Ayadi and Barri investigated 1,497 confirmed *D. fragilis* cases and found co-infections with *E. vermicularis*, *B. hominis*, *Endolimax nana*, *Entamoeba coli*, and *Giardia intestinalis*.

Elimination is difficult, unless a PACT™ program is employed. Understanding the role of the terrain and its ability to adapt to anti-pathogenics make it a good survivor. The following help with eradication:

**Herbs & Probiotics**

- Saccharomyces Boulardii up to 30 billion CFU’s daily
- Bifidus (Colonic Bacteria)species and lower small intestinal species in divided doses with food up to 30 billion CFU’s
- Garlic (1000mg – 2000mg per day) – this is a low risk broad antifungal/parasitic suggestion and may be used away from the probiotics suggested above.
- Wormwood,
- Berberine,
- Citrus Seed Extract
- Black Walnut
- Artemesia annua.
Endolimax nana (Protozoa)

- Chronic Fatigue
- Myalgias
- Eczema
- Vaginitis
- Rheumatoid Arthritis
- HIV Immune Progression
- Irritable Bowel
- Malabsorption
- Brain Fog
- Arthritis

Considered harmless in low amounts, becomes pathogenic and toxic in over-proliferative states. Nonpathogenic intestinal protozoa are single-celled parasites commonly found in the intestinal tract but never associated with illness. They do not harm the body, even in people with weak immune systems. Symptomatic people who are found to have these protozoa in their stool should be examined for other causes of their symptoms.

The nonpathogenic intestinal protozoa include: Chilomastix mesnili, Endolimax nana, Entamoeba coli, Entamoeba dispar, Entamoeba hartmanni, Entamoeba polecki, Iodamoeba buetschlii

Endolimax nana is a relatively new member of the pathogenic group of amoebas. It is the smallest of the intestinal amoebas, causing researchers of the past to overlook its potential virulence. This amoeba lives in the lower bowel, but the larvae can sluggishly travel to other parts of the body. It has been linked as a possible cause of rheumatoid arthritis, as well as a host of other collagen-related diseases.

The endolimax nana parasite is a type of amoebozoa which is found in the intestines of humans and other animals especially monkeys. The endolimax nana parasite with four nuclei forms cysts which can eventually become trophozoites. Studies show that the endolimax nana parasite even plays a role in the HIV-1 infection progression. Other studies show that it can cause arthritis by eating the calcium from the bones. The endolimax parasite is the smallest type of amoeba found in the intestine and has been associated as the cause of collagen related diseases and also rheumatoid arthritis. It is also very common for HIV patients to experience diarrhea and other problems due to the presence of the endolimax nana parasite.

Herbs: Wormwood, black walnut, cloves, grapefruit seed extract, goldenseal
Entamoeba histolytica (Protozoa)

This is a single celled parasitic animal, i.e., a protozoa, that infects predominantly humans and other primates. Diverse mammals such as dogs and cats can become infected but usually do not shed cysts (the environmental survival form of the organism) with their feces, thus do not contribute significantly to transmission. The cysts are readily killed by heat and by freezing temperatures, and survive for only a few months outside of the host. The active (trophozoite) stage exists only in the host and in fresh feces; cysts survive outside the host in water and soils and on foods, especially under moist conditions on the latter. When swallowed they cause infections by existing (trophozoite stage) in the digestive tract.

**Trophozoite** – a protozoan of an active (feeding) form as distinguished from one of a reproductive or resting form.

**Cyst** – a capsule formed about a minute organism going into a resting or spore stage; also: this capsule with its contents, a resistant cover about a parasite produced by the parasite or the host.

*E. histolytica*, as its name suggests (*histo*–*lytic* = tissue destroying), is pathogenic; infection can be asymptomatic or can lead to amoebic dysentery or amoebic liver abscess. Symptoms can include fulminating dysentery, bloody diarrhea, weight loss, fatigue, abdominal pain, and amoeboma. The amoeba can actually ‘bore’ into the intestinal wall, causing lesions and intestinal symptoms, and it may reach the blood stream. From there, it can reach different vital organs of the human body, usually the liver, but sometimes the lungs, brain, spleen, etc. A common outcome of this invasion of tissues is a liver abscess, which can be fatal if untreated. Ingested red blood cells are sometimes seen in the amoeba cell cytoplasm.

