

Biomedical and Nutritional Intervention Training Week 4



Nancy Guberti, MS, CN, Functional Medicine Specialist
<http://biomedicalnutritionalintervention.com/training/>

Week #4 - Chronic Candida/Yeast along with Bacteria, Parasites & Other Health Complications

Why is Candida a culprit?

Linking Candida to other health ailments

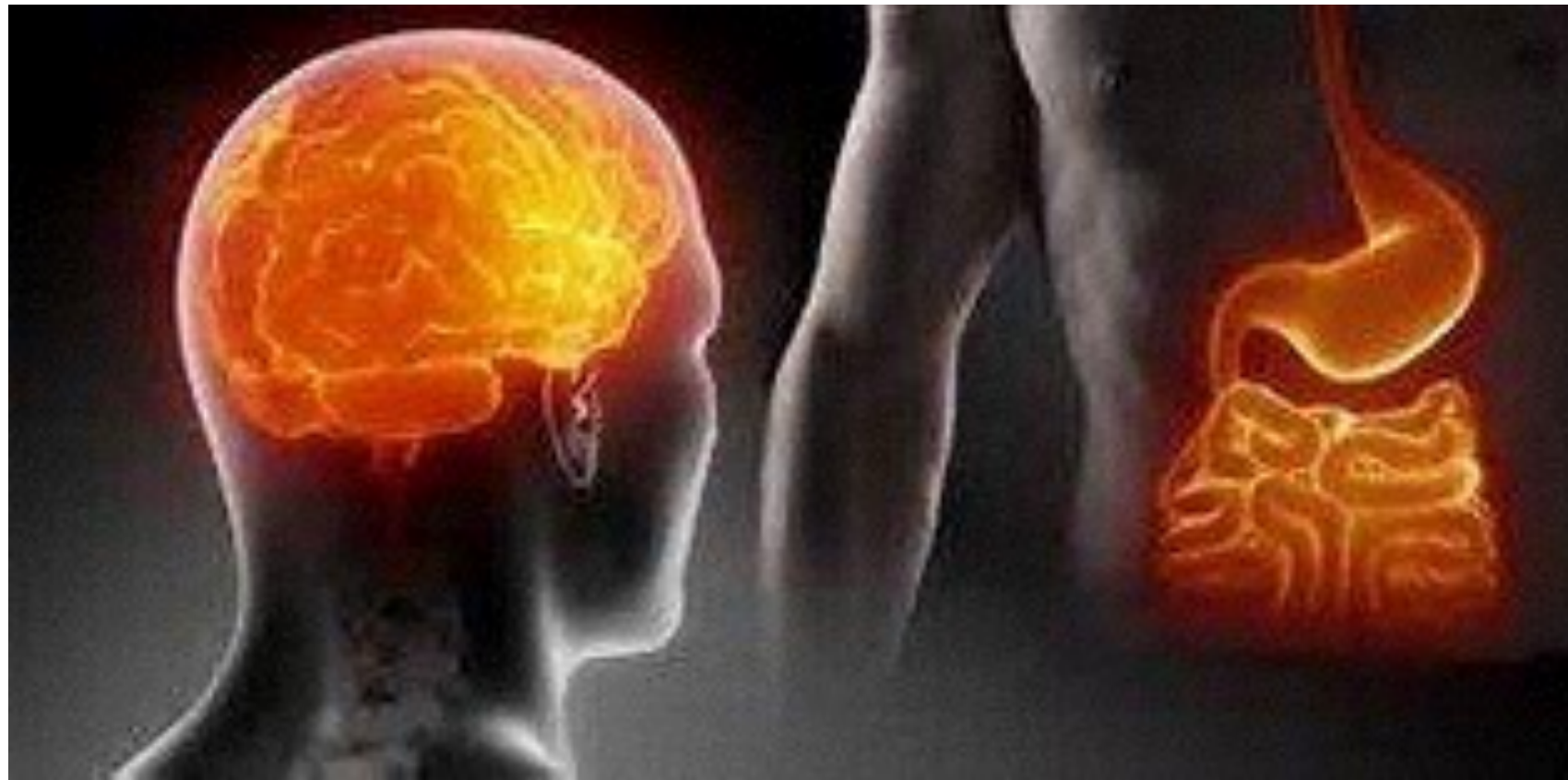
Signs to look for in patient

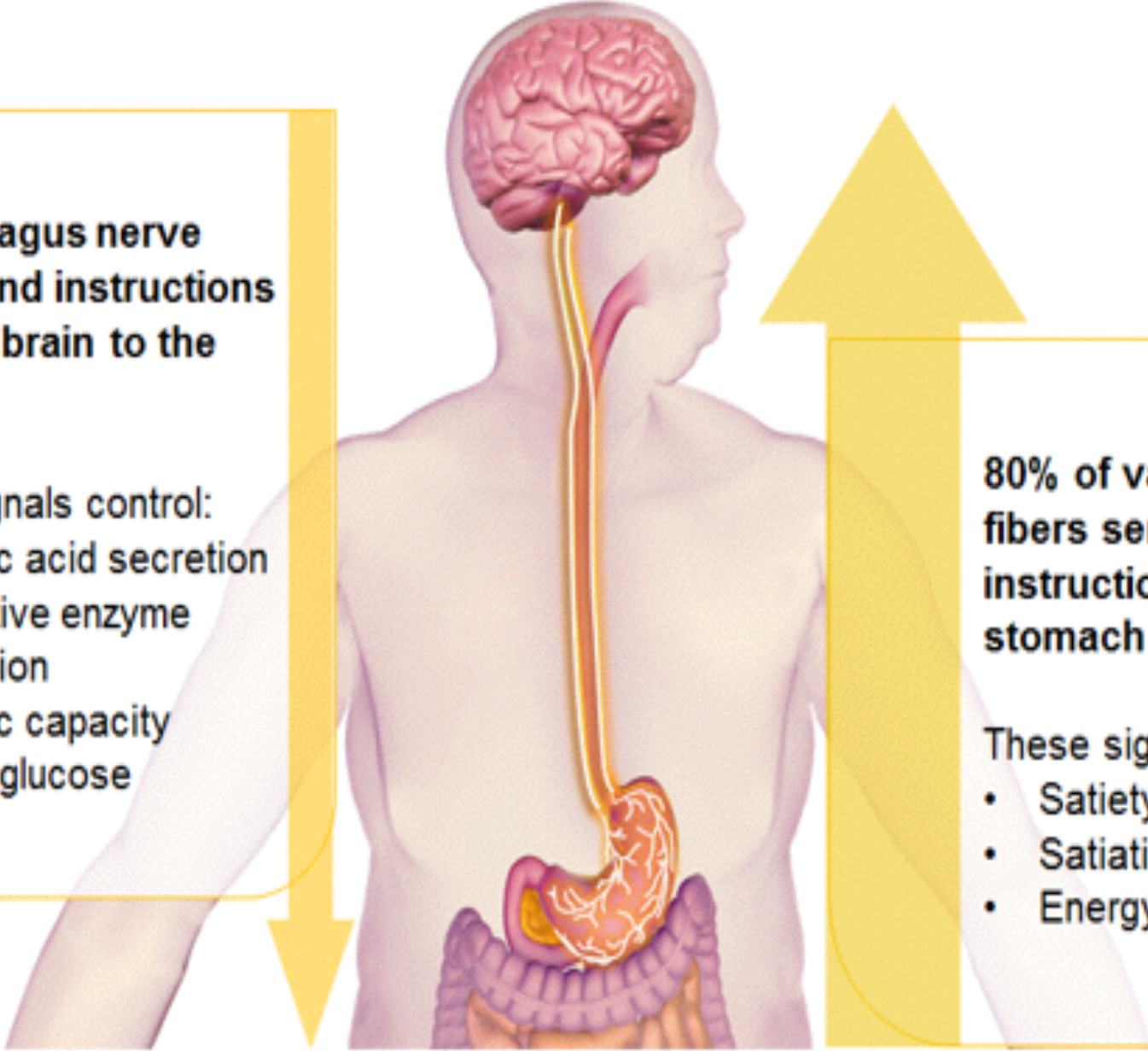
Vicious cycle of feeding candida

Toxicity of candida in body & brain

Natural remedies for treatment

Mind-Gut Connections





20% of vagus nerve fibers send instructions from the brain to the stomach

These signals control:

- Gastric acid secretion
- Digestive enzyme secretion
- Gastric capacity
- Blood glucose

80% of vagus nerve fibers send instructions from the stomach to the brain

These signals control:

- Satiety (Hunger)
- Satiation (Fullness)
- Energy Metabolism

→
Empirical
evidence

- - - →
Unknown
in humans

Microbiome

Neurotransmitters
(e.g., DA, 5-HT)

