The Science Behind Candida
By Dr. Jeffrey McCombs, DC

This is a transcript of The Science Behind Candida webcast with Dr. Jeff McCombs, founder of The McCombs Plan For Health, Vitality & Transformation.

Candida Definition

When we talk about Candida, it's good to have a definition of Candida, and it's also good to have an understanding of the human body. That, in itself, is pretty much impossible, as much as we can attempt it. There's a lot we know about the human body, but as I tell most of my patients and most people I talk to, we know probably about 1% of what goes on in the body, and that's why everything is such a mystery, and that's why some things work, some things don't. That's why you have so little understanding. That's one of the main reasons why drugs don't work, because they don't really know what's taking place in the body once you give somebody a drug, and therefore, you have all these side effects. They don't know really why we have those side effects.

In terms of Candida, what we're doing is we're talking about an organism, which lives inside the intestinal tract, or commonly referred to as the gut. The intestinal tract, in humans, contains the small intestine and large intestine. The length of that intestinal tract is approximately 28 feet, 25 to 28 feet in most people.

The intestinal tract has a vast surface area inside, which allows it to absorb a lot of nutrients. They have what are called villi, which are little finger-like projections, and this increases the surface area of the intestinal tract to be approximately 200 square meters, or roughly the size of a tennis court, which is the common analogy for that amount of area. Within this 25 to 28-foot length tract, we have 100 trillion cells. Well, that's a number that most people really can't relate to, but a good way to relate to it is that the human body has 10 trillion cells, so there are actually 10 times more microorganisms that live within this 25 to 28-foot tract than there are in the rest of the body.

Human cells are much larger than the microorganisms, than the bacteria, the fungus, the yeast, the mold, the virus, the parasites, which make up all these microorganisms that live in the gut. Now all of these microorganisms have coevolved over the years. This usually happens right at birth. Since then they have coevolved to exist together.

Good and Bad Bacteria

So many times, we hear people talk about beneficial bacteria, bad bacteria. When we think of a healthy intestinal tract, it's really all tends to be good. They're all working together in concert. There's a strong immune system, which helps to regulate and keep everything in check. 70% of the immune system of the body is in the digestive tract, so if we have an imbalance here, that is most of the immune system of the body, so we have to really consider what happens in the gut as the way the rest of the health of the body will go, and much of what happens in the gut, as far as all these bacteria, microorganisms, helps to develop our immune system and helps to prime the immune system.

And science shows us that even as immune cells are being produced in distant sites such as the bone marrow, it is what happens in the gut which helps to determine how these cells are produced, how they will function later on in their life, as short as it is. So we have 100 trillion cells, and what we're focusing on are not really bacteria and Candida, but everything together.

The human gut has been called the densest ecosystem on the planet, and much of the advances in science are based on technology that we were using in dense ecosystems like the Amazon jungle and other rainforest habitats. We found that if we took that technology and applied it to the gut, we were able to find out more and more about the gut and about the microorganisms that live there. And there are even more new advances that are taking place in nanotechnology, which are going to allow us to see what exactly is happening inside the cells. And a good point here is we don't know exactly what is happening inside the cells, so we're back to this piece of information I give to people, we know about 1% of what's going on.

But based on that 1%, at least in the holistic community, we know that the best way to approach healing in the body is to support the body in doing what it does, to bring balance back to the body, and let the body do what it can do best, and not try to interpret through science, such poor science as it is, to try and understand how we can destroy bacteria, how we can destroy fungus through antifungal drugs, antibacterial drugs, antibiotics.

So if we look again at all these microorganisms, they're called commensals, and basically, the best way to describe commensals is harmless. Candida, in its normal state is a harmless microorganism, as are most of the other organisms in the gut. E. coli is a bacterial organism that many people are familiar with through a lot of news reports of E. coli-infected spinach, beet, et cetera, causing disease and illness in people. Well, E. coli, as a commensal, as a harmless bacteria in the gut, is part of all these other 100 trillion organisms, and it plays a role. It helps in the synthesis of vitamin K, which we need for normal blood clotting. It's when we change the balance of the internal environment that we run into problems.

Yeast or Fungus?

So Candida, as an organism, usually exists as a commensal, as a yeast organism, but as a polymorphic organism, it has the ability to change its form, or morph. It can change from a yeast to a pseudohyphal form or pseudofungal form and into a mycelial hyphal, which is the fungal form. It's this ability to change which creates the problem, very similar to the problems you see with E. coli. It can change from its harmless form to a pathogenic, harmful form. What we look for is what can create that pathogenic fungal form.

Again, **70% of the immune system is in the gut**. So anything that would suppress the immune system can have an affect on the growth of Candida. Some of the things that commonly affect the immune system are drugs, antibiotics, and the chemicals in the environment. If we look at the body burden survey that was done a few years ago, the umbilical cords of babies that were tested in the study had an average of 200 chemicals before they were born. If you look at the 200 chemicals that babies were being born with, most of these induce cancer, suppress the immune system, and contribute to all kinds of diseases and other conditions.

As adults we've lived longer and accumulated more chemical toxins over the years. Of the 200+ toxins they found in babies, they were only checking for 413 toxins, so over half of what they looked for showed up. There are over 100,000 chemicals in the environment, and we don't have the capacity yet to test for all of them, but there is new science, which is actually an old scientific technique called high-throughput screening, which will allow us to test large amounts of chemicals now and in the near future. So we'll start to really understand how many chemicals the human body holds.

Antibiotics Induce Candida

So we have chemicals inside of us having an effect and a cumulative effect, and then we introduce drugs, which can have a very devastating effect. One of the things I really look at continually with Candida is the use of antibiotics. Antibiotics, by far, will induce systemic fungal infections, more so than any other drug. Steroids are another one, and we'll look at some science here that shows that. What I want to do is actually read to you some of the information that's in the science, and all of these articles that I'll read from will be in our Candida Library, and many of them are already put in the library, and we're continually loading hundreds of others.

Some of the videos and pictures we'll be showing you today are also in the library. I'm hoping to connect some of the information in a way that's meaningful to people, so that even in the future, you can go back, review this video and find the information you're looking for.

I'm designing the library in such a way that all the information is organized and itemized. You can take this research information to a healthcare practitioner. You can take it to your doctor. You can say, "Look, here's the science. There are many scientific studies that show this is what happens, and if you don't believe it, look, here it is. Many of these studies have been around for years."

The Rise of Candida Symptoms

One of the graphs that I wanted to show today is SciTrends.net. It's a great site, because they track the amount of research that's been done in different fields for as long as that research has been done going back as far as the 1940's. One of the interesting charts you'll be able to pull up is when you type in "Candida albicans" and search for that, you'll see a straight line that goes up continuously until the present day.

If you look up "antifungal" therapies, what you'll notice is there'll be a straight line close to zero around 1949, and it'll cross over to 1951, and it'll go up to about 400-500 studies that year on antifungal therapy. Why does that take place? Well, that is when antibiotics were introduced in the late-'40s, and they were originally used sporadically. But by 1950-51, they became very, very popular, and everybody started using antibiotics, and medical doctors started using antibiotics. And what they saw shortly after that was a tremendous increase in fungal diseases in their patients.

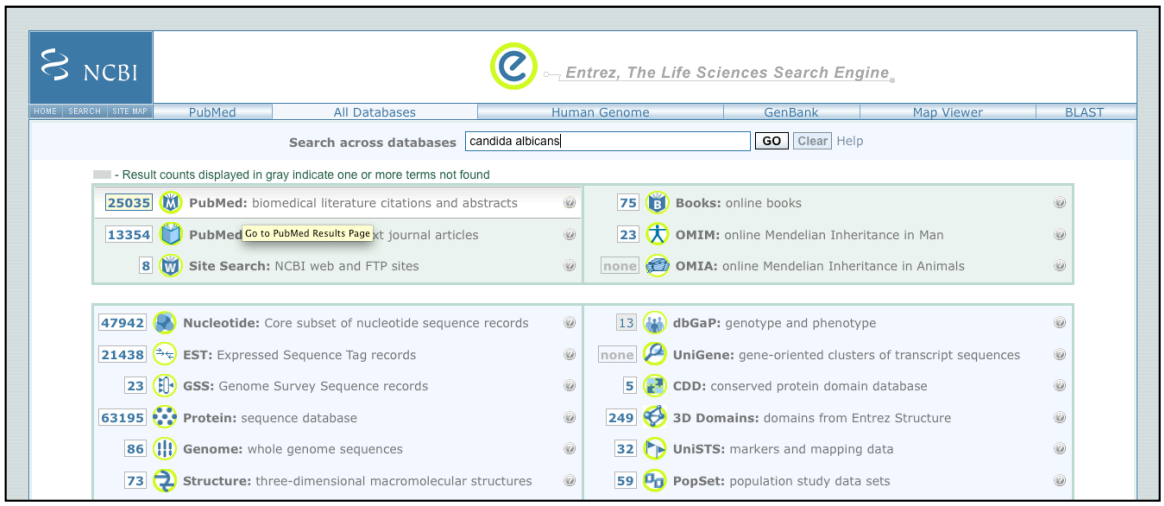
There was fungal arthritis. There was fungal ophthalmitis. There was fungal endocarditis, or heart fungus, joint fungus, fungus in the eyes. They had an increase in fungal skin infections. They had an increase in fungal sinus infections. They had an increase in fungal vaginal infections and fungal oral infections. All of these are common Candida symptoms that started appearing right after the popularization of antibiotics.

So you can see in SciTrends.net where this research jumps shortly after introduction of antibiotics. Now it's not zeroed out in 1949, because Candida has existed for a long time, but it generally existed only in very immuno-suppressed patients or very malnourished patients. Candida was first cited back in the Second Century by Galin, and in the Fourth Century by Hippocrates. So it goes back quite a way. It wasn't until 1923 that it was really identified as Candida albicans, and most Candida literature prior to then was only Candida thrush or Candida esophagitis. So you'll see the development on the timeline, and SciTrends will show you how there's a tremendous increase.

A Wealth of Candida Research

Another great site is the Entrez PubMed site. This is a good site to go to if you want to see how many scientific studies have been done on Candida. So once you go to this PubMed site there'll be a search box at the top, and you can enter Candida albicans. This going to give you how many articles have been published. Currently we're seeing some 24,567 articles. Below that it shows you 12,000 articles that, theoretically, will give you the full articles. The 24,567 is for articles where you can get the abstract, which is just the short synopsis of the research.

Entrez PubMed Web Site: http://www.ncbi.nlm.nih.gov/sites/gquery



So there's a tremendous amount of research into Candida albicans. Around the upper right, you'll find the different books that have been published, and below that, you're going to find more of the studies that are more into the genomics, the genetics of Candida, the proteomics, the protein, the glycomics. So you'll find how that's broken down a little bit and a little bit more specific.