**Herbs:** Golden Seal (Hydrastis canadensis) Punarnava (Boerhavia diffusa), Barberry (Berberis aristata), Amritha (Tinospora cordifolia), Garlic (*Allium sativa*), wormwood (*Artemesia annua*), Black Walnut (*Juglans nigra*), Yellow Myrobalan (*Terminalia chebula*) and Ginger (*Zingiber officinale*).
Enterobacter cloacae (Bacteria)

- Respiratory infections
- Urinary tract infections
- Endocarditis
- Extracellular matrix infections
- Osteomyelitis
- Central Nervous System Infections
- Intestinal overgrowth linked with obesity

Any of various rod shaped bacteria of the Enterobacteriaceae family. Includes some pathogens of plants and animals such as the colon bacillus and salmonella. Enterobacters are highly adaptable and quickly become antibiotic resistant.

Enterobacter cloacae is the most common Enterobacter species that can cause diseases in humans. This bacteria is widely distributed in water, sewage and soil, and in the feces of healthy persons. They are opportunistic pathogens and cause infections of wounds, the urinary tract and the respiratory tract. They can occasionally cause blood and brain infections, especially in immune-compromised individuals. Antibiotics are the mainstay of treatment for this infection. The goal of therapy is to eradicate the infection and to prevent complications.

A recent study has shown that the presence of Enterobacter cloacae B29 in the gut of a morbidly obese individual may have contributed to the patient's obesity. Reduction of the bacterial load within the patient's gut, from 35% E. cloacae B29 to non-detectable levels, was associated with a parallel reduction in endotoxin load in the patient and a concomitant, significant reduction in weight. Furthermore, the same bacterial strain, isolated from the patient, induced obesity and insulin resistance in germfree C57BL/6J mice that were being fed a high-fat diet. The study concludes that E. cloacae B29 may contribute to obesity in its human hosts through an endotoxin-induced, inflammation-mediated mechanism.


Enterobacter cloacae has been used in a bioreactor-based method for the biodegradation of explosives and in the biological control of plant diseases.

E. cloacae tends to contaminate various medical, intravenous and other hospital devices. Nosocomial outbreaks have also been associated with colonization of certain surgical equipment and operative cleaning solutions. Another potential reservoir for nosocomial bacteremia is the heparin solution used to irrigate certain intravascular devices continually. This fluid had been implicated as a reservoir for outbreaks of device-associated bacteremia in several instances.

**Herbs:** Goldenseal, Elderflower, Uva Ursi, Tea tree oil, Grapefruit seed extract, Artemesia, Echinacea, Olive Leaf Extract, Garlic
Enterococcus faecalis
Streptococcus faecalis

- Superantigen release
- Inflammatory endotoxin: lipoteichoic acid
- Urinary tract infections
- Endocarditis
- Extracellular matrix infections
- Chronic Fatigue
- Meningitis

*Enterococcus faecalis* is a non-motile, gram-positive, spherical bacterium. It occurs in the colon in single, planktonic form; in pairs; or in short chains, and is most often found in the large intestine of humans. It is a facultative anaerobe with a fermentative metabolism. *E. faecalis* is a leading cause of nosocomial (originating in a hospital) infections and has mutated due to the use of antibiotic drugs. Most of these infections occur post abdominal surgery or a puncture wound, but also from IV’s and catheters. It is among the most antibiotic resistant bacteria known.

More than 25% of the *E. faecalis* genome is exogenously acquired, leading to its resistance to the strongest antibiotics and in some cases all antibiotics. It is also considered to be a carrier of vancomycin resistance for other genera of bacteria. With *E. faecalis* occurring frequently in hospital secondary infections, these multiple drug resistant strains create a scary concept that points to the need to reexamine the escalating antibiotic “kill, kill” mentality.