Amygdala/Hippocampus

Frontal-Striatal

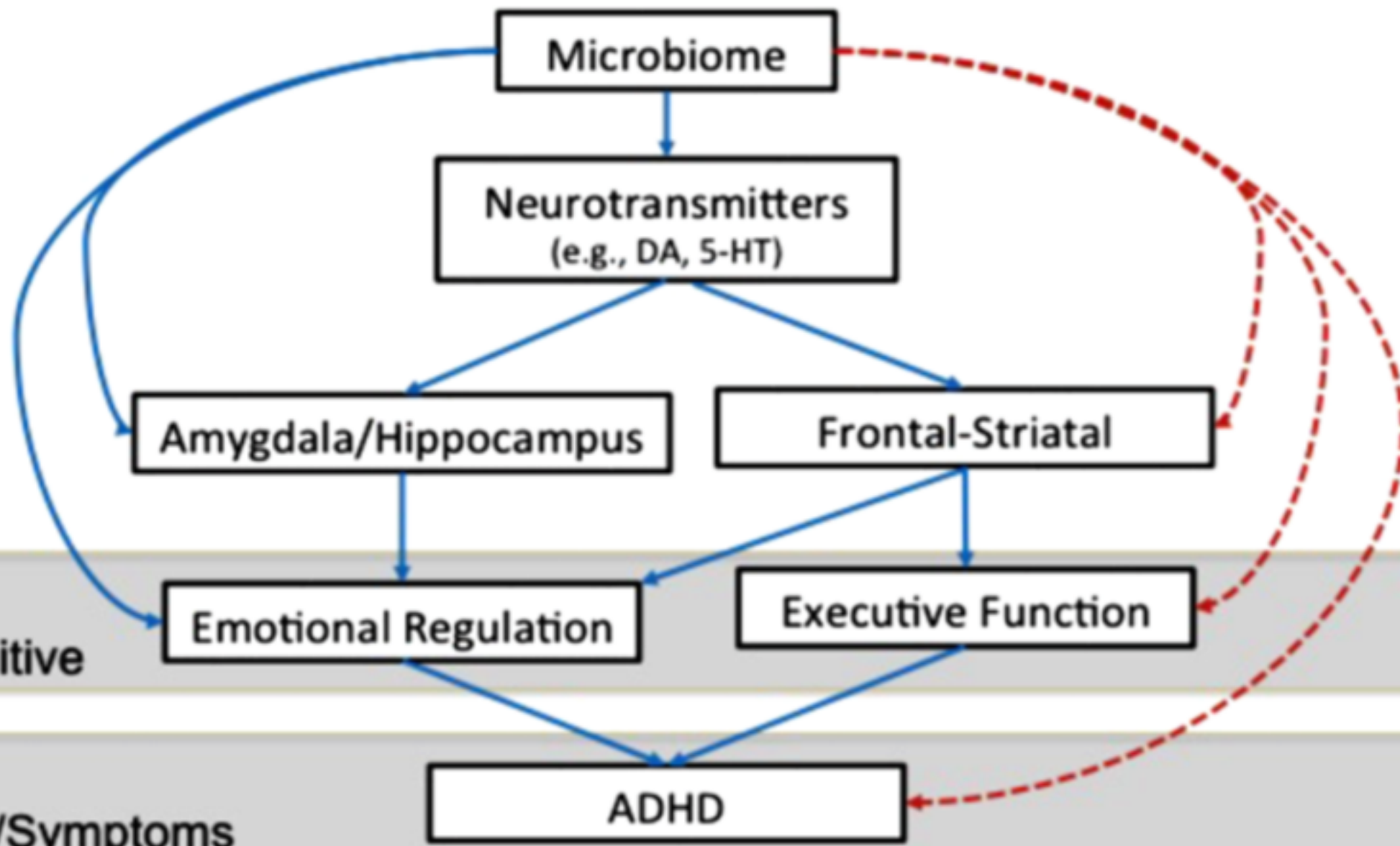
Aim 2:
Neurocognitive

Emotional Regulation

Executive Function

Aim 1:
Behavioral/Symptoms

ADHD



Functions of Gut Bacteria

- It helps the body to digest certain foods
- It helps with the production of some vitamins
- It helps us combat aggressions from other microorganisms
- It plays an important role in the immune system

What is Candida?

- Candida is a type of yeast and most common cause of fungal infections worldwide
- Candida Albicans is most common species
- C. albicans is part of the normal flora of the mucous membranes of the respiratory, gastrointestinal and female genital tracts.

GENERAL INFORMATION

- ✗ **Classification:** Dimorphic fungus- can exist in yeast and fungal form (virulence factor)
- ✗ **Genus:** *Candida*
- ✗ **Species:** *albicans*
- ✗ **Shape:** spores and hyphae(branching tubes that make up the body of a multicellular fungus)
- ✗ **Size:** 10-12 μm in diameter
- ✗ **Gram +**
- ✗ **Growth:** reproduces by budding
- ✗ **pH:** Needs a slightly alkaline environment to thrive , a pH about 7.4
- ✗ **Temperature:** 37°C, warm and damp environments
- ✗ **Oxygen:** Facultative anaerobes

ROUTE OF TRANSMISSION/PORTAL OF ENTRY

- ✗ *C. Albicans* is normally present on the skin and in mucous membranes such as the vagina, mouth, rectum, and digestive tract
- ✗ The fungus also can travel through the blood stream in immunocompromised individuals