PubMed is from the National Institute of Health, so it's a government site, and you can see over 24,000 articles. If we count back to 1949, that means there's more than one article a day for the last 61 years, with enough left articles left over for another 6 years or so.
So that's a tremendous amount of research into Candida albicans, so it's not that there hasn't been research, and it's in all areas. You can look up Candida in mercury, Candida in antifungal drugs, Candida in the body, Candida in the immune system, quite a lot of different areas. So there is a lot of science behind Candida.

Myths About Candida

One of the things I commonly run into is that the medical community doesn't really acknowledge Candida, but there's science behind it. So it's really that they haven't been exposed to it. They haven't been taught that Candida exists and the enormity of the problem in the general population, and all the studies show that it's there.

And the other part is that there is really a lot of mythology, or a lot of bad information, or kind of word-of-mouth information, which isn't true, so what I find is that I'm constantly dealing between

people who don't want to accept it, and people who have created more stories around it than are actually true or actually backed by science. So we'll try to look at both of these here today.

Antibiotics: A Devastating Imbalance

But again, one of the things I really consider to be the most prevalent cause of Candida in the body, systemic Candida, which will be the fungal form, is antibiotics, so I want to give you some of the reasons that I have posted previously on some sites about antibiotics. And first, I want to read a quote by Lewis Thomas, who popularized the theory of Antibiotic Syndrome, which is what happens in the body after you take antibiotics. He wrote that, “the microorganisms that *seemed* to have it in for us, turn out to be rather more like bystanders.”

So he's talking about the 100 trillion organisms that live in the gut. They're just bystanders. They're there. They're breaking down food, digesting food, building our immune system, playing a vital role to our health, an extremely vital role to our health. He said, "It is our response to their presence that makes the disease." So it's not that these things create the problem, but it's that how we treat them and how we respond to their presence that creates the problem. He says, "Our arsenals for fighting off bacteria are so powerful that we are more in danger from them than from the invaders."

Now there's a lot of good science recently. Research out of University of Stanford shows that through the use of antibiotics, we actually risk short-term problems like diarrhea and life-threatening colitis, inflammation of the colon, which is life-threatening, to more long-term problems like ongoing allergies, asthma, arthritis, and then also to implications for cancer and obesity, among other conditions. So some of these new research technologies are bringing out how devastating antibiotics are in the body and the problems that they create.

5 Ways Antibiotics Create Problems

So let's look at antibiotics, and specifically, with Candida. In studying the effects of antibiotics and how they work in the body, I came up a short list of the top five ways that antibiotics are creating problems in the body:

1. Antibiotics Destroy Competitive Inhibition

The one that most of us are familiar with is that **antibiotics destroy bacterial colonies**, thus they create space for the growth of other organisms. Without these bacterial colonies, we lose what's called competitive inhibition. Competitive inhibition means the bacterial colonies create competition by taking up space, so they prevent other organisms from growing.

2. Antibiotics Disturb pH Balance

Another reason that antibiotics cause problems is antibiotics destroy bacterial colonies that secrete acids that maintain **the intestinal pH of the digestive tract** in its normal, proper range. The stomach is a very acid tissue. The pH of the stomach is about one to three, very acid. The small intestine, as the acid is dumped from the stomach into the small intestine, is also very acidic. As you go through the small intestine, it starts to become more alkaline, but it's more in the range of 4.5 to 6, 6.5.

What we find is that one of the things that will trigger the growth of Candida is when that pH gets up to over 6.5. That’s one of the things that will induce or trigger the conversion of Candida in its yeast form to its fungal form. So we know that antibiotics destroy competitive inhibition and they change the pH, and pH is one of the direct triggers of the conversion of the yeast to

fungal form in Candida. And again, the yeast form is the normal, commensal, harmless form, and the fungal form is the pathogenic, problematic form, which disperses very easily throughout the body.

3. Antibiotics Decrease Fatty Acids

Also, three, antibiotics destroy bacterial colonies that secrete fatty acids that inhibit **Candida's yeast to fungus transformation**. One of the main ones is butyric acid. A good thing to point out here is most fatty acids inhibit fungus. It's one of the main ways that many plants defend themselves against fungus in the natural environment. They secrete these fatty acids. Olive oil has an antifungal property to it, and so does coconut oil, another antifungal. In the digestive system, it's butyric acid that inhibits fungus.

Butyric acid is a fatty acid that plays a role in protecting the digestive tract. It also protects the lining of the digestive tract and helps to heals the cells, helps to prevent leaky gut, and leaky gut is a term to describe when there are openings between the cells of the gut, which allow substances, which wouldn't normally pass into the tissues and bloodstream, to pass into it, so leaky gut is like a lot of holes.

Candida can create leaky gut, but there is also some misinformation that once Candida burrows through the tissue, that the hole would remain, and it's more likely that the body can repair that. Only in someone who is very severely diseased would you see that it wasn't able to repair these holes. So a leaky gut may be something that appears at one time, but doesn't really show up later on, so it may not be a persistent problem. But in someone who has a loss of a lot of the normal bacterial flora, which are the bacterial colonies, a lot of invasive pathogenic bacteria or fungus, then you might see more of that taking place.

So we lose butyric acid. Butyric acid has an antifungal effect that inhibits the yeast-to-fungus conversion of Candida. So here, you got three ways already. What's amazing to me is that these are three ways that definitely prove how the creation of fungal Candida takes place.

4. Antibiotics Create An Immune System Reaction

Antibiotics destroy bacterial colonies, **causing a hemorrhaging of intercellular bacterial components**. So the bacteria itself contains all these substances, to which the body is very immuno-reactive. It initiates a very strong immune reaction, and when you destroy the bacteria, the cells fall apart. All this stuff leaks out into the body, it increases a pro-inflammatory response in the body. So that pro-inflammatory response is part of the body's healing response.

Many times, antibiotics are given to shut down that pro-inflammatory response, and they do that by inhibiting the white blood cells, which create that response. So antibiotics actually interfere with you and suppress the immune system. We'll get into that in more detail later on. That's one of the ways that antibiotics also contribute to the growth of fungus in the body.

But what you see is once some of the substances peptidoglycans, which also are composed of two substances, *N*-acetylmuramic acid and *N*-acetylglucosamine. These two substances are strong, potent promoters of the yeast-to-fungus conversion in Candida. So when you take antibiotics, and you destroy bacteria, you have a lot of leaking of these substances. Peptidoglycans are in what's called Gram-positive bacteria. By destroying these substances, it promotes the yeast-to-fungus conversion, so we have another way this takes place.

5. Antibiotics Suppress White Blood Cells

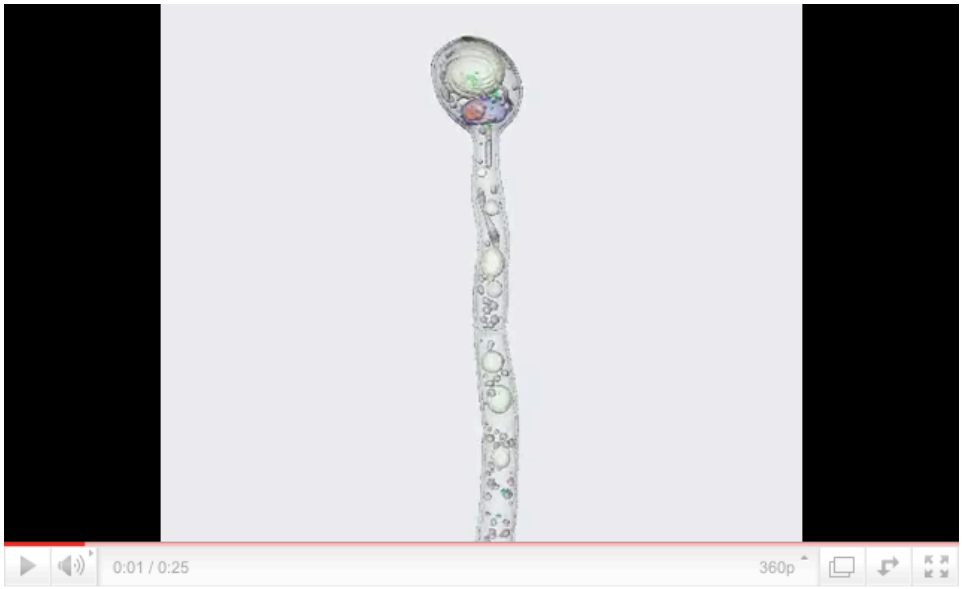
Antibiotics suppress macrophages, which inhibit fungal Candida. Now macrophages are white blood cells, and macrophages are considered the primary line of defense in the body against all infectious agents. Well, this isn't something coming into the body. This is something that's already in the body. The fungal form of Candida has repeatedly shown that it has the ability to suppress macrophages, evade macrophages, destroy macrophages, and inhibit their function. Some of the research shows that when a macrophage comes along, it will eat microorganisms, and then it'll destroy them.

Preview of Candida Library Videos

So I think what I'd like to do now is actually go into some of our videos, so you can refer back to this information with the image of the video in your mind.

Video: What Does Fungal Candida Look Like?

http://www.youtube.com/watch?v=-nCj-dt6a5w



The first video we're going to show you is actually a great piece of animation. It's going to show you the hyphal form of fungus.

So this hyphal form of fungus is elongated, so you'll see what is at the tip was the yeast cell, and as it changes, it kind of grows this long projection, this filamentous form, this hyphal extension, this kind of long piece, and you can see how that contains what you're seeing are pictures of enzymes and sugars and different intracellular components. But again, the original form was that little bulb at the top, that yeast, and it changed into this.

Now if you can picture a macrophage, or a white blood cell, trying to eat the yeast, that's easy, because it's a little form, it's that little bulb at the top. It can consume that. But for it to try and eat this very, very long filamentous fungus form, is very difficult. Science shows us that when it even tries to do so, that enables the Candida fungus to cause the immune system to shift into a response that favors the spread and growth of Candida.

Video: Candida Evades White Blood Cells

http://www.youtube.com/watch?v=hdB7v1d9r1o

So this next video we're going to look at is another animation. You're going to see first from the viewpoint of the yeast in the body, and maybe you can freeze it on that when it comes up. It'll show you here, the brown is going to be the yeast cell, so there are the yeast cells. What you see coming towards them in the foreground is a white blood cell.

So the yeast is there. You see it's round. This is the normal shape of the yeast cell. They appear to have this smooth, round surface, and there're actually receptors that coat the surfaces, but generally this gives you a good idea.
And what you see are some of these yeast cells in the upper-left corner. They're going to elongate very rapidly, and there it goes, and you can see another one in the middle screen at the top that just did that. So it changes very rapidly to adapt to the white blood cells coming after it. Now sometimes that change doesn't take place until the macrophage or the white blood cell has eaten the yeast, and then it'll change to that form and rupture the cell membrane of the white blood cells. It does this very effectively.