**Herbs:** Triphala, Green Tea, Neem, Yellow Myrobalan (Terminalia chebula), Nutmeg (Myristica frangrans), Aloe vera, Curcumin, Neem

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**Evaluation of antimicrobial efficacy of herbal alternatives (Triphala and green tea polyphenols), MTAD, and 5% sodium hypochlorite against *Enterococcus faecalis* biofilm formed on tooth substrate: an in vitro study.**

Prabhakar J, Senthilkumar M, Priya MS, Mahalakshmi K, Sehgal PK, Sukumaravan VG.

The purpose of this study was to evaluate the antimicrobial efficacy of Triphala, green tea polyphenols (GTP), MTAD, and 5% sodium hypochlorite against *E. faecalis* biofilm formed on tooth substrate. Extracted human teeth were biomechanically prepared, vertically sectioned, placed in the tissue culture wells exposing the root canal surface to *E. faecalis* to form a biofilm. At the end of the 3rd and 6th weeks all groups were treated for 10 minutes with the test solutions and control and were analyzed qualitatively and quantitatively. Qualitative assay with 3-week biofilm showed complete inhibition of bacterial growth with Triphala, MTAD and NaOCl, except GTP and saline, which showed presence of bacterial growth. In quantitative analysis, GTP- and saline-treated tooth samples have shown 1516 +/- 17.2 CFU/mL, 156.4 x 10^9 +/- 3.1 x 10^9 CFU/mL respectively. Qualitative assay with 6-week biofilm showed growth when treated with Triphala, GTP and MTAD whereas NaOCl has shown complete inhibition. All groups except NaOCl showed eight log reduction when compared to control when analyzed quantitatively. 5% sodium hypochlorite showed maximum antibacterial activity against *E. Faecalis* biofilm formed on tooth substrate. Triphala, green tea polyphenols and MTAD showed statistically significant antibacterial activity. The use of herbal alternatives as a root canal irrigant might prove to be advantageous considering the several undesirable characteristics of NaOCl.

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**Influence of various herbal irrigants as a final rinse on the adherence of *Enterococcus faecalis* by fluorescence confocal laser scanning microscope.**

Rosaline H, Kandaswamy D, Gogulnath D, Rubin M.

AIM: The aim of this study was to assess the antibacterial efficacy of three different herbal irrigants against *Enterococcus faecalis*.

MATERIALS AND METHODS: Single rooted teeth were extracted due to orthodontic and periodontal reasons. The teeth were then inoculated with *E. faecalis*. The teeth were randomly divided into three experimental groups and two control groups of six samples each. Group 1 specimens were treated with 5.2% sodium hypochlorite (NaOCl) for 30 min followed by 5 mmol/L Ethylenediaminetetraacetic acid (EDTA) for 5 min and saline as final irrigant. Group 2 specimens were treated with and 5.2% NaOCl for 30 min as final irrigant. Group 3 were treated with Morinda citrifolia (MC) for 30 min as final irrigant. Group 4 were treated with Azadiracta indica (AI) as final irrigant. Group 5 were treated with green tea (GT) for 30 min as final irrigant. The dentin specimens were carefully spread onto a microscope slide and stained with BacLight and examined in a confocal laser scanning microscope set to monitor fluorescein isothiocyanate and propidium iodide. A total of nine fields were examined for each treatment and the bacteria presented were counted.

RESULTS: AI treatment produced the maximum reduction in adherence of *E. faecalis* to dentin (9.30%) followed by NaOCl (12.50%), GT (27.30%), MC (44.20%) and saline (86.70%).

CONCLUSION: Neem is effective in preventing adhesion of *E. faecalis* to dentin.
**Escherichia coli**

- Diarrhea (watery to bloody)
- Abdominal cramping
- Nausea, Vomiting
- Urinary Tract Infections, Kidney Failure
- Anemia
- Colitis
- Increased epileptic seizures
- Gastroenteritis
- Septic arthritis
- Hemolytic Uremic Syndrome (blood clots in capillaries)

*Escherichia coli* is a Gram-negative, facultatively anaerobic, rod-shaped bacterium of the genus *Escherichia* that is commonly found in the lower intestine of warm-blooded organisms (endotherms). Most *E. coli* strains are harmless, but some serotypes can cause serious food poisoning in their hosts, and are occasionally responsible for product recalls due to food contamination. The harmless strains are part of the normal flora of the gut, and can benefit their hosts by producing vitamin K₂, and preventing colonization of the intestine with pathogenic bacteria.