- ✗ *Candida* can enter newborn infants during or shortly after birth
- ✗ This organism is OPPORTUNISTIC- for example, antibiotics kill the good bacteria leaving *Candida* free to grow

HOW CANDIDA CAUSES AN INFECTION:

- ✗ The infections caused by all species of Candida are called Candidiasis-most commonly Candida albicans
- ✗ Candida is known to impair immune functioning by directly and negatively impacting the helper-suppressor ratio of T lymphocytes
- ✗ Organism causes disease by invading human tissue by means of pseudohyphae (long filaments) which can penetrate intracellular cracks
- ✗ The overgrowth of Candida is complex and a difficult condition to overcome once it enters the body. It is one of the most highly adaptive organisms, and has the ability to mutate and develop stronger forms of itself

HOW IT AFFECTS THE IMMUNE SYSTEM

- ✗ T-cell efficiency can be influenced to a useful extent by nutrition.
- ✗ It is largely the suppressors which are involved in fighting Candida
- ✗ It's adaptability allows it to produce disguising antigens which deter the immune system from recognizing it as foreign and harmful.
- ✗ In this way the immune system may eventually become non-responsive to the presence of *Candida albicans*.
- ✗ Impaired production and function of the T-cell lymphocytes cannot effectively regulate B-cell immunoglobulin production. As a result the body cannot discriminate between harmless and potentially toxic agents.