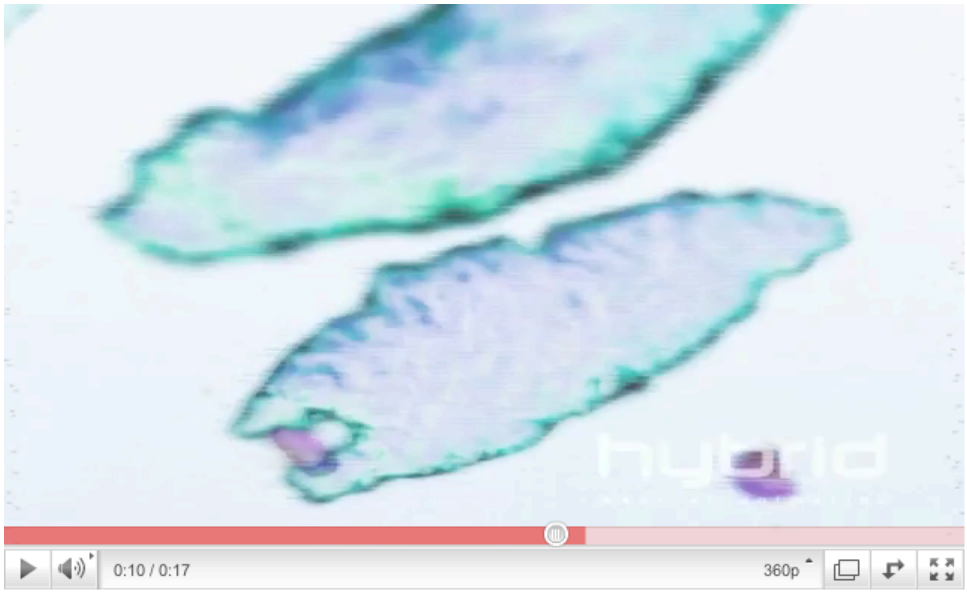
Also, science shows us repeatedly that once it's inside the macrophage, Candida can start to take the macrophage apart. It can start to destroy these protein filaments that make up the structure of the macrophage, so it can weaken the macrophage.

When we look at white blood cells, one of the ways they destroy bacteria and try to destroy fungus is that they secrete enzymes in kind of this oxygenated, oxidative burst, which will destroy the substance. I think you'll see in our next video that it's that oxidative burst which will instantly dissolve these substances.

Candida has an ability to instantly adapt to its environment, to go into starvation mode so that it doesn't require sugars. It can start to live of fats. It can start to live off whatever it finds inside the white blood cell, and it can resist this oxidative burst, this attempt by the white blood cell to try and destroy it.

Video: How White Blood Cells Destroy Bacteria

http://www.youtube.com/watch?v=m6qJ69wcSnc&annotation_id=annotation_878039



So you're going to see what are white blood cells, and you're going to see these little kind of purple-pinkish bacteria. And you can see the white blood cell kind of open up and create something that looks like a mouth and then engulf the bacteria, and you watch the bacteria now, and it'll dissolve. It's gone. So that's what white blood cells do to organisms that they find in the body. Watch this a few times to see how it works.

So once they engulf them, they dissolve it through this oxidative burst. What you're going to see is they engulf it, and they form a little sack around the bacteria or yeast or whatever, and then another sack will come and attach to it that contains the enzymes, and those enzymes will be released into the sack containing the bacteria and destroy it, and these little vacuoles, or sacks, are designed this way so they don't destroy the inner mechanism of the white blood cell. So this is one of the ways the immune system works.

Candida in its yeast form has the ability to adapt and change instantly and evade that, or change that response inside the macrophage, the neutrophil, another type of white blood cell or a dendritic cell.

Now we'll move onto a good video that shows white blood cells consuming yeast and how the yeast never dissolves. It has the ability to persist, and again, what I mentioned, one of the mechanisms, it'll turn to its filamentous form and rupture the white blood cell.

Video: Candida Yeast Cells Survive White Blood Cells

http://www.youtube.com/watch?v=5c7upnFy94A

So you see white blood cells just gobbling up all the yeast, and you see how the yeast, you can still see all the little white and yellow fluorescent yeast cells inside the bacteria. It's going nowhere. It's not dissolving it, so eventually, these yeast cells will convert to a fungal form and rupture the membrane of the white blood cell.

It's a great video, and I think there are several videos out there that demonstrate this, how these yeast cells can actually continue to survive inside the white blood cell.

Our next video is going to show you the presence of yeast and a dendritic cell. It's hard to distinguish them, but these dendritic cells are again going to consume the yeast cell. So the big cells are the white blood cells, and the little cells you see are the yeast.

Video: Yeast Cells Survived Dendritic Cells

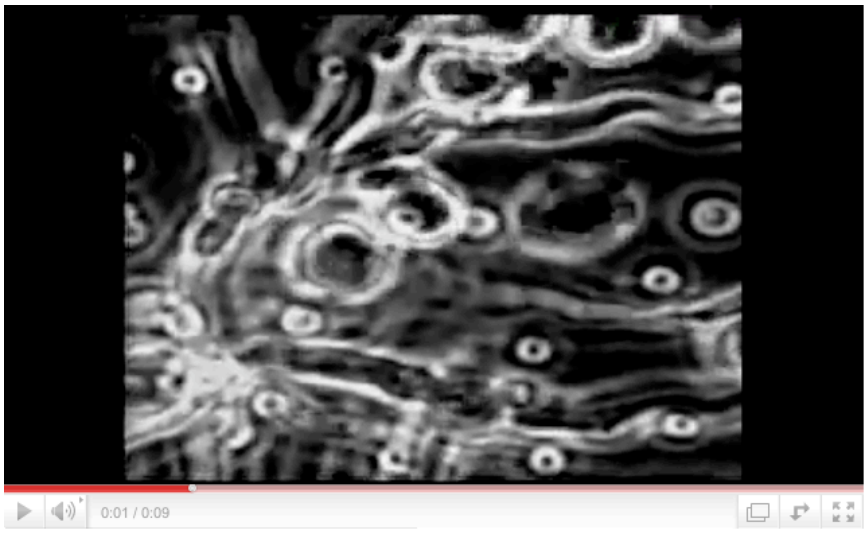
http://www.youtube.com/watch?v=trFKvJT57Vc

Again, this is a good example of white blood cells, human cells, being much larger than the microorganisms, but the microorganisms have an incredible ability to create problems in the body. Again, fungus has been on the planet for millions and millions of years, all the way back to the dinosaur age. And you see the yeast cells are just surviving, and they're not being destroyed. These are great pictures that really demonstrate that.

Every once in a while, this cell on the bottom, you'll see it kind of extend once in a while these little what are called pseudopodia, which are like these false feet that kind of reach out and grab something and pull it in.

Video: White Blood Cells Unable To Consume Fungus

http://www.youtube.com/watch?v=MA36hGcVMcM



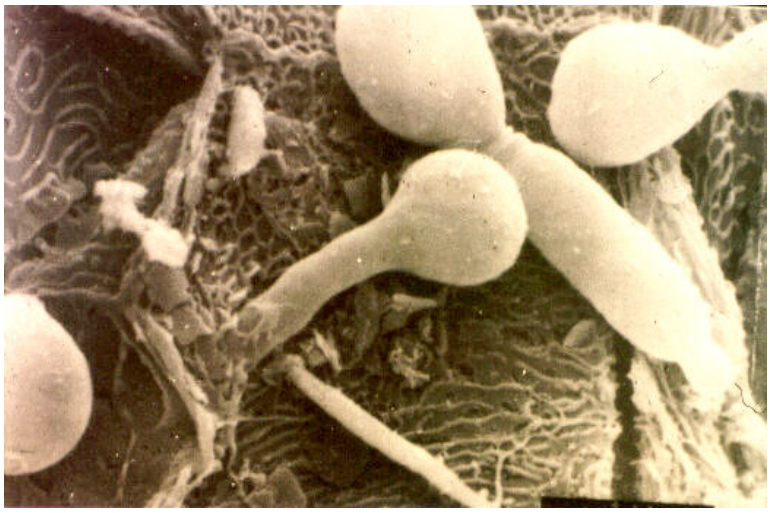
This is a very short video. So once the yeast has converted to its fungal form, now you see the white blood cells having a very, very difficult time doing anything. The yeast cells aren't really free cells it's able to grab, and even the ones that you can try to grab are attached to these long, filamentous strands of fungus, so it can't really get around the entire cell. You'll see how many of these white blood cells are trying to do that.

And again, one of the things that we see in science is that when white blood cell will wrap around the fungus cell, it'll induce this immune shift from a Th1 response, which is what you're seeing there. This is a Th1 response, where the white blood cells try to get rid of the infectious agent, to a Th2, where it later develop substances called antibodies to try and attack these organisms. But the Th2 response really favors the growth of many organisms, systemic fungal Candida, E. coli, and many other organisms, but they have learned, through their evolutionary process and changes to their own genetics, how to really adapt and to compensate for what the body is trying to do.

What you're seeing are long, filamentous strands of fungus. This is a slide from vaginal tissue. So the human cells are the bigger cells with the nucleus in the center, and you see these fungal strands just wrapping around and layering between the cells, and even on the microscope, the fungus will go in between layers. Although we're looking at it in 2-D, and you're just seeing the strands.

Photos of Candida

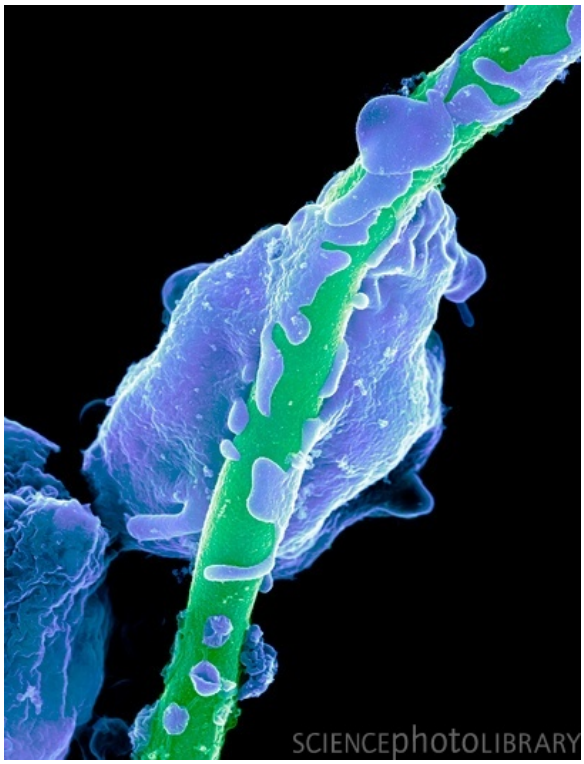
So let's go to some pictures. All of these are on the Candida Library, so you'll be able to see these. And we have some great pictures, which are going to illustrate through high-power microscopy, microscope fields, different pictures of Candida as well as some animated pictures.



Here you see the Candida cell again. Here you see the yeast cell which has elongated into this fungal form, and right in the middle, you'll see the one that's piercing through tissue, so it's piercing through epithelial tissue, I believe, and this is how it escapes the digestive tract and enters into the bloodstream. And once in the bloodstream, the pH of the bloodstream is very pH neutral, and that's very conducive to Candida growth.