*E. coli* and other facultative anaerobes constitute about 0.1% of gut flora, and fecal–oral transmission is the major route through which pathogenic strains of the bacterium cause disease. Cells are able to survive outside the body for a limited amount of time, which makes them ideal indicator organisms to test environmental samples for fecal contamination. There is, however, a growing body of research that has examined environmentally persistent *E. coli* which can survive for extended periods outside of the host.

The bacterium can be grown easily and inexpensively in a laboratory setting, and has been intensively investigated for over 60 years. *E. coli* is the most widely studied prokaryotic model organism, and an important species in the fields of biotechnology and microbiology, where it has served as the host organism for the majority of work with recombinant DNA. Under favourable conditions it takes only 20 minutes to reproduce.

Although most types of *E. coli* are harmless, some types can make you sick.

The worst type of *E. coli*, known as *E. coli* O157:H7, causes bloody diarrhea and can sometimes cause kidney failure and even death. *E. coli* O157:H7 makes a toxin called Shiga toxin and is known as a Shiga toxin-producing *E. coli* (STEC). There are many other types of STEC, and some can make you just as sick as *E. coli* O157:H7.

One severe complication associated with *E. coli* infection is hemolytic uremic syndrome (HUS). The infection produces toxic substances that destroy red blood cells, causing kidney injury. HUS can require intensive care, kidney dialysis, and transfusions.

*E. coli* has a nasty trick regarding the bladder. It binds to a receptor on the outside of bladder cells designed to help the bladder expand when it fills with urine. The receptor triggers levels of a signalling chemical called "cyclic AMP" to rise, which causes empty sacs within the cells to travel towards the cell membrane and fuse with it. The fusing adds to the cell membrane, helping the bladder lining to stretch when filled with urine. Later, when cyclic AMP levels fall again, the sacs re-enter the cells. But as they do so, the *E. coli* bacteria lying in wait outside the cells stealthily slip into the sacs.
**Herbs:** Goldenseal, Echinacea, Garlic, Holy Basil, Olive Leaf Extract, Garlic, Clove, Cinnamon, Oregano, Sage, Eucalyptus, Manuka Honey, Forskolin (Indian Coleus)

**Giardia lamblia (Protozoa)**

- Diarrhea / Constipation
- Abdominal pain
- Food allergies
- Chronic Fatigue Syndrome
- Multiple Chemical Sensitivity
- Irritable Bowel Syndrome
- Rheumatoid, Poly Arthritis
- Maculopapular Rash
- Mapped Tongue

Giardia lamblia is a flagellated protozoan parasite that colonizes and reproduces in the small intestine, causing giardiasis. The parasite attaches to the epithelium by a ventral adhesive disc, and reproduces via binary fission. Giardiasis is an infection of the small intestine that is caused by the parasite, *Giardia intestinalis*, also known as *Giardia lamblia*. It is the most common cause of parasitic gastrointestinal disease; it is estimated that 20,000 cases of giardiasis occur each year in the U.S., and there is a 20% to 30% prevalence in the world’s population.

Giardia lamblia exists in two forms, an active form called a trophozoite, and an inactive form called a cyst. The active trophozoite attaches to the lining of the small intestine with a "sucker" and is responsible for causing the signs and symptoms of giardiasis. The trophozoite cannot live long outside of the body, therefore it cannot spread the infection to others. The inactive cyst, on the other hand, can exist for prolonged periods outside the body. When it is ingested, stomach acid activates the cyst, and the cyst develops into the disease-causing trophozoite. It takes ingestion of only ten cysts to cause infection. Trophozoites are important not only because they cause the symptoms of giardiasis, but also because they produce the cysts that exit the body in the feces and spread the infection to others.

Cysts of Giardia are present in the feces of infected persons. Thus, the infection is spread from person to person by contamination of food with feces, or by direct fecal-oral contamination. Cysts also survive in water, for example in fresh water lakes and streams. As a result, giardiasis is the most common cause of water-borne, parasitic illness in the U.S.. Domestic mammals (for example, dogs, cats, calves) and wild mammals (for example, beavers) can become infected with Giardia; however, it is not clear how often domestic or wild mammals transmit giardiasis to humans. Giardiasis also has occurred as outbreaks from recreational water sources such as swimming pools, water parks, and hot tubs, most likely because of an infected user rather than a source of water that was contaminated.

