



Candida Protocol

Candida is a ubiquitous yeast in the human microbiome. It is well known for causing oral, dermatological, and vaginal infections. Additionally, thousands of bacterial taxa reside with this fungus in the intestine and participate in inter-kingdom interactions. In the gastrointestinal (GI) tract, there are significant interdependencies between fungi and bacteria. "Gut bacteria closely associate with *C. albicans* cells in the colon, break down and feed on complex sugars decorating the fungal cell wall, and shape the intestinal microhabitats occupied by the fungus."¹

When the gut microbiome is healthy, normal amounts of *Candida* are harmless (commensal). But, if there is microbial imbalance or immune system dysfunction, *Candida* can become an opportunistic pathogen, proliferating as yeast, pseudohyphae, or true hyphae, which they use to invade the gut's mucosal lining.² GI candidiasis can also result in fungal overgrowth in the small intestine, resulting in [SIFO](#). The symptoms often associated with it include gas, bloating, and irritable bowel-like illness.

In addition to GI symptoms, the pathophysiology of *Candida* infection can result in systemic effects through two pathways – invasion of any epithelial or mucosal surface (e.g., GI, skin, urogenital, oral) and production of damaging metabolites and pro-inflammatory mediators.

Comprehensive support for *Candida* overgrowth requires a combination of diet changes, antifungal (herbal or pharmaceutical) therapeutics, and restoration of a healthy microbiome.

Common Clinical Presentation of *Candida* overgrowth

- Blood sugar dysregulation
 - NAFLD
 - Sugar Cravings
- Neurological/cognitive
 - Anxiety
 - Depression
 - Insomnia
 - Irritability
 - Sensory hypersensitivity
 - Brain fog
 - Short-term memory impairment
- Skin
 - Rashes
 - Pruritus
- Gastrointestinal
 - Intestinal permeability
 - IBS
 - Gas/Bloating
- Immune
 - Upregulation/inflammation – pain in joints and connective tissue
 - Suppression – fungal overgrowth (intertriginous, nails, scalp), frequent infectious illness (these patients may be "sick all of the time")



¹ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8489915/>

² <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3654610/>

“Dozens of Candida species—a group of fungi—cause infections, ranging from mild oral and vaginal yeast infections to severe invasive infections. Many are resistant to the antifungals used to treat them.”³

Epidemiology

The CDC estimates that *Candida* results in 3.6 million U.S. healthcare visits each year, and \$3 billion in estimated direct medical costs.³ *Candida spp.* are the fourth most common cause of hospital-acquired systemic infections in the United States.⁴

Superficial (hair, skin, nails) fungal infection affects one billion people globally, and *Candida albicans* is the primary pathogen responsible for mucosal disease.⁵

Global Incidence of *Candida* Infection -

- Thrush (oral) – 2 million (predominantly HIV patients)
- Esophageal – 1.3 million (predominantly HIV patients)
- Recurrent Vulvovaginal – 134 million!
- Invasive Candidiasis – 750 thousand⁵
- Candidemia (blood infection with greater than 40% mortality) – 34,800 (USA only)²

Though it is the most common form of invasive candidiasis, candidemia does not represent all forms of invasive candidiasis. In fact, the number of cases of invasive candidiasis might be twice as high as the estimate for candidemia. Candidemia causes intestinal permeability and digestive problems and can spread systemically, infecting virtually any organ in the body (blood, skin, bones, scalp, esophagus, heart, nails, brain, etc.) and leading to a wide range of health issues.⁶