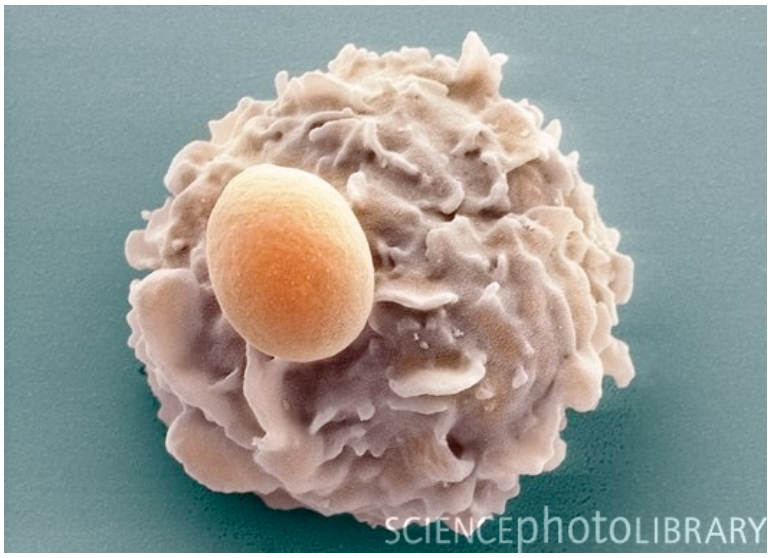
And Candida, once it converts to the fungal form, has this amazing ability to go from fungal to yeast to fungal to yeast depending on what's happening in the body. So if the body is trying to destroy it, it has an ability to change very rapidly to adapt and compensate to what our body does to try and get rid of it.

This is Candida stained. Again, you'll see the cells. What we start to see in this picture is how it's not really this one dimensional, but it becomes like this mass, like a mass of tumbleweed, and how it spreads in tissues. Candida is known to create abscesses in tissues and cause cystic changes, and part of all that is also the inflammation that goes along with it, the continued, ongoing pro-inflammatory immune response, which then fatigues the immune system, so you eventually get immunosuppression just by longstanding infections in the body, whether bacterial, fungal, viral, et cetera.



Above you see a great picture. It shows a white blood cell, colorized with blue, trying to wrap itself around a filamentous, or hyphal, form fungal form of Candida, colorized with green. You can see how the fungal form is very large, the white blood cell isn't, and again, the Candida has an amazing mechanism to withstand this type of assault and to manipulate the immune system at will to be more favorable to the spread of Candida. Beautiful picture.

Here are two Candida cells, and they're going through what's called a budding process. So they'll go from the yeast to the bud to form other yeast cells, or they'll bud to form a pseudohyphal, which is going to be the transition state between the hyphal fungal form and the yeast form. It's a nice picture that shows that taking place.

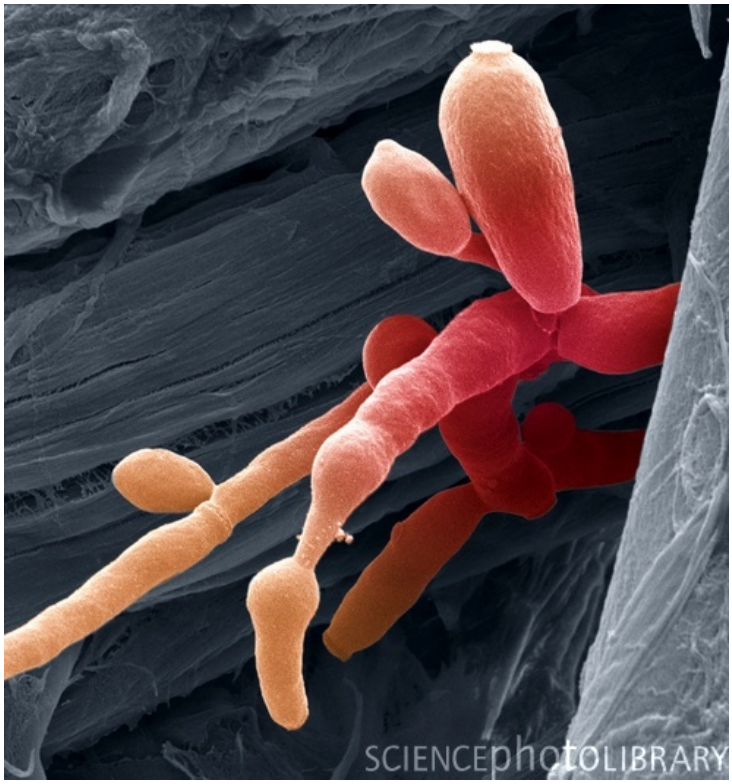


Here again, you have another picture of a yeast cell and a white blood cell, and the white blood cell is much larger, can consume the yeast cell, but then the yeast cell has an amazing ability to manipulate the white blood cell, especially the macrophage. **Neutrophils tend to be the most effective white blood cells against Candida, but they require the macrophage to send out the correct signals to the body so that the neutrophil can come along, leave the bloodstream, and enter the tissue where the infection is taking place.**

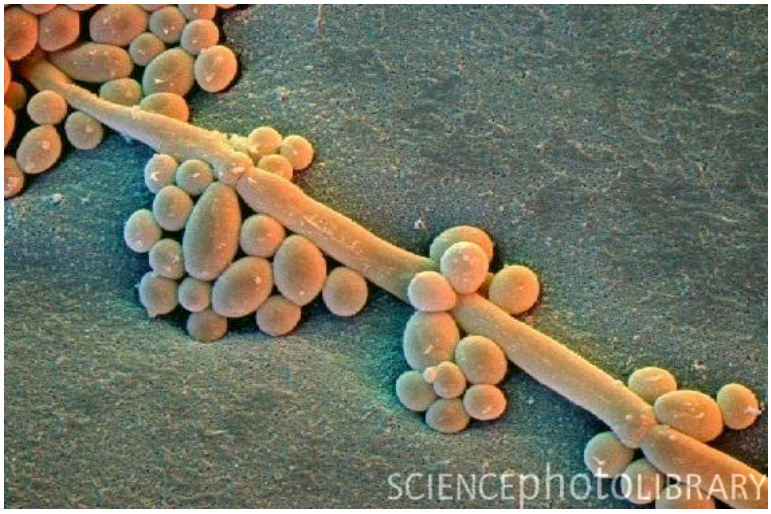
Now especially fungal forms of Candida have an extreme ability to manipulate the immune system, and also, through mechanisms of secreting enzymes into the tissue around it or enzymes into the bloodstream to inhibit or destroy the ability of these immune cells to leave the bloodstream and enter the tissue where the infection is. This allows the infection to continue. This can be one of the mechanisms you'll see with toenail infections, are very difficult to

eliminate. Sometimes oral thrush is difficult because of the ability of these cells to inhibit the correct immune response.

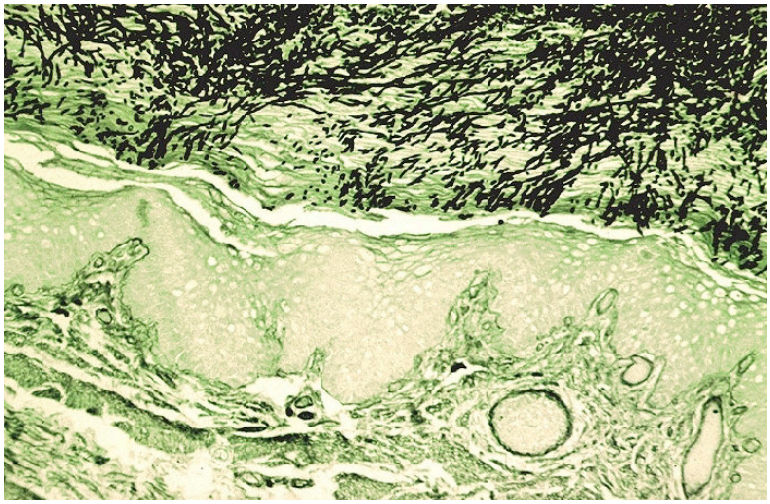
More fungal cells in the hyphal form, you see these strands just layered over. This slide comes from vaginal issue. You see the cells are very skin-like, scale-like. These are human cells.



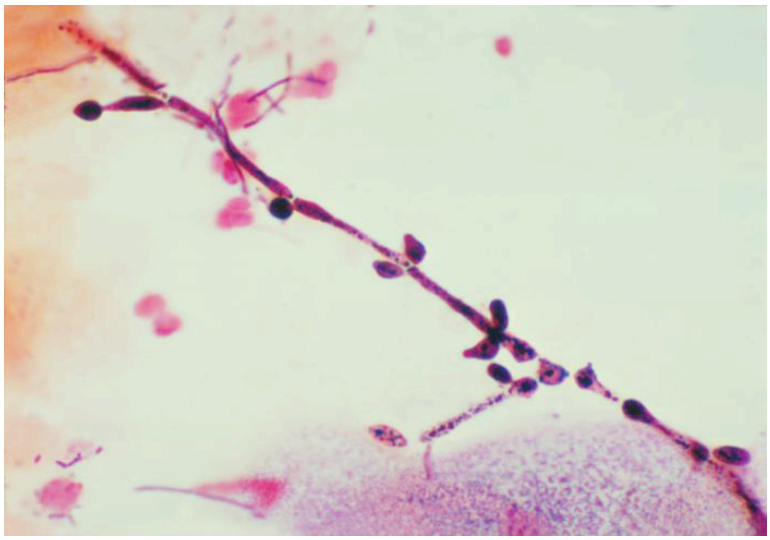
Another great picture showing a fungal form which is continuing to bud, and that's where you start to get these kind of tumbleweed appearances where it's budding off into all these different directions.



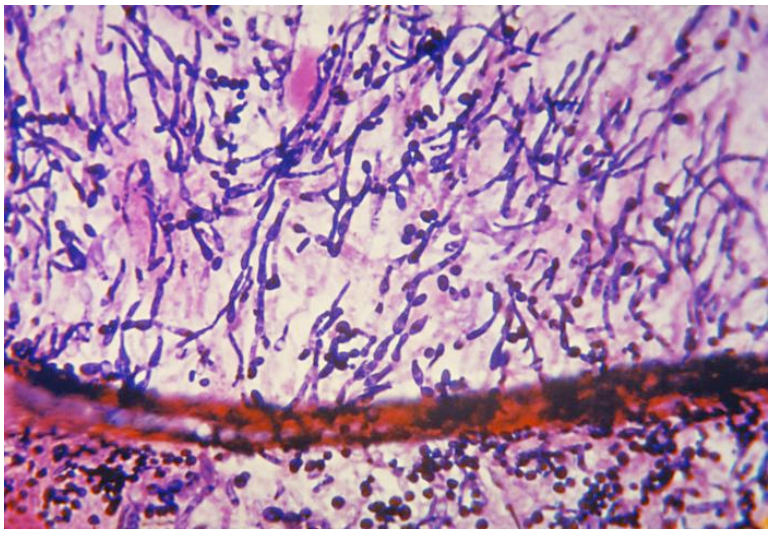
Here's another fungal form. You see multiple little spores that are forming and budding off the fungal stem cell or stem. More budding pictures, budding not in just one direction, but several directions.