*Giardia* relies on glucose as its major energy source and breaks glucose down into ethanol, acetate and carbon dioxide. However, it can also use arginine as an energy source. *Giardia* possesses unique biochemical pathways that suggest it diverged from other eukaryotes at an early stage in evolution. B vitamins and bile salts, as well as glucose, are
necessary for *Giardia* to survive, and a low-carbohydrate diet was shown in mice to reduce the number of *Giardia* organisms present.

**Herbs:** Black Walnut, Kalmia, Wild Geranium, Wormseed Oil, Ervo Tostão, Goldenseal, Oregon Grape, Pippali rasayana, Garlic, Piper Longum.

**Hafnia alvei (Bacterium)**

- Meningitis
- Pneumonia
- Gastroenteritis
- Arthritis
- Skin infections
- Urinary tract infection
- Becomes antibiotic resistant

*Hafnia* is an Enterobacteriaceae family whose only species is the Gram-negative, anaerobic, rod-shaped bacterium.

*H. alvei* is a commensal of the human gastrointestinal tract and not normally pathogenic, but may cause disease in immunocompromised patients. It is often resistant to multiple antibiotics, including the aminopenicillins.

The genus *Hafnia*, a member of the family *Enterobacteriaceae*, consists of gram-negative bacteria that are occasionally implicated in both intestinal and extraintestinal infections in humans. Despite the fact that the genus currently contains only a single species (*H. alvei*), more extensive phylogenetic depth (two or more species) is apparent based upon DNA relatedness and 16S rRNA gene sequencing studies. *Hafnia* causes a variety of systemic infections, including septicemia and pneumonia; however, its role as a gastrointestinal pathogen is controversial. Many of the data supporting a role for hafniae as enteric pathogens were incorrectly attributed to this genus rather than to the actual pathogen, *Escherichia albertii*. There are numerous gaps in our understanding of this genus, including ecologic habitats and population genetics, disease-producing role in animals, phenetic and genetic methods useful in distinguishing genomospecies within the *H. alvei* complex, and bona fide pathogenicity factors.


**Gastroenteritis:**


**Herbs:** (lacks research): Goldenseal, garlic, citrus seed extract, olive leaf extract, oregano oil all indicated as probable agents.
Helicobacter pylori (Bacteria)

- Stomach Ulcers
- Loss of Intrinsic Factor (B12 absorption)
- Gastritis
- Esophagitis
- GERD
- Diabetes
- Belching, Bloating
- Nausea, Vomiting
- Releases inflammatory Cytotoxin Vac A
- Inflammation – Elevated Hemaglobin A1C
- Fatigue
- Dark, tar-like stools
- Bad Breath
- Heart burn
- Low appetite

Helicobacter pylori (H. pylori) is a bacterium that causes chronic inflammation of the inner lining of the stomach (gastritis) in humans. This bacterium also is considered as a common cause of ulcers worldwide; as many as 90% of people with ulcers have detectable organisms.

H. pylori infection is most likely acquired by ingesting contaminated food and water, and through person to person contact. In the United States, about 30% of the adult population is infected (50% of infected persons are infected by the age of 60), but the prevalence of infection is decreasing because there is increasing awareness about the infection, and treatment is common. About 50% of the world population is estimated to have detectable H. pylori in their gastrointestinal tract (GI tract, but stomach, mainly).

The infection is more common in crowded living conditions with poor sanitation. In countries with poor sanitation, approximately 90% of the adult population can be infected. One out of every six patients with H. pylori infection may develop ulcers of the duodenum or stomach. H. pylori also are associated with stomach cancer and a rare type of lymphocytic tumor of the stomach called MALT (mucosa-associated lymphoid tissue) lymphoma. Conversely, the presence of small amounts of H. Pylori can help prevent certain types of esophageal cancer. Several recent research papers have shown a link between diabetes, infections, elevated Hemoglobin A1C levels, and H. pylori.

