

**TREATMENT OF PATHOGEN-ASSOCIATED BIOFILM DYSBIOSIS IN THE GUT**  
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InterFase® and InterFase Plus® are enzyme products I formulated that break down pathogenic biofilm in the gut. InterFase Plus® has enzymes plus disodium EDTA.

I have tested InterFase® and InterFase Plus® against the following microorganisms in the laboratory and found them to significantly disrupt microbial biofilms and reduce their populations.

*Escherichia coli* O157:H7  
*Gardnerella vaginalis* ATCC 14018  
*Helicobacter pylori* ATCC 43504  
*Klebsiella pneumoniae* ATCC 4352  
*Pseudomonas aeruginosa* ATCC 27853  
*Pseudomonas aeruginosa* PAK FKC4-003

*Staphylococcus aureus* ATCC 29213  
*Staphylococcus aureus* MRSA 399  
*Staphylococcus aureus* MRSA U of C #13  
*Streptococcus pneumoniae* ATCC 10015  
*Streptococcus pyogenes* ATCC 10096

*Candida albicans* SJ2083133  
*Candida paratropicalis* ATCC 99916

InterFase® and InterFase Plus® do not digest mucin probably because mucin is abundantly glycosylated which makes it resistant to proteolysis.

I have tested InterFase® and InterFase Plus® against the following probiotic microorganisms and found that the formulations have no adverse effects on these healthful microbes.

*Bifidobacterium bifidum* PT131  
*Bifidobacterium breve* PT132  
*Bifidobacterium longum* PT136

*Lactobacillus casei* PT116  
*Lactobacillus rhamnosus* PT112  
*Lactobacillus salivarius* ATCC 29602

Parasites have not been shown to make biofilm. Viruses do not make biofilm although certain viruses may stimulate the production of a polysaccharide proteinaceous secretion from potential host cells that facilitates binding.

What follows are my suggestions on using InterFase® and InterFase Plus® as part of a comprehensive protocol to disrupt pathogenic biofilm.

For most gut pathogens I would use InterFase Plus® 4 caps bid on an empty stomach for the duration of the antimicrobial treatment period and for 2 weeks after. InterFase® works well against *Helicobacter pylori* and makes standard antibiotics more effective at lower concentrations with the exception of metronidazole. There is no synergy between InterFase® and metronidazole. I only recommend InterFase Plus® for clostridia. There is no synergy between InterFase®/InterFase Plus® and metronidazole for *Clostridium difficile*, but InterFase® Plus® makes vancomycin more effective against *C. difficile*.

Below is the approach I have been suggesting for gut *Candida* biofilms in people with candidiasis sensitivity syndrome. Practitioners have been using this in children with autism with success. The "die off" phenomenon can be quite significant in some patients with candidiasis sensitivity syndrome and chronic fatigue syndrome so it is important to warn the people to expect this. Although unpleasant, I regard this as a positive sign. An underlying principle of this approach is to "start low and go slow." This will work with any yeast dysbiosis.

#### Week 1

InterFase® 1 capsule bid on an empty stomach together with antiCandida agent(s). This(ese) could be natural agents such as oil of oregano, undecylenic acid or berberine. We offer Undecylex™ (on the ProThera® side), which combines undecylenic acid, berberine, and other natural antimicrobial agents. It works quite well. Or prescription antifungals may be used. It depends on how the patient has been treated in the past and what s/he has responded or not responded to. For patients who have one or more courses of prescription antifungal I suggest the use of two or three antifungals simultaneously. There is no reason to take the antimicrobial 30-60 minutes after the InterFase®. We have done all of our studies with antibiotics giving them simultaneously with the enzymes.

At a different time of day with meals, start a multispecies probiotic such as Ther-Biotic® Complete or just continue the probiotic you are using assuming it is dairy-free, and a prebiotic such as BiotaGen™. Start the Ther-Biotic® Complete at 25 billion CFU/d (I know your patient is at a higher dose) and the BiotaGen™ at 750 mg/d. The Ther-Biotic® Women's Formula is an alternative for women with recurrent urinary tract infection or vaginitis/bacterial vaginosis.

Activated charcoal 1.1 oz (33 mL) or modified citrus pectin 5 grams in water or another binding agent may be used at bedtime to bind toxins. These can mitigate "die off" symptoms. I have found that most patients do not need these. However, if the person has had trouble with "die off" in the past, I would use one or the other.

#### Week 2

Increase InterFase® to 2 capsules bid on an empty stomach together with antiCandida agent(s). Increase Ther-Biotic® Complete and BiotaGen™ to bid with meals. Continue charcoal or pectin if needed.

#### Week 3

Increase InterFase® to 3 capsules bid on an empty stomach together with antiCandida agent(s). Increase Ther-Biotic® Complete to 50 billion CFU bid and BiotaGen™ to 1.5 grams bid with meals. Continue charcoal or pectin if needed.

#### Week 4

Increase InterFase® to 4 capsules bid on an empty stomach together with antiCandida agent(s). Increase Ther-Biotic® Complete to 100 billion CFU bid and BiotaGen™ to 3 grams bid with meals. Continue charcoal or pectin if needed if needed.

#### Week 5

Discontinue InterFase®.  
Start InterFase Plus® 1 capsule bid on an empty stomach together with antiCandida agent(s). Continue Ther-Biotic® Complete at 100 billion CFU bid and increase BiotaGen™ to 4 grams bid with meals (the powders are more cost effective at these doses).

Charcoal or pectin is usually not needed at this point.

#### Week 6

Increase InterFase Plus® to 2 capsules bid on an empty stomach together with antiCandida agent(s).

Continue Ther-Biotic® Complete at 100 billion CFU bid and increase BiotaGen™ to 5 grams bid with meals.

#### Week 7

Increase InterFase Plus® to 3 capsules bid on an empty stomach together with antiCandida agent(s).

Continue Ther-Biotic® Complete at 100 billion CFU bid and BiotaGen™ at 5 grams bid with meals.

#### Week 8

Increase InterFase Plus® to 4 capsules bid on an empty stomach together with antiCandida agent(s).

Continue Ther-Biotic® Complete at 100 billion CFU bid and BiotaGen™ at 5 grams bid with meals.

#### Weeks 9-12

Continue Week 8 regimen.

The protocol is merely a guide. It goes without saying that everyone is different and therapy needs to be individualized. If there is no significant die-off, InterFase® titration may be accelerated. Some patients may need higher probiotic doses. A few patients do not tolerate InterFase Plus® due to GI upset. Patients on InterFase Plus® need to be on a good multiple vitamin/mineral supplement providing 20 mg/d of zinc. This is to prevent zinc deficiency due to EDTA.