This is a great picture. If you notice, at the top of the picture, you can see the fungal form of Candida, all these little black cells and these fungal strands invading the tissue. This is a slide that was taken of the esophagus, so this will be fungal esophagitis, very common. Fungal esophagitis is considered to be one of the markers for many AIDS patients. If you get fungal esophagitis, it's one of the things that they call an AIDS-defining symptom, but you see how it's this massive amount of fungus invading the esophageal tissue.

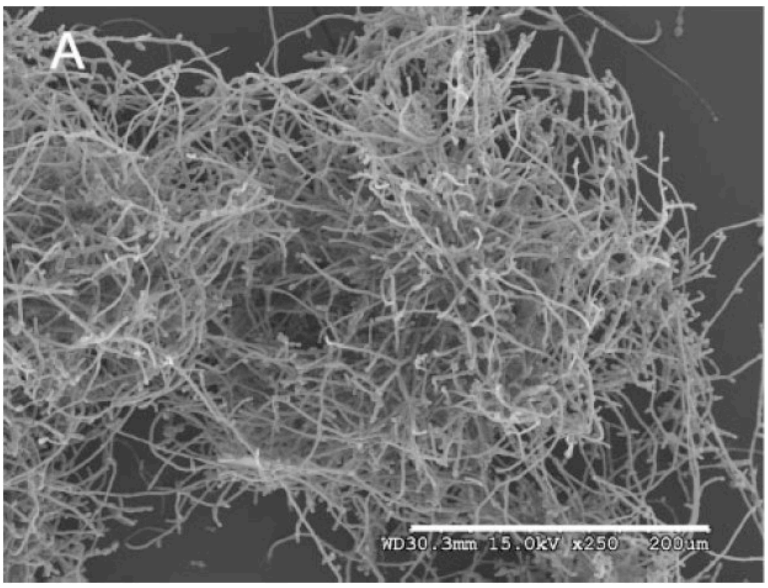


Another nice, pretty, colorful picture of fungal Candida.

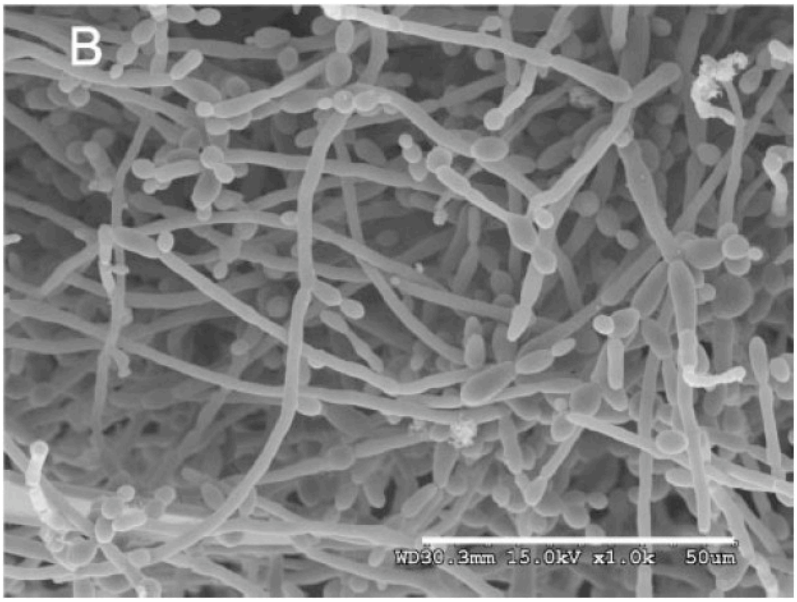


Another good slide, this is of heart tissue, so you see these fungal cells invading the heart tissue. Again, you see all these strands branching off in different directions. Again, it's 2-D. It actually is happening in 3-D, in multiple directions. And all of these fungal cells are going to be secreting enzymes, which are destroying the tissue around it, manipulating the immune response, harvesting nutrients from the cells around it.

Candida and all microorganisms need iron, so they're going to look to the tissues and cells to get that iron, and they'll harvest it. The enzymes they secrete, the secreted aspartyl proteases, protein enzymes, they destroy protein. Phospholipases, which they destroy phospholipids, phospholipids are in the cell membrane in most of our cells in the body. They have an ability to destroy that, enter the cell. Lipases destroy fat cells. So they secrete all these enzymes, which enable them to enter tissue and spread this way, and they can do this asymptomatically. This can be going on in your body, and all the research will be in our Candida Library. This is all going to be organized in a very effective flowchart for people to follow and go to and refer to.



This is a beautiful picture. You can see the fungal mass here going in multiple directions. It looks like a massive piece of tumbleweed. The scientific literature is going to show that there are instances where doctors thought that they were seeing that people had tumors, cancer. When they opened them up what they found were these fungal masses inside of people, and so the fungal cell, itself, not the long-strand form, but the yeast cell, is very, very similar to our human cell, much smaller. So what they think they're looking at as human cells are actually fungal cells.

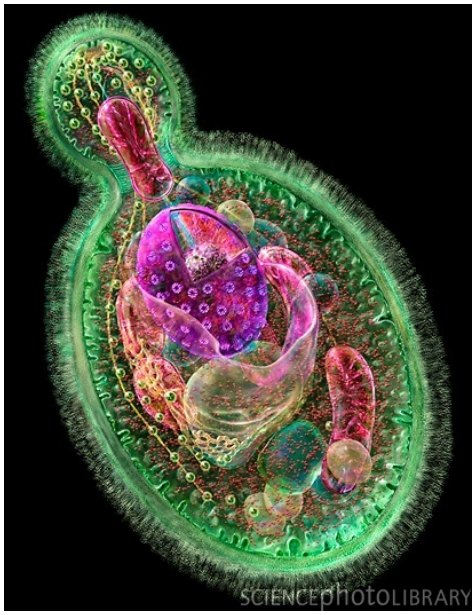


This is another close-up picture of the same thing. But you see this mass, and all these cells. These are individual cells connected, these filamentous forms. They're secreting enzymes. They're continuing to do what they need to do to spread into the environment.

Fungus Is Everywhere

If we look in the environment, what do fungal cells do? Fungus occupies a lot of different niches in the environment, but especially, the floor of a jungle where everything falls to the floor of the jungle, and the fungus lives there to decompose it, to break it down, so it secretes all these different types of enzymes. And fungus is ubiquitous, it's everywhere in the environment, so all the plants around us have antifungal properties. There's hundreds and thousands of years of scientific research to still discover all the antifungal substances in nature, but we're seeing the reasons why it's so effective. It spreads in a form that literally can take over a plant, suffocate it, and this is really, in one sense, what it does to the body.

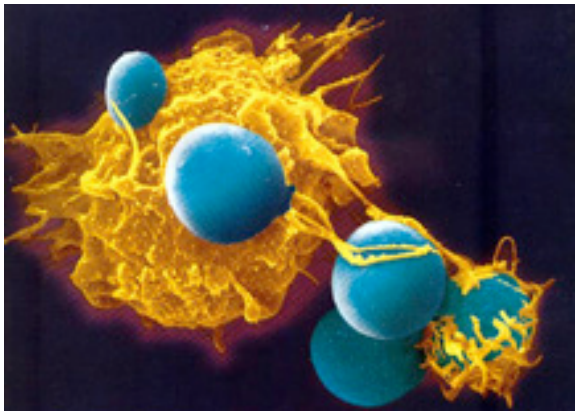
Illustrations From The Candida Library



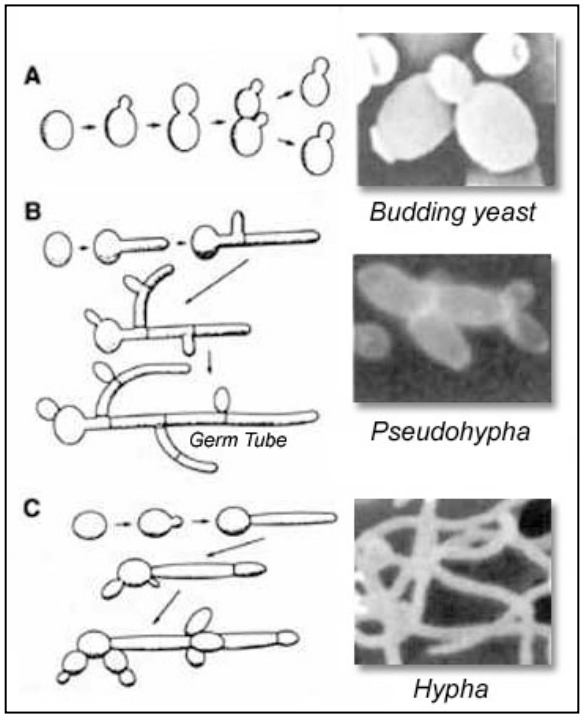
This is just a pretty picture. It shows the yeast cell converting to and going through the budding process, how substances inside the yeast cell are starting to enter the body and that'll duplicate. Candida can reproduce asexually. It doesn't need another yeast cell to reproduce. It can just reproduce on its own. It just needs the nutrients, and it gets that from the environment it's in.

Candida Needs Fatty Acids

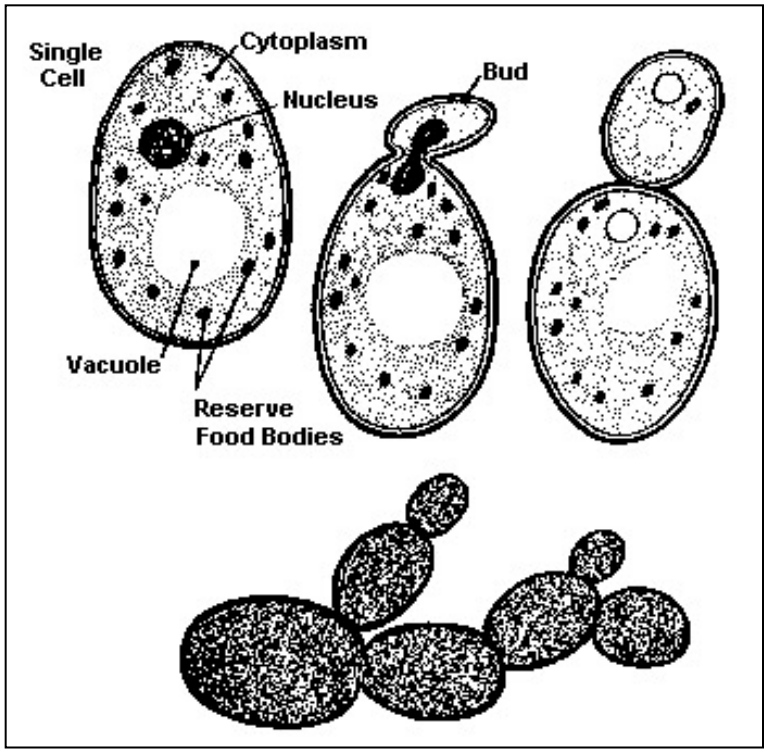
One of the main nutrients Candida needs is fatty acids, and it gets those from our body. It needs different fuel sources, sugars are one fuel source, different amino acids, et cetera, but it needs these things to run them in the machine of its cell, and it gets these from our environment, which is one of the ways our product, Candida Force, is very effective, is that we provide it with a fatty acid which affects the inner machinery and doesn't allow it to produce the cell wall membrane it needs to produce and can also affect the pH inside the cell.