H. pylori infections start with a person acquiring the bacterium from another person (via either the fecal-oral or oral-oral route). Although the majority of individuals that have these bacteria in their GI tracts have few if any symptoms, most people develop stomach inflammation (gastritis) from the body’s response to the bacterium itself and to a cytotoxin termed Vac-A, a chemical that the bacterium produces. Researchers also suggest that the stomach acid stimulates the bacterium in addition to the cytotoxin, and increases invasion of the lining of the stomach, inflammation, and ulcer formation. Other investigators have shown that these bacteria and their products are associated with alterations in the cells lining the stomach that when altered are associated with stomach and other cancers, although these are infrequently seen diseases.
The frequency of people infected may somehow be related to race. About 60% of Hispanics and about 54% of African Americans have detectable organisms as compared to about 20% to 29% of Anglo Americans. In developing countries, children are very commonly infected.

**Herbs, etc.:** Goldenseal, Lomatium, Citrus seed extract, Olive leaf extract, Oregano Oil PLUS Bismuth

**Klebsiella pneumonia**

- Diarrhea
- Gastroenteritis
- Arthritis (reactive)
- Ankylosing spondylitis
- 2 Endotoxin (lipopolysaccharide)
- Inhibits Cytochrome p-450 detox
- Pneumonia (if in lungs)
- Urinary Tract Infections (cranberry is effective)

The genus *Klebsiella* belongs to the tribe Klebsiellae, a member of the family Enterobacteriaceae. The organisms are named after Edwin Klebs, a 19th century German microbiologist. Klebsiellae are non-motile, rod-shaped, gram-negative bacteria with a prominent polysaccharide capsule. This capsule encases the entire cell surface, accounts for the large appearance of the organism on gram stain, and provides resistance against many host defense mechanisms.

It naturally occurs in the soil, and about 30% of strains can fix nitrogen in anaerobic conditions. As a free-living diazotroph, its nitrogen fixation system has been much-studied, and is of agricultural interest, as *K. pneumoniae* has been demonstrated to increase crop yields in agricultural conditions.

Members of the *Klebsiella* genus typically express 2 types of antigens on their cell surface—lipopolysaccharide (O antigen); capsular polysaccharide (K antigen). Both antigens contribute to pathogenicity. ± 77 'K' antigens, 9 'O' antigens exist. Their structural variability forms the basis for classification into various serotypes. The virulence of all serotypes appears to be similar.

Three species in the genus *Klebsiella* are associated with illness in humans: *Klebsiella pneumonia*, *Klebsiella oxytoca*, and *Klebsiella granulomatis*. Organisms previously known as *Klebsiella ozaenae* and *Klebsiella rhinoscleromatis* are considered nonfermenting subspecies of *K pneumonia* that have characteristic clinical manifestations. With those exceptions, strains within this genus ferment lactose, most produce highly mucoid colonies on plates because of the production of a luxuriant polysaccharide capsule, and all are nonmotile. In recent years, klebsiellae have become important pathogens in nosocomial infections.

**Phage Therapy.** Multiple drug-resistant *K. pneumoniae* strains have been killed *in vivo* by intraperitoneal, intravenous, or intranasal administration of phages in laboratory tests. While this treatment has been available for some time, a greater danger of bacterial resistance exists to phages than to antibiotics. Resistance to phages may cause a bloom in the number of the microbes in environment, as well as among humans (if not obligate pathogenic).

**Herbs:** Curcurmin, Amla (with fish oil), Holy Basil, Black Pepper, Garlic, Green Tea Extract, Gum Arabic, Cinnamon, Clove, Mullen, Yarrow, etc.