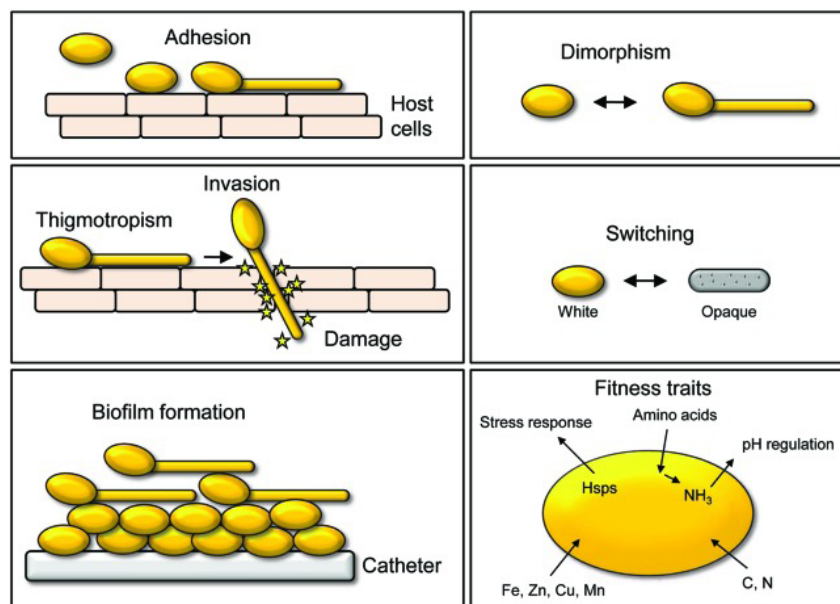


Figure 1. Pathogenicity mechanisms of *Candida albicans*. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3654610/>

³<https://www.cdc.gov/drugresistance/pdf/threats-report/candi>

⁴<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3654610>

⁵<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5753159/pdf/jof-03-00057.pdf>

⁶<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6619947/>

Candida Species

Candidiasis is caused by over 350 species of *Candida*. Approximately 90% of infections are caused by five species: *Candida albicans*, *Candida glabrata*, *Candida tropicalis*, *Candida parapsilosis*, and *Candida krusei*, with *Candida albicans* being the most common fungus in the human body.⁷ While most *Candida* infections in people are caused by *Candida albicans*, which has very low levels of drug resistance, other types of *Candida*, including *Candida glabrata*, are frequently resistant and more deadly.

Many clinical laboratories cannot test *Candida* for drug resistance, limiting the ability to guide treatment and track resistance.³ "In particular, resistance to fluconazole is common, which is important as it is the most commonly used antifungal agent for prophylaxis and treatment of *Candida* infections in many parts of the world."⁵

Risk Factors

The following are predisposing conditions for *Candida* overgrowth

- Chronic stress
- Chronic steroid use
- History of antibiotic use
- NSAIDS use
- Hormonal imbalances or long-term use of oral contraceptives
- HIV, immune suppression, or weakened immune system
- High sugar and refined carbohydrate intake
- Mycotoxin exposure
- Excess alcohol consumption
- Standard American Diet
- Diabetes or metabolic syndrome
- Crohn's/Ulcerative Colitis
- Gastric Ulcers

Candida Biofilms

Candida is renowned for the production of biofilms. In the oral cavity, it is one of the primary producers of plaque – an oral biofilm. Plaque is readily produced in the mouth, as the teeth provide a non-shedding surface for adhesion of microorganisms and an ongoing source of nutrients to feed them. Just as teeth provide an opportune site for biofilm growth, medical implants do the same – making them another risk factor for overgrowth of *Candida* (and other biofilm species).

When assessing the risk for *Candida* overgrowth, include medical devices in your intake. See our [Biofilms Protocol](#) for more information.