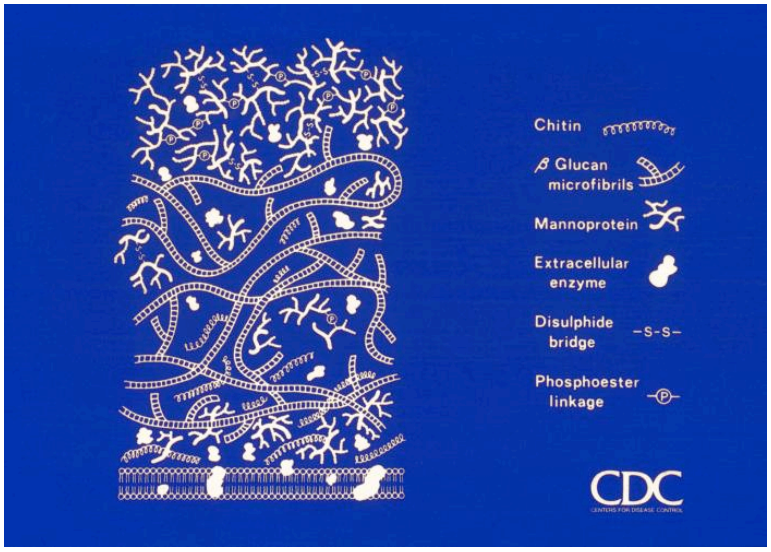
This is a nice animation of what we saw earlier of a white blood cell consuming multiple yeast cells.



Here's a nice graph you'll find on a lot of different websites. You'll see the budding process at the top where the yeast is budding, creating two yeast cells, and how that process continues. Then you'll see in the middle, you'll see the yeast cell creating pseudohyphal cells, and how they start to branch off and create more spores and pseudohyphal cells, and these are seen in the microscopic view to the right. And then, on the bottom, you're seeing the creation of the hyphal form and the branching that takes place. That's a nice diagram you'll find on several different sites.



Here is another diagram that shows a little bit more about the inner machinery just through a 2-D image and kind of the branching that takes place at the bottom. That looks like cactus.



This is showing you the cell wall membrane, and you're going to see a lot of different components. You'll see that there are sugars in the cell wall membrane. But if you look at the very bottom, what you're looking at is a phospholipid bilayer. There's a row of cells on the bottom and top, and they have a little space in between them, and those are phospholipids, and they have channels in there, and they also are incorporating other components of either sugars or protein.

But you'll see the layer underneath that has a lot of what are called mannoprotein glucans, beta-1,3, beta-1,6 glucans, which are sugars. Mannoproteins are sugar and proteins combinations. Chitin, another sugar, these makes up really a lot of the stiffness, or backbone, of the cell wall membrane.

Candida Hides From Your Body

But Candida has an amazing ability to shift these components. So if the way our body would identify a fungal cell is through what shows up on the surface by digesting it and putting these pieces up on the cell surface of the white blood cell, the body knows exactly what to go after. But Candida can shift that, almost instantaneously. It can create a shift, and it can change the outer membrane, so the white blood cells no longer recognize it. It's an amazing process.

Also, with a lot of infectious agents, with a lot of fungus, and with Candida, it'll form what's called a biofilm around it. A biofilm, is a mucousy layer so that the body can't identify the fungus once again. Many times, these biofilms are made of other bacteria.

Recent research shows that one of the common bacteria which forms a biofilm around the Candida, concealing it from the body, is E. coli, which has undergone the same shift because of how we've changed the internal environment of the intestinal tract through antibiotics or through steroids or other drugs or sometimes even stress and how we affect the immune system, but primarily through antibiotics.

This next picture is a good picture that's going to show a white blood cell. You can see all these little projections sticking out of the white blood cell, and these are receptors, and receptors are common – you'll find these in all cells. But one of the ways that Candida affects white blood cells in the body, is it secretes these enzymes, these secreted aspartyl proteases, and they cleave, or they chop off or cut off, these receptors.

Why are these receptors important? For human cells, we have receptors that allow insulin to bind to the human cell, and then by binding, it increases the uptake of sugar inside the cell, so it's kind of a lock-and-key mechanism. The insulin comes along, it's the key, opens the door,

sugar goes into our cells. When that doesn't happen, we have blood sugar imbalances, and that can lead to diabetes.

Also, with immune cells, when it chops off these receptors – white blood cells travel through the immune system, once they've been produced by the bone marrow activated by different tissues or activated within the tissues, and then they'll travel through the bloodstream. These receptors will latch onto the wall of the arteries or veins, and there's a reaction that takes place between the receptor and the wall, which allows the cells of the wall to separate to allow the white blood cell to leave the bloodstream and enter the tissue where there's an infection.

Well, Candida has recognized this ability of white blood cells, so it secretes enzymes, which specifically destroy what are called CD11 and CD18 receptor sites on the surface membrane of the white blood cell, and this causes immunosuppression. And also, what they've found in research, and there is one research that identified all these three components, was that these enzymes also cause hypertension, high blood pressure. So that was research that was done at the University of California San Diego by Frank DeLano and his researchers, and also, by other research. It also has to do with the ability of Candida to resist and adapt and change the antifungal drugs, which it's constantly being assaulted with.

So that's the end of our picture slideshow. You'll be able to see those pictures, videos, and many more on our Candida Library.

Antibiotics Suppress The Immune System

So I want to get back to the effect of antibiotics in the body. We left off where antibiotics suppress macrophages, which inhibit fungal Candida. Again, macrophages were the primary line of defense by the immune system, and Candida has repeatedly shown an incredible ability to suppress, manipulate, and destroy macrophages.

Antibiotics suppress cytokines that recruit neutrophils, which inhibit fungal Candida. Again, macrophages, these white blood cells, are one of the primary producers of cytokines that are carried through the tissues and the bloodstream to recruit neutrophils to come along to the site of the infection. When you take an antibiotic, you suppress these cytokines by suppressing the white blood cell. You now have really suppressed the ability of the body to eliminate Candida, and the body's main defense against Candida.

So macrophages have been found to be ineffective, antibiotics are now suppressing the main effective cell that can come and actually play a role. It's not that it gets rid of all of them, but it does have a suppressive effect, so it's another factor that plays into the conversion of yeast to the fungal form.

Antibiotics suppress cytokines that sequester or hide iron away from Candida and other microorganisms that require iron to grow and spread. So some of these cytokines, which come along later on, and again, these come along at different hours or even days into an infectious process, some of these will bind iron so that the microorganism doesn't have it available to grow. So without the iron, it really inhibits or impedes the growth of Candida.

Antibiotics destroy bacteria that synthesize B vitamins, a very important part. A lot of the good bacteria or a lot of the bacteria that's destroyed synthesizes vitamins for the body. E. coli synthesize vitamin K. Bacteria synthesize vitamin B. Vitamin B is one of the main stress vitamin for the nervous system, so you can have a lot of nervous system effects from Candida in the

body, and the destruction of these bacteria through antibiotics, which is part of the antibiotic syndrome, or post-antibiotic syndrome.

These B vitamins also play a role in producing hydrochloric acid for the stomach. Hydrochloric acid is one of the kind of primary defenses that prevent parasites and infectious agents from getting into the digestive tract. It also – hydrochloric acid produces an environment which allows enzymes in the stomach to break down your protein to absorb iron, to absorb vitamin B12 by activating an intrinsic factor protein in the stomach. You lose iodine absorption, so you affect thyroid function.

Calcium, you decrease calcium absorption. So you start to see how you have this kind of global effect when you take antibiotics, destroying bacteria, which – so in addition to creating fungal Candida, which in itself is so problematic, we upset the normal bacterial floral of the body.

Antibiotics cause a **cytokine storm**, a massive amount of cytokines, and this is sort of a reflexive event that takes place, because the initial effect is to suppress the cytokines, but by destroying all the bacteria, you eventually, down the road, get this massive amount of inflammation inside the digestive tract. And Candida will use inflammation to help destroy the – or weaken the cells lining the intestinal tract to allow it to exit the intestinal tract and enter the bloodstream more effectively.

As you can see from some of the slides we had shown, you saw Candida in the esophagus, you saw Candida in the heart, you saw Candida in the vagina tissue. All these pictures are demonstrating that once it gets into the body, it has the ability to spread throughout the body.

Antibiotics directly stimulate the yeast-to-fungus conversion. One of the antibiotics that's been shown to do this, and I don't know if this is still really considered to be the most accurate science, but it was tetracycline. Much of the research that was done in the early-1950s, late-1940s, early-'60s, they really looked at – they didn't know why there was such this overgrowth of fungus after people were taking this new drug called an antibiotic, and they were really investigating.

A lot of pharmaceutical companies were investigating, and when they couldn't figure out what was causing it, they kind of started leaving that behind. But you'll see, if you can get to SciTrends, if it comes back online, you'll see a lot of these – the gradual increase in the study of antifungals, in the Candida articles, and as we showed on PubMed, over 24,000 research articles on Candida.

So it's very much a problem, and so most people are rubbing their heads who have this problem or suspect they have this problem, or when they go to an MD, and they say, "Look, I think I have a Candida infection." And they say, "That's crazy. That doesn't exist here, you know. That's impossible. That doesn't happen." And, you know, there's the science there to prove it, and if they're really open-minded, they'll look at the science. It's there.

When you go to an MD, they say it doesn't happen. They say it only happens in people who have immunosuppression, because they're suppressing their immune system, that they have cancer, or that they're AIDS patients. MD's tend to say it's rare and immunosuppression is pretty much the only way to get Candida.

Candida is the fourth most common hospital-acquired infection out there, so it's not something that doesn't exist in hospitals or in their environment.

Ask The Candida Expert Q&A

I think what I'd like to do now is shift to some questions, because some of the questions will take us back into the science, and we can look at it from that angle.

"Why isn't there a standard test for Candida?"

Q: Our first question comes from the U.K., from England, and it says, "Why is there no test on the NHS – and this is their National Health Service – that shows Candida? Whey is there no medical backup for my hospital or general practitioner who just keeps telling me there's nothing wrong that they can find?"