Cranberry consumption induces an anti-microbial effect in the urine against Klebsiella bacteria - Evid Based Complement Alternat Med. 2008 Jan 16. Epub 2008 Jan 16. PMID: 18955308 Yee Lean Lee, Wadie I Najm, John Owens, Laurie Thrupp, Sheryl Baron, Edward Shanbrom, Thomas Cesario. We explore the anti-microbial activity of urine specimens after the ingestion of a commercial cranberry preparation. Twenty subjects without urinary infection, off antibiotics and all supplements or vitamins were recruited. The study was conducted in two phases: in phase 1, subjects collected the first morning urine prior to ingesting 900 mg of cranberry and then at 2, 4 and 6 h. In phase 2, subjects collected urine on 2 consecutive days: on Day 1 no cranberry was ingested (control
specimens), on Day 2, cranberry was ingested. The pH of all urine specimens were adjusted to the same pH as that of the first morning urine specimen. Aliquots of each specimen were independently inoculated with Escherichia coli, Klebsiella pneumoniae or Candida albicans. After incubation, colony forming units/ml (CFU ml⁻¹) in the control specimen was compared with CFU ml⁻¹ in specimens collected 2, 4 and 6 h later. Specimens showing ≥50% reduction in CFU ml⁻¹ were considered as having ‘activity’ against the strains tested. In phase 1, 7/20 (35%) subjects had anti-microbial activity against E. coli, 13/20 (65%) against K. pneumoniae and 9/20 (45%) against C. albicans in specimens collected 2-6 h after ingestion of cranberry. In phase 2, 6/9 (67%) of the subjects had activity against K. pneumoniae. This pilot study demonstrates weak anti-microbial activity in urine specimens after ingestion of a single dose of commercial cranberry. Anti-microbial activity was noted only against K. pneumoniae 2-6 h after ingestion of the cranberry preparation.

**Proteus mirabilis (Bacterium)**

- Kidney/Bladder infections
- Catheter infections
- Endotoxins induce inflammation
- Fast antibiotic resistance
- Alkalizes urinary tract (more proliferative)
- Forms biofilms

*Proteus mirabilis* is part of the normal flora of the human gastrointestinal tract. It can also be found free living in water and soil. When this organism, however, enters the urinary tract, wounds, or the lungs it can become pathogenic. *Proteus mirabilis* commonly causes urinary tract infections and the formation of stones. *Proteus mirabilis* is part of the Enterobacteriaceae family. It is a small gram-negative bacillus and a facultative anaerobe. *Proteus mirabilis* is characterized by its swarming motility, its ability to ferment maltose, and its inability to ferment lactose. *P. mirabilis* has the ability to elongate itself and secrete a polysaccharide when in contact with solid surfaces, making it extremely motile on items such as medical equipment.

The most common infection involving *Proteus mirabilis* occurs when the bacteria moves to the urethra and urinary bladder. Although *Proteus mirabilis* mostly known to cause urinary tract infections, the majority of urinary tract infections are due to *E. coli*. One-hundred thousand cfus per milliliter in the urine are usually indicative of a urinary tract infection. Urinary tract infections caused by *P. mirabilis* occur usually in patients under long-term catheterization. The bacteria have been found to move and create encrustations on the urinary catheters. The encrustations cause the catheter to block.

Symptoms for urethritis are mild including frequency of urination and pyuria (presence of white blob cells in the urine). Cystitis (bladder infection) symptoms are easier to distinguish and include back pain, concentrated appearance, urgency, hematuria (presence of red blood cells in the urine), and suprapubic pain as well as increased frequency of urination and pyuria. Pyelonephritis (kidney infection) can occur when the bacteria migrates from the lower urinary tract. Although it is seen as a furtherance of infections, not all patients have the symptoms associated with urethritis and cystitis. Pyelonephritis is marked by nausea and vomiting. *Proteus mirabilis* can enter the bloodstream through wounds. This happens with contact between the wound and an infected surface. The bacteria induce inflammatory response that can cause sepsis and systemic inflammatory response syndrome (SIRS). SIRS has a mortality rate between 20 and 50 percent.

*P. mirabilis* can also, though less common, colonize the lungs. This is the result of infected hospital breathing equipment and causes pneumonia. Symptoms for pneumonia include fever, chills, chest pain, rales, and cough.
Prostatitis can occur as a result of *P. mirabilis* infection, causing fever, chills, and tender prostate in men.

**Herbs:** Kutaj, Lasuna, Sage, Salvia, Barbary, Goldenseal, Cinnamon, Bilberry, Periera, Burdock, Hydrangea, Agrimony, Marshmallow, Celery Seed, etc.