⁷ <https://pubmed.ncbi.nlm.nih.gov/25183855/>





Most Common Medical Implant Devices⁸

Implantable Cardioverter Defibrillator (ICD)	Artificial Joint
Pacemaker	Breast Implant
Spinal fusion hardware (screws, rods, pins, etc.)	Intrauterine Device (IUDs)
Coronary Stent	Ear Tubes
Artificial Eye Lenses	Dentures

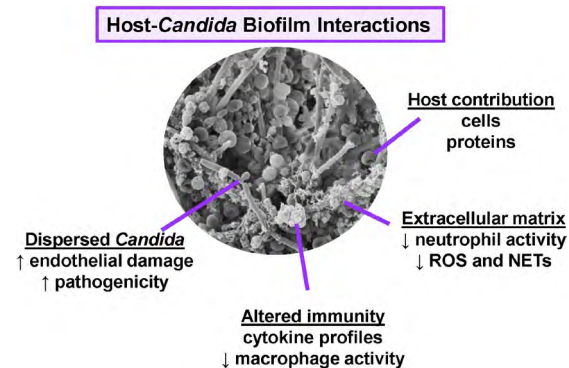


Figure 2. <https://www.frontiersin.org/articles/10.3389/fmicb.2020.01437/full>

Clinical Pearl #1 – Don't Forget the Mouth!

An often overlooked area when addressing *Candida* is the oral microbiome. *Candida* species are present in the oral cavity of up to 75% of the population.⁴ *Candida* is commonly overgrown in the mouth, which is swallowed and translocated to the gut. Research shows that brushing the teeth more frequently reduces levels of *Candida* in the stool. Failure to address oral dysbiosis can result in recurrent GI infections. See our [Oral Health Protocol](#) for more information.

Clinical Pearl #2 – Don't Forget Skin & Nails!

Often found on the surface of the skin, *Candida* can sometimes spread below the skin's surface and under nails, causing infection.

Since yeast loves warm, moist environments, these infections are often found in intertriginous spaces (genitals, armpits, and under breasts).

Clinical Pearl #3 – Consider Mold

If patients fail to respond to antifungal treatments (or get sick again as soon as they discontinue them), consider evaluating for mold exposure. Patients with a genetic susceptibility to mold can experience both immune suppression and inflammation concurrently, making them more susceptible to fungal infections of all kinds, including *Candida*). See our [Mold Protocol](#) for more information.

⁸ <https://www.businessinsider.com/the-11-most-implanted-medical-devices-in-america-2011-7#check-out-the-most-popular-pharmaceuticals-in-the-us-12>

The Power of Botanicals

Pilot research by Dr. Joseph Musto, Ph.D., of MicrobiologyDx, shows that Biocidin® LSF (liposomal formula) resulted in 99.8% inhibition of the following *Candida* species at 50% dilution

Biocidin Botanicals™ Pilot Research assessing effectiveness of Biocidin® LSF in nares cultures in an inhibition assay of <i>Candida</i> species.	
<i>Candida albicans</i>	
<i>Candida parapsilosis</i>	
<i>Candida guilliermondii</i>	
<i>Candida glabrata</i>	
<i>Candida famata</i>	

Research by Dr. Claudia Marques, Ph.D., of the University of Binghamton, showed the same level of inhibition at only 25% concentration, in addition to activity against *Candida* biofilms.

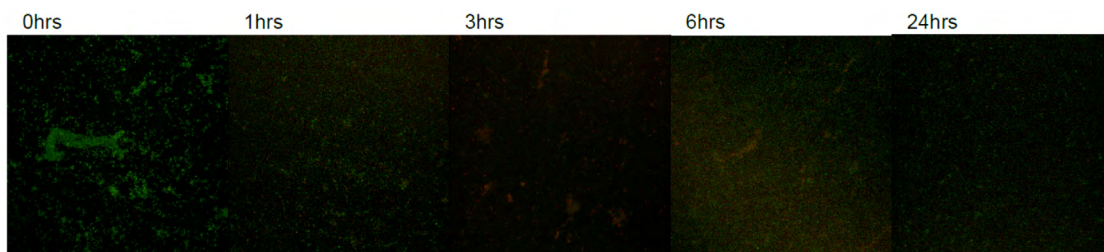


Figure 3. *C. albicans* biofilms exposed to 25% Biocidin® for a period of 24 hours

Lifestyle Recommendations

- Evaluate habits, including smoking and alcohol consumption.
- Address stress levels. Deep breathing, simplifying, learning to say "no," and consistent sleep/wake cycles are all ways to help balance cortisol. Chronically elevated cortisol levels are a significant contributor to *Candida* overgrowth.
- Studies show that brushing your teeth more frequently reduces levels of *Candida* in the stool. (*What grows in the mouth will grow in the gut!*) The Dentalcidin® Oral Care System makes an additional impact.