TOXINS

- ✗ Produces toxins
 - Gliotoxin: inactivates important enzymes, and is cytotoxic
 - Acetaldehyde: normal by-product of metabolism, however excess production of this by Candida can cause impaired neurotransmission in the brain
- ✗ Candida Albicans and its toxins can infiltrate and effect any organ or system in the body and can be responsible for a large variety of physical and mental health conditions that we see so commonly in people today
- ✗ Toxic waste can also be absorbed into the blood stream

DEMOGRAPHICS:

- ✖ Candidiasis is an extremely common infection. Thrush occurs in approximately 2–5 percent of healthy newborns and occurs in a slightly higher percentage of infants during their first year of life.
- ✖ Over 1 million adult women and adolescent girls in the United States develop vaginal yeast infections each year. It is not life-threatening, but the condition can be uncomfortable and frustrating.

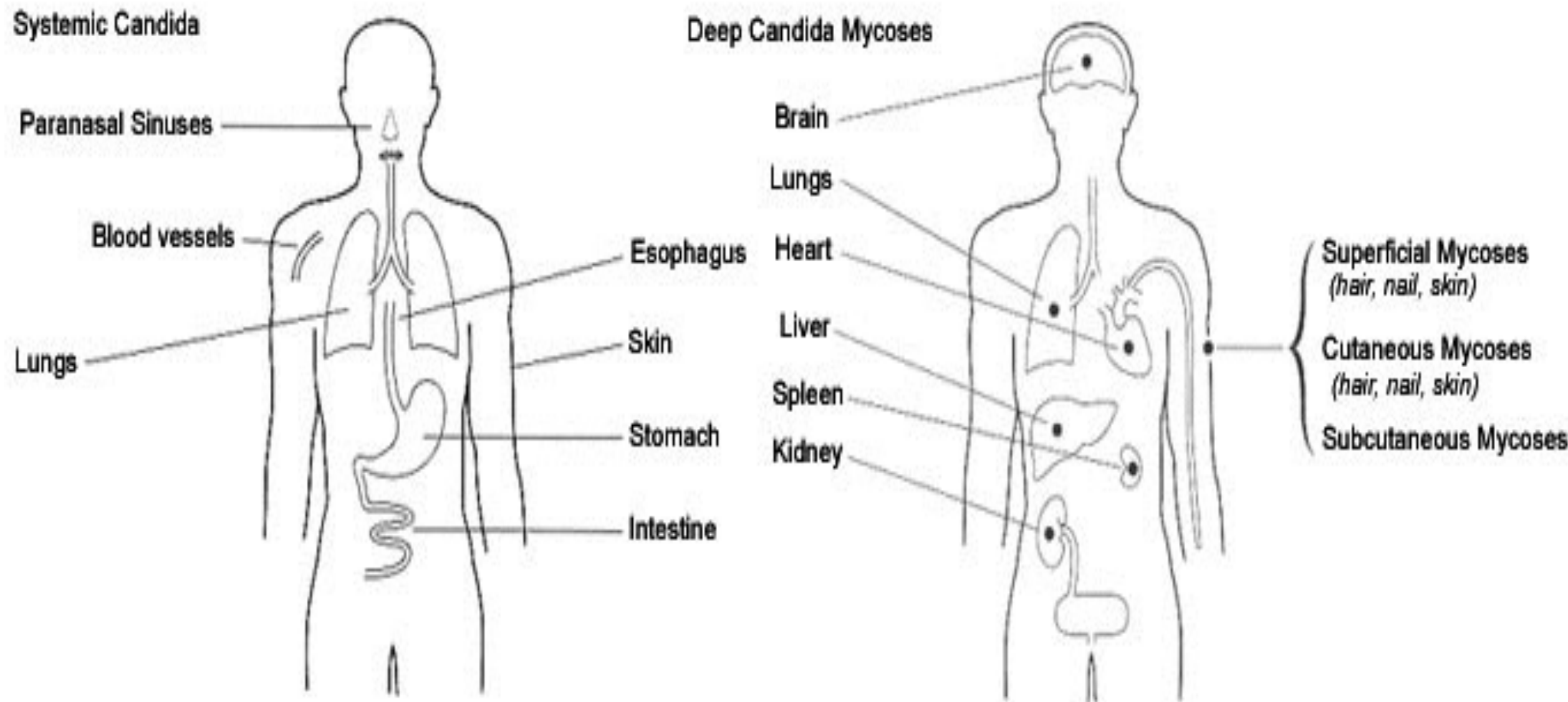
COMMON FACTORS THAT CAN CAUSE INFECTION:

- ✗ A common cause of Candida albicans fungus is the overuse of antibiotics or oral contraceptives
- ✗ Steroid hormone medication, ex. Cortisone, or corticosteroids often prescribed for skin conditions such as rashes, eczema
- ✗ Suppressed immune systems, ex. Anyone with diabetes, cancer, autoimmune, HIV, and that receive radiation or chemotherapy
- ✗ High sugar and starch diet (yeasts live on sugar, and starches are converted into sugar very quickly during our digestion process)
- ✗ Alcohol (regular drinkers and recovering alcoholics may have severe candida overgrowth)

AREAS AFFECTED:

- ✗ Candida species can infect tissues in essentially every body system, producing a wide range of clinical manifestations
- ✗ is called thrush when it grows in the mouth, especially in infants
- ✗ shows up on skin as a red, inflamed, and sometimes scaly rash, ex: diaper rash
- ✗ causes vaginitis, commonly known as a yeast infection
- ✗ causes candidal onychomycosis in the nails
- ✗ can affect the esophagus and the digestive tract
- ✗ think of any condition ending in ~itis

Where Candida can wreck havoc in the body



OROPHARYNGEAL CANDIDIASIS (THRUSH)



- ✗ Yeast infection that develops in the mouth
- ✗ White plaques in mouth, tongue, gums, palate, and/or pharynx
- ✗ Preventable by practicing good oral hygiene (maybe!)
- ✗ To prevent from spreading to infants: treat vaginal yeast infections during last 3 months of pregnancy, wash bottles and pacifiers, and do not reuse bottles more than an hour after a baby has drank from it

ONYCHOMYCOSIS (NAIL INFECTION)



- ✗ Also categorized under cutaneous candidiasis
- ✗ Characterized by red swelling around the nails, destruction of nail tissue, and loss of nail
- ✗ Occurs more often in toenails than fingernails because toenails are often confined to warm and moist environments, let feet air out before putting on socks
- ✗ Difficult to treat; OTC creams and ointments available, but not very effective; Oral antifungal medications work best, treat inside out with silver and can apply silver cream to nail as well. Fix the gut!

SYMPTOMS OF INFECTION:

- ✗ Oxygen-carrying red blood cells are rigid and stiff when compared to people without candida
- ✗ Fatigue
- ✗ Carbohydrate craving
- ✗ Topical infections of fingernails, vaginal infections, underarm infections, dermatitis anywhere on body
- ✗ White coated tongue
- ✗ Increased allergic symptoms
- ✗ Reduced thyroid function
- ✗ Lowered immune system and increased susceptibility to viral infections
- ✗ T-cell helper/suppressor ratios radically lowered
- ✗ Up to 3/4 of the lymphocytes become paralyzed
- ✗ Candida seems to upset the function of organs as opposed to damaging the
- ✗ Overgrowth of candida can cause superficial infections

TREATMENT:

- ✗ Antifungal medications -- these include oral peroxide food grade rinses and silver, herbal vaginal suppositories, and silver creams. *For vaginal yeast infections, medications that are available over the counter include creams and suppositories such as Monistat, Vagistat, and Gyne-Lotrimin. Your doctor may prescribe a pill, Diflucan. Explore natural remedies instead!*
- ✗ Creams combined with low-strength corticosteroids -- reduce inflammation and itching. Explore silver gel cream, anti-inflammatory **calendula** extract.
- ✗ The “Candida diet”- detox, probiotics, improve what you eat
- ✗ Most treatments last a long time and then go into maintenance mode. Be sure to take daily exactly as prescribed. If you do not, the same infection could come back, or you could become infected with a new strain of candida.
- ✗ For severe candidiasis that could be life threatening to someone with a comprised immune system.

Other Conditions linked to Candida Overgrowth

- ▶ **Schizophrenia**
- ▶ **Alzheimer's disease**
- ▶ **Systemic lupus erythematosus (SLE)**
- ▶ **Fibromyalgia**
- ▶ **Chronic fatigue syndrome & CFIDS**
- ▶ **HIV infection**
- ▶ **Colitis**
- ▶ **Depression**
- ▶ **PMS**
- ▶ **Vaginal yeast infection**
- ▶ **Multiple sclerosis**
- ▶ **Interstitial cystitis**
- ▶ **Seizures**
- ▶ **Irritable bowel**
- ▶ **Cancer**

How does yeast symptoms impact a child/adult with ASD?

A healthy digestive tract contains hundreds of trillions of microbes from thousands of different species including yeast, fungi, viruses and bacteria. The balance of good bacteria to other microbes plays an important role in regulating inflammation, digestion, immune function and brain health. *Postnatal development relies on the good bacteria in the gut to support optimal development of language, social and cognitive skills.*

Bacteria live in the intestinal tract, sharing space with yeasts. Antibiotic use makes creates the opportunity for yeasts to overgrow, especially in the small intestine where most nutrients including zinc, magnesium, B12, folate and iron are absorbed. Antibiotics kill both good and bad bacteria, but not yeast. *Children, whose mothers were on antibiotics during pregnancy, or received antibiotics during labour and deliver (either C-section or if they were GBS positive) or have been on frequent antibiotics will undoubtedly have issues with yeast overgrowth.*

How do yeast symptoms impact a child/adult with ASD?

We pass our microbiome onto babies during gestation, during delivery, breastfeeding and from proximity. Mothers who have altered gut flora (called dysbiosis) will pass their gut community onto their babies, decreasing the health of the babies microbiome. *Yeast thrives under certain conditions including chronic constipation, chronic diarrhea and on diets high in sugars and complex carbohydrates.*

Yeasts are part of our microbiome but when elevated as found in autism, contribute to physiological and biochemical changes that impact development. *Alterations in the microbiome directly impact the metabolism of the brain. In the case of yeast, the disruption in brain function is caused, in part, by depletion of B6, CoQ10, alpha lipoic acid and biotin.*

Let's look at the link of certain vitamins, and their depletion, that are important in ASD

Vitamin B6 is blocked when acetyl-aldehydes from yeast bind to proteins. B6 is very important because it acts as a co-factor, or helper, in the creation of brain chemicals known as neurotransmitters. B6 dependent enzymes help to produce serotonin, dopamine, norepinephrine and GABA. *Neurotransmitters need B6.*