A: Well, it's going to be the limitation of the science in terms of being able to diagnose this. There are tests that you can do to diagnose Candida, through stool tests, through blood tests, through saliva tests, and through urine tests. The organic urine tests are done through the Great Plains Lab. They do great organic urine testing, and you can go there for that.

Most labs will do antibody testing, which is usually the blood testing. Some will do stool testing. I think Diagnos-Techs Labs will do stool and saliva testing. Genova Labs, also does stool and saliva and blood testing.

So there are tests out there, but you really have to look at the medical profession, and really, I think this applies to all of us. We create walls around us based on our beliefs, and our beliefs are many times based on what we've learned in life or what we've been taught. So as a medical doctor, you're not really taught this, so this is not even in your realm, your sphere of knowledge. When it happens, and you're in a hospital, you don't really know anything, so what you do is you call an infectious disease specialist who will come and look at this information, but basically, they don't have an understanding of this.

When you tell them it's antibiotics that cause it, they say, "No," and that's because they don't know the science. They don't look at the science. The science is out there. What's coming down the line based on some of this fantastic new research and fantastic PCR testing, where we're using the testing that we used in the ecosystems of the jungle, and now we're turning that inward and looking at the gut. This research out of Stanford shows this has implications for obesity and cancer and other conditions, asthma, diarrhea, life-threatening conditions, allergies. The science is showing this.

Another great thing came out of that research out of Stanford. It was commonly believed that the 100 trillion microorganisms in the gut were composed of 400 or 500 different species. The Stanford research show that there were anywhere from 3,300 to 5,700 different species, and that was research out of 2009. Research out of 2008 out of University of Michigan said there was anywhere from 15,000 to 30,000 species.

So you can see that we've come a long way from the 400 to 500 hundred, which is really what you'll find in most Candida studies, most fungal studies. It's in the literature. It's still coming out. Even in current literature, you'll find the reference to 400 to 500 species. There was even good research that was done in the '90s that show that there was 1,000 species, and they quit counting at that point, but the new research methods give us a faster and easier way to look at the number of species in the intestinal tract.

About The Candida Library

So the research is there, the research about how antibiotics are bad, the research about Candida, 24,567 articles in PubMed, National Institute of Health, United States. There is research around the world. Our Candida Library will give you several databases you can go to. You'll find research that isn't in PubMed. You'll find research that's in other languages that hasn't been translated. You'll even find research on PubMed where there's no abstract or research article, but it's just logged there.

The Candida Library is a free site. It's a non-profit site. We're not going to be promoting the McCombs Plan on there. We're not going to be promoting any plan. We're just going to give information that everybody can use to educate themselves, educate their physicians, and unfortunately, that's what has to be done today.

The pharmaceutical companies have realized this, which is why you have a lot of direct-to-consumer marketing by pharmaceutical companies about conditions and diseases, and the drugs that you should take for them, and then a long disclaimer about all these side effects that go with the drug. They're really looking at educating the consumer, and then having the consumer go to the doctor and educating the doctor, and this is kind of a scary way to look at the medical profession, that they have to be educated by their patients and by the consumer.

That being said, I'm open to being educated by everybody and finding education from every source that's out there. But some people aren't, which is why a medical doctor doesn't want to practice outside of what everybody else is doing. It's safe. It keeps them safe from lawsuits. If they do what everybody else is doing, they're fine. They can keep making a living.

So unfortunately for those millions of people who have Candida, they can't address this situation, but there are many situations they can address, which is why holistic practitioners are so successful in this area, as well as chiropractors, acupuncturists, naturopaths, massage therapists, nurse practitioners. There are a lot of people out there who have this information.

So I think what's wrong is the model where people have a condition, and they go to the MD, but the MD doesn't understand many things. The MD really is more into drug therapy protocols, and I had this experience when I had twins that were born at 25 weeks, very early, and they were in a neonatal intensive care unit for almost 5 months, 19 weeks. I was there every day, and I questioned these doctors continuously. They knew very little about physiology, which is very scary, because that's how you treat a body. That's how you treat the human body, your understanding of physiology and what you're doing to the body and how that affects the body and what long-term and short-term that's going to have based on your understanding of physiology. And nobody knew anything, so that's why I spent every day in the neonatal intensive care unit for five months.

So I think the medical model is wrong. I think we need to go to other practitioners. We need to quit thinking of the medical doctor as the person who knows, because in most instances, they don't. They know the drug therapy protocols and what to do. But even back in the '80s, there have been medical practitioners that were saying that the doctor of the future, the key doctor would be a chiropractor, because he knew so much more about every other different field and wasn't limited. Doctors of chiropractic have a broad scope of practice, so they have a tendency to learn more than other people.

You also find that in acupuncturist and naturopaths, there is a tremendous wealth of practitioners to go to. I wouldn't just go to an MD or a hospital thinking they knew.

"How do I know if I have Candida?"

Q: "I am unsure as to whether I have Candida, but something tells me that I have it."

A: My belief is if you've ever done antibiotics, and based on the information we gave you earlier, you'll have systemic Candida. If I take just the information I gave on antibiotics, that alone is a diagnostic for having a fungal systemic Candida infection. It goes back to the information we gave earlier, that humans are really sponges, and we have thousands of chemicals to show for it.

Babies are being born with 200+ chemicals in their body on the day of birth, and we accumulate thousands of chemicals, and they're having an effect, and also, the effect of stress, nowadays, suppresses the immune system. Some of our articles on the Candida Library will go into how all these different things affect the immune system and makes us vulnerable to Candida.

Aging affects the immune system. Diabetes in the body creates chronic inflammation in the body. Obesity creates chronic inflammation in the body, and the percentage of adults and children who are obese now or overweight that creates chronic inflammation that interferes with all the detoxification pathways, the hormonal systems, and interfering with those pathways creates chronic inflammation. So all those things weaken the immune system, so if you take these all collectively – I think antibiotics alone can do it, but if you add antibiotics with a person who already has a problem, this is how it systemic Candida is created.

Here's something to consider. Research shows that antibiotics will destroy bacteria enough and create such an imbalance that it allows the overgrowth of Candida. Let me read it to you directly from the research.

"We previously reported that the primary defense mechanisms inhibiting translocation, that's the ability of antibiotics to leave the intestinal tract and enter the bloodstream and affect tissues, are an ecologically balanced GI microflora." It says, "Oral antibiotics are especially effective in disrupting the GI ecologic equilibrium, and oral antibiotic therapy in humans often leads to colonization and overgrowth of the GI tract by Candida albicans."

So who's doing this research? Well, if we look down here, Biocodex. Biocodex is an independent, family-owned pharmaceutical company specializing in gastroenterology. So this isn't me and my practice. This isn't an acupuncturist. This isn't a university, though I think universities do great research. Interestingly, most of the research is being done by universities funded by pharmaceutical companies. Well, this is a pharmaceutical company doing the research, and their results show that the primary defense mechanism inhibiting translocation from the GI tract are an ecologically balanced GI microflora, and oral antibiotics are especially effective in disrupting the GI ecologic equilibrium.

Candida Without Symptoms

Here's another study. "The frequencies of the carriage of yeast pathogens tend to increase with the length of a patient's stay in a hospital. This trend was observed even though none of the patients shows signs or symptoms of superficial or systemic Candidiasis, which is an abnormal Candida infection."

So no signs, no symptoms, but the longer they stayed in the hospital and were exposed to more and more antibiotics, which is what's taking place here – the more their Candida infectious rate rose, and they were still asymptomatic and showed no signs of superficial or systemic Candidiasis.

Many people wonder, "Well, if I had Candida, would I know that I did?" And this is what I tell people, "If you did antibiotics 30, 40, 50 years ago, you'll still have systemic Candida." You may not be symptomatic of a very severe infectious process, which is the only process that the medical profession recognizes, but you still have it from taking antibiotics, from steroids, from living in today's society, all these toxins, all these things combined. So this is how it happens, and this is the research being done.

Some of the initial research back in the 1940s, '50s, '60s was done by pharmaceutical companies, NASA, even the U.S. Naval Department did research on Candida. On our site, you'll see we talk about systemic Candida in astronauts, because when you put astronauts in a weightless environment that promotes more symptomatic expression of Candida.

So there are many different mechanisms, but my point of view is these people already have Candida in the body from antibiotic use, living on the planet, but there are certain things that'll bring it out more. It's the conditions that allow Candida to really express itself. If you were really stressed, if you get another disease that comes along that weakens your immune system further, if you didn't get a good night's sleep, if you're doing extreme exercise. Intensive exercise suppresses the immune system. A lot of these different mechanisms contribute to this infection, which has been there since your antibiotic exposure, to now become symptomatic.

"I haven't felt well since I took antibiotics. Could this be Candida?"

Q: After taking a round of antibiotics, I felt better in some ways, but other symptoms appeared. Now I have pain and discomfort. In your opinion, is it possible that the antibiotics left a systemic Candida infection that I'm experiencing now?

A: Well, that's what usually takes place. An important thing to point out is, many times when we have infections, we have the release of cytokines, the white blood cells, the pro-inflammatory response, which creates these other chain reactions that create healing in the body. But the cytokines, that pro-inflammatory response, creates a lot of body aches and pain and soreness and, you know, runny nose, etc. That immune system response is usually what gets suppressed by antibiotics, so people think, "Oh, I feel better. I don't have those symptoms anymore."

So the real test of whether antibiotics were used appropriately is whether they did a blood test, because that is the protocol. Whenever a doctor uses antibiotics, they should culture the specimen, expose it to antibiotics to see if that particular antibiotic had an effect, and then give that antibiotic to the patient only if, through the culture, it demonstrated an effect. But they don't do that. It's never done. They look at sheets and say, "Well, this one has been proven to work." So doctors really have to question, "Am I treating the infection? Or am I treating the symptom of inflammation due to cytokines?"

To answer your question, yes, it's the result of the antibiotics, the post-antibiotic syndrome that you're experiencing. That plays an effect in the spread of Candida, and then you have all these developments down line, which can create lifelong problems, as the research has shown. Even the research from 1922 has shown the effect that most people experience from antibiotic use.

So yes, it's definitely, "I took antibiotics," and this is what I hear all the time. "I took antibiotics. I did 60 days. When I was young, I took antibiotics for a year, two years, and now I have these terrible problems." That's very common, and the way you reverse that process is get rid of the Candida, add back the good bacteria, balance the ecosystem of the digestive tract, and allow the body to start healing and start the repair process. It's not always an automatic, "I did a diet, took the products, got rid of the Candida, and now all my problems are all done."

A lot of things will shift, and this is what people see. But sometimes maybe one thing that they're really focused on is the thing that's going to take longer. It's going to take the healing process of the body. It may take another time through a Candida cleanse protocol. It may take ongoing support. But if you restore the natural bacterial flora of the intestinal tract, now you've increased the ability to absorb nutrients that your body and cells and tissues need to repair and rebuild. From antibiotics, you lose ability to absorb; you create inflammatory allergic reactions. Many people start having food allergies, meaning a lot of foods you can't eat.

It's best to look at this as a process, and many times that process happens quickly, sometimes it takes longer, but you want to look to see what else is taking place. Are there changes taking place? Do I feel a little better? Have I seen changes in other areas? Maybe not in the area I'm focused on, but have I seen changes in other areas that indicate my body is healing?

So that's what the McCombs Plan is for. That's what we developed it for.

"Do probiotics really stay in your digestive system?"

Q: I have some doubts about the effectiveness of probiotics. I've heard they can't survive the stomach acid, and I've also heard they don't stay in your gut.

A: There's a lot of marketing information that's put out, like X brand survives the stomach acid. Well, most of the probiotics do survive, and research shows that. Even research that's been done over the years has demonstrated it.

So the research supports that it does survive, and in cases when it doesn't, it's still having a positive effect. The more you take, the better off, the more likely you're going to have more benefit. You should take it ongoingly. Even when you're done with the McCombs Plan, you should continue to take probiotics, because some are transient and some colonize.

I think one of the questions we had was I looked at the other day on my blog on CureZone, was that someone was mistaken that all the probiotics were transitory, they don't set up in the digestive tract, and that's not true. Some probiotics do colonize. Many colonize. But some are just temporary, but they reproduce very rapidly, so they constantly replace themselves. So even though you may lose a bunch, others that grew inside the intestinal tract replace them. It's good to take ongoing probiotics just to support the intestinal tract and overall health of the body.

You Can't Take Too Much Probiotics

You know, what's been shown is that you can't overdo it, and I know, in the medical profession, one of the things they look at is bacterial overgrowth and that bacterial overgrowth is causing a problem. It hasn't been shown to occur with probiotics. There may be bacterial overgrowth, because this person was exposed to antibiotics, and now this pathogenic organism, like E. coli, which is normally harmless, has been converted to a harmful bacteria, or the yeast form of Candida is converted to the fungal, pathogenic, harmful form of Candida. Now you're having an

overgrowth problem, but it hasn't been documented with probiotics. There's no scientific research that supports a concern with taking more probiotics. It's actually the opposite. There's no limit to the amount of probiotics you can take on a daily basis.

Now if you've completed the McCombs Plan, fermented foods will have natural bacteria, and this is one of the great things about fermented foods. It helps assist the body in digesting the food. Kefir, a wonderful substance, is kind of a liquid version of yogurt. Many yogurts that are commercial, some studies show that by the time people consume them, there's no longer really that many viable bacteria present in there.

So don't have fermented foods on the plan while you're doing the McCombs Plan, because fermentation also creates sugars, and we're trying to limit what Candida can grow on, and there are some other effects that when you have systemic fungal Candida that may not be so beneficial to the body until you've controlled it and rectified that problem. So taking kefir and fermented foods comes in after doing our Plan. Flora Prime is our probiotic that goes with the Plan and you can also take that as a maintenance dosage for ongoing support.

"Antibiotics saved my life, but…"

Q: At age 15, my first antibiotic, streptomycin, saved my life. But I have been plagued by fungal problems from multiple antibiotics and chronic sinus infections ever since, and I'm now 77 years old.

A: This brings up the question inside me. For many years, I really haven't criticized antibiotics, because many people believe it does have a life-saving effect, and under certain circumstances, it might. But what we have to address is that, at the same time, we're creating a life-long imbalance in people.

So on the one hand, if someone was a burn victim, they lose the natural protective barriers of the skin, so antibiotics are used. This is one of the first major findings with antibiotics - how remarkable that so many more people survived. But what was never addressed was that you can create life-long problems in these people, so yes, we acknowledge that they can save lives, but it's never addressed that they can create fungal problems and endocarditis and chronic arthritis, chronic heart, chronic vision, chronic vaginal, just so many chronic problems. Most autoimmune disease is believed to come from the gut. When you upset the microflora balance, you can have autoimmune diseases that'll kill you.

And yes, sinus infections are very much related to the use of antibiotics. The Mayo Clinic in 1998-99 said **96% of all sinus infections were fungal**, and they were being treated with antibiotics. Well, that only makes the problem worse, creates all these effects that we've discussed here. So I would say that the streptomycin early on actually created other problems, which he sought medical treatment for, which then was treated with antibiotics, which created more and more problems, and now he's looking to get out of that.

His message continues, "Now that all my mercury is gone, I trust that with your program, I'll finally have the health, energy, and memory I should have had all along." That's what we're here for. That's what we're working for. Anybody who has come to our site, you find that when you call us, we're there. We respond to e-mails. We have live customer service, people who have done the Plan, people who answer your questions. If they can't answer it, they come to me. We give people the answers and the support they need.

We have an incredible amount of support for people. We're supporting people all the way through the plan, and even after the plan. We have people who, two years, three years, four years, six years down the road, call, "I did your plan, and I was wondering if you could help me out with a problem," so we answer that. We're trying to help people, and we find that the Plan helps many people with many problems.

So again, in rebuilding the body it's a process towards health. We have to do the things that are necessary to create that, and it's better that we don't look at – even the McCombs Plan as, "Oh, I did this, and now I should be healthy." It depends on what your body requires, what the process is that your body is involved in to create greater health.

"What about antifungal resistance?"

Q: "I know Candida can become resistant to drugs. Can Candida become resistant to natural antifungals?

A: There is a lot of research on that, and that'll be in our treatments section of the Candida Library. Here is a research report.

"The capacity of Candida albicans to rapidly acquire resistance to antifungal drugs, such as anfotericina B, flucytosine, and a series of azoles…" So your azoles are going to be like your Diflucan, Fluconazole. I was just reading research on another new azole drug coming out. So the capacity of Candida albicans to rapidly acquire resistance to antifungal drugs such as these drugs means that continued development of new antifungals remains an important focus for clinicians and pharmaceutical companies.

So Candida has an amazing ability to adapt to the ways that these drugs try to destroy it, and there's a problem with killing fungus in the body, too. Just as we mentioned, when you kill bacteria, you get a hemorrhaging of all these intercellular components that create a very strong inflammatory reaction, this happens with fungus too. So if you destroy these cells, and they release all their internal components, you create this strong inflammatory reaction, and there's a possibility that that can lead to autoimmune disease.

You'll see this over and over that because of Candida albicans' amazing ability to adapt to antifungal drugs, they have to continually develop new drugs. I think what that information tells us is it's the wrong approach, because they're not having success, and the success they've had is limited. What they're doing is also creating antifungal-resistant strains. So now we're empowering this microorganism to become stronger.

One of the early criticisms of antibiotics is that they cause antibiotic resistant strains. This goes all the way back to the 1920s, to the development of antibiotics, I think 1926. You know, what comes out of Candida? One study shows 85 immunoreactive protein species. Immunoreactive meaning our body system reacts to these substances, and that's just the protein, so it doesn't include the sugars.

So the sugars, the proteins, these substances inside our bodies are highly reactive to Candida, and this can create a lot of inflammation as well as lead to depletion of the immune system, manipulation of the immune system, creating shifts in the immune system, which favors the spread of the microorganisms. This is what happens when we use drugs, and this is why they need to keep researching. This is why we get the resistance, so, yes, we do develop resistance to antifungal drugs.

Natural Antifungals

The question asked about Candida developing resistance to natural antifungals. I haven't really seen that. Natural antifungals tend to inhibit more than they destroy cells. I talked about antifungals first because that what grabs my mind when you talk about resistance. But natural antifungals tend to inhibit, so what we use in Candida Force is a fatty acid, which, again, as I mentioned, Candida requires fatty acids to function, to develop its cell wall membrane, to convert from the yeast to fungal form.
So whole natural substances like garlic, Pau d'arco, olive leaf extract, oregano, lavender oil, a lot of different essential oils, and again, as I mentioned earlier, every plant on the planet makes an antifungal substance, so these are all designed to inhibit the fungus. But you see, it's not wiping out the fungus in these jungle environments, it's just keeping the plant safe, and that's really what natural antifungals do. They inhibit the growth, but they don't get rid of it.

So when you have a systemic problem, usually you don't see natural antifungals that affect Candida systemically. It can have a benefit in the intestinal tract, and that can help reduce a lot of problems, but it won't get rid of the systemic problem. We've found Candida Force to be the most effective natural antifungal at a systemic level.

"What about a Die-Off Reaction?"

Q: Do probiotics cause or accelerate the Candida die-off effect?

A: I haven't seen them cause a die-off effect from Candida. As I mentioned, there is this process called a cytokine storm, the release of these cytokines, a pro-inflammatory reaction based on how the immune system responds. People sometimes misinterpret that response, which will cause aches, body aches, pains, as the same response, which is called a die-off reaction.

Die-off reaction is usually thought of as when you take something to kill Candida or get rid of Candida and it's too much, more than the body can handle. It creates all these aches and pains. I think, many times, what people are seeing is an immune system response, and not a die-off reaction, per se. But unfortunately, based on some of the early books on Candida that were put out, this became commonly known as the Herxheimer Reaction, also called the die-off reaction. People have got that fixated in their minds, and I think it's really more of an immune system response that people are experiencing.

So that's not necessarily a bad thing. That may be a positive sign that your immune system is coming back, that it's playing a role in eliminating Candida, so it's not that you need to get rid of that.

"What does it take to get rid of Candida?"

Q: What does it take to clear this up?

A: I use my own Dr. McCombs' Candida Plan. I created the plan about 18 ½ years ago. It takes getting rid of the Candida, the fungal Candida, reverting it back to its yeast form. We don't try to kill it. We just want to revert it back to the yeast form. We want to revert the fugal form to the yeast form, and then let the system get rid of what's excess and restore the balance.

We want the body to bring the balance back. We're not going to pretend that we know more about what the body can do, but we want to give it a fatty acid, which weakens the cell wall membrane, allow the immune system to restore the normal balance, allow bacterial colonies to be replenished through Flora Prime, and allow that whole process to restore the normal balance. So it's really about restoring the normal balance, boosting the body, detoxification, a very important thing. It's a good idea to do that as part of this whole process so that we're boosting the immune system, and we're also increasing the body's ability to recover and repair itself.

We'll be launching our Candida Library soon to start to get the research information available to you. Then we'll put together a flow of how you can navigate that, and get more information on there.

If at anytime you have any questions about the plan, about Candida, about what you're doing, trying to do, about conditions you've dealt with, give us a call at (888) 236-7780. Visit us at McCombsPlan.com or Facebook.com/McCombsPlan. Review the videos on YouTube. There's a lot of information in previous videos we've done. You can do a replay of all the webcasts on our site.

If you want more detail on particular studies, if you have a question about the Candida research, I'd be glad to answer. Everything is going to be included in the Candida Library, and in the meantime I can post something off to you.

Take care of yourself, enjoy life, get healthy, and have fun. Thank you for reading The Science Behind Candida.

- Dr. Jeff McCombs, DC