Nutrition Recommendations for Reducing *Candida* Overgrowth

Practitioners often recommend an *Anti-Candida* or low-yeast diet. These dietary recommendations usually focus on whole, nutrient-dense, anti-inflammatory foods like non-starchy organic vegetables, herbs and spices, healthy proteins (wild-caught and pasture-raised fish, poultry, and meats), and healthy fats. Some allow low-sugar fruits, gluten-free grains, and pressure-cooked legumes.

Most recommend strictly avoiding the foods known to feed yeast – all processed sugars and processed or fast foods.

When recommending therapeutic diets, it is important to remind patients to include as much diversity as possible within these restrictions (e.g., choose a wide variety of non-starchy vegetables, and aim for as many different protein sources as possible, not just chicken). A three-day rotation diet can help patients focus on greater diversity in the foods they eat each day.

People with *Candida* overgrowth often have sensitivities to mold and yeast in foods or any foods that stimulate the overgrowth of yeast on the body. Many of these foods are also high in [histamine](#). You may consider having your patients eliminate the foods on the following list to support healing.

- Peanuts
- Nuts (many types are high in mycotoxins)
- Mushrooms (except medicinal mushrooms)
- All grains (corn, wheat, oat, barley, rye, etc.)
- Dairy, especially cheese
- Alcohol
- Fast food
- Sugary beverages (soda, fruit juices)
- Conventional coffee – use organic coffee that has been tested for mold toxicity; purchase whole beans and keep frozen before grinding fresh
- Most teas, even organic – avoid unless the manufacturer tests for mold contamination
- Kombucha
- Sprouts
- Dried fruit
- Starchy plant foods

Therapeutic Plan Suggestions

See our [Product Usage Guide](#) for serving sizes.

Product	Key Activities* <small>See Product Sheets for ingredient-specific actions</small>
Biocidin® Liquid	Antioxidant, Immunomodulatory, Healthy Elimination, Healthy Gastrointestinal Flora, Microbial Balance
Biocidin® LSF <small>(to be used after finishing first full bottle of Biocidin® Liquid)</small>	Antioxidant, Immunomodulatory, Healthy Elimination, Healthy Gastrointestinal Flora, Microbial Balance

Therapeutic Plan Suggestions (continued)

Product	Key Activities* See Product Sheets for ingredient-specific actions
Olivirex®	Virome Balance, Immunomodulatory, Healthy Inflammatory Response, Microbial Balance
G.I. Detox™+	Absorbent, Microbial Balance, Immunomodulatory, Healthy Inflammatory Response, Antioxidant
Proflora™ 4R	Antioxidant, Immunomodulatory, Healthy Elimination, Healthy Gastrointestinal Flora, Microbial Balance
Dentalcidin® Toothpaste	Biofilm Disruptor, Immunomodulatory, Microbial Balance, Healthy Inflammatory Response, Antioxidant
Dentalcidin® LS Oral Rinse	Liposomal technology provides deeper activity. Biofilm Disruptor, Immunomodulatory, Microbial Balance, Healthy Inflammatory Response, Antioxidant
Biotonic™	Adaptogenic, Antioxidant, Elimination of Unhealthy Elements, Digestive Stimulant, Hepatoprotective, Neuroprotective, Healthy Inflammatory Response, Microbial Balance

Questions?

For clinical questions, email clinical@biocidin.com
or call 800-775-4140, x3.



*These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure or prevent any disease.