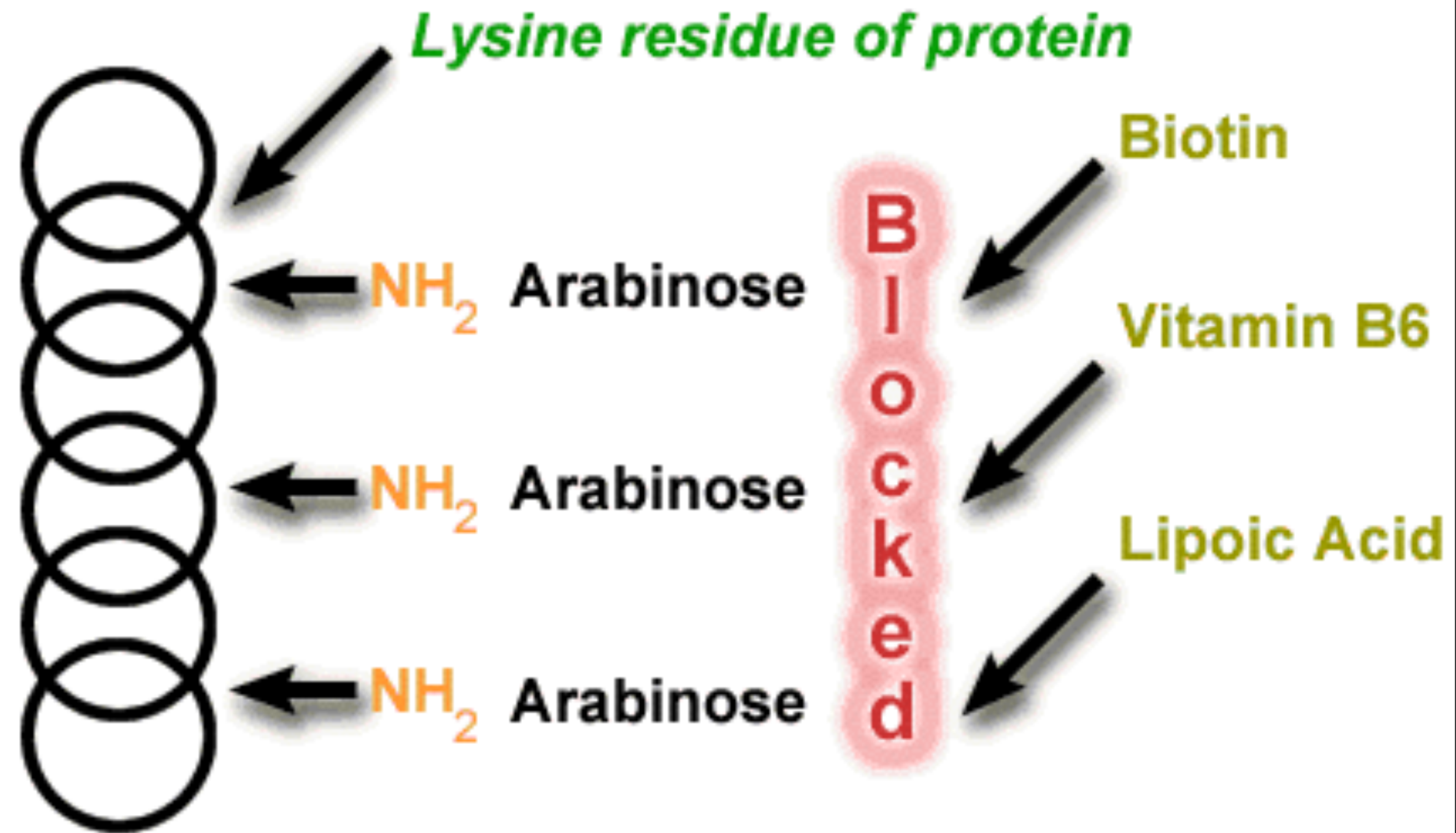
CoQ10 plays a key role in mitochondrial function. Mitochondria are the tiny organelles in your cells that make energy. It is estimated that 8-20% of autism spectrum disorder is linked directly to mitochondrial impairment. Recent research has also shown that women exposed to toxicity can pass on mitochondria (children only get mitochondria from their mothers) that are up to 17% damaged. CoQ10 serves as an antioxidant (protector) to all cell membranes.