**Pseudomonas aeruginosa (Bacterium)**

- Endotoxin producer – systemic inflammation
- Diarrhea / Constipation
- Nausea / Vomiting
- Multiple Sclerosis
- Fatigue
- Brain Fog
- Effex drug-sampling pumps
- Bacteremia (blood infection)

Treatment of infectious diseases becomes more challenging with each passing year. This is especially true for infections caused by the opportunistic pathogen *Pseudomonas aeruginosa*, with its ability to rapidly develop resistance to multiple classes of antibiotics. Although the import of resistance mechanisms on mobile genetic elements is always a concern, the most difficult challenge we face with *P. aeruginosa* is its ability to rapidly develop resistance during the course of treating an infection. The chromosomally encoded AmpC cephalosporinase, the outer membrane porin OprD, and the multidrug efflux pumps are particularly relevant to this therapeutic challenge. The discussion presented in this review highlights the clinical significance of these chromosomally encoded resistance mechanisms, as well as the complex mechanisms/pathways by which *P. aeruginosaregulates their expression. Although a great deal of knowledge has been gained toward understanding the regulation of AmpC, OprD, and efflux pumps in *P. aeruginosa*, it is clear that we have much to learn about how this resourceful pathogen co-regulates different resistance mechanisms to overcome the antibacterial challenges it faces." from medical research.

*Pseudomonas* is a rod-shaped bacterium that is normally found in moist or wet areas, like water or soil. It can be found in hot tubs, inadequately chlorinated swimming pool, sinks, and toilets. It’s also very prevalent in hospitals. These bacteria don’t usually affect healthy people; rather, they attack those with a weakened immune system, and can cause infections in any part of the body. People with cystic fibrosis, diabetes, AIDS, or cancer are especially at risk for infection with *pseudomonas aeruginosa*. Patients in hospital, especially those who are on a ventilator or are catheterized, are also very much at risk. *Pseudomonas* infection is potentially very serious and is often resistant to treatment, requiring two or more antibiotics, often intravenously.

*Pseudomonas aeruginosa* can cause infection of the blood (bacteremia), heart (endocarditis), central nervous system (meningitis, brain abscess), ear (otitis externa, or swimmer’s ear), eyes, bones, joints, skin, urinary, and gastrointestinal tract, in addition to the respiratory tract. When it affects the respiratory tract, it is typically in people whose immune system is weakened by illness or medication. People with chronic lung disease or congestive heart failure are particularly susceptible to pneumonia caused by *pseudomonas infection*, especially if they are hospitalized.

People who have cystic fibrosis are at particular risk of *pseudomonas infection*. The lungs of most children with cystic fibrosis become colonized with *pseudomonas aeruginosa* before their 10th birthday. This may cause them to have a chronic, phlegm-producing cough, loss of appetite, weight loss, wheezing and a fast breathing rate (tachypnea). Although antibiotics can help mitigate *pseudomonas*’ effects, the bacteria can never be totally eliminated and so people with cystic fibrosis suffer repeated bouts of *pseudomonas*-related breathing problems.
Herbs, Etc: Daphne giraldii Nitsche, Ginseng, Garlic (blocks quorum sensing), Colloidal Silver, Horse Radish, Vanilla extract, Honey, Oregano Oil,

**Bacteriophages Can Treat and Prevent Pseudomonas aeruginosa Lung Infections**

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Presented in part: 18th International Evergreen Phage Biology Meeting, Olympia, WA, 9-13 August 2009 (keynote speech of the Human Phage Therapy session). Antibiotic-resistant bacteria threaten life worldwide. Although new antibiotics are scarce, the use of bacteriophages, viruses that infect bacteria, is rarely proposed as a means of offsetting this shortage. Doubt also remains widespread about the efficacy of phage therapy despite recent encouraging results. Using a bioluminescent *Pseudomonas aeruginosa* strain, we monitored and quantified the efficacy of a bacteriophage treatment in mice during acute lung infection. Bacteriophage treatment not only was effective in saving animals from lethal infection, but also was able to prevent lung infection when given 24 h before bacterial infection, thereby extending the potential use of bacteriophages as therapeutic agents to combat bacterial lung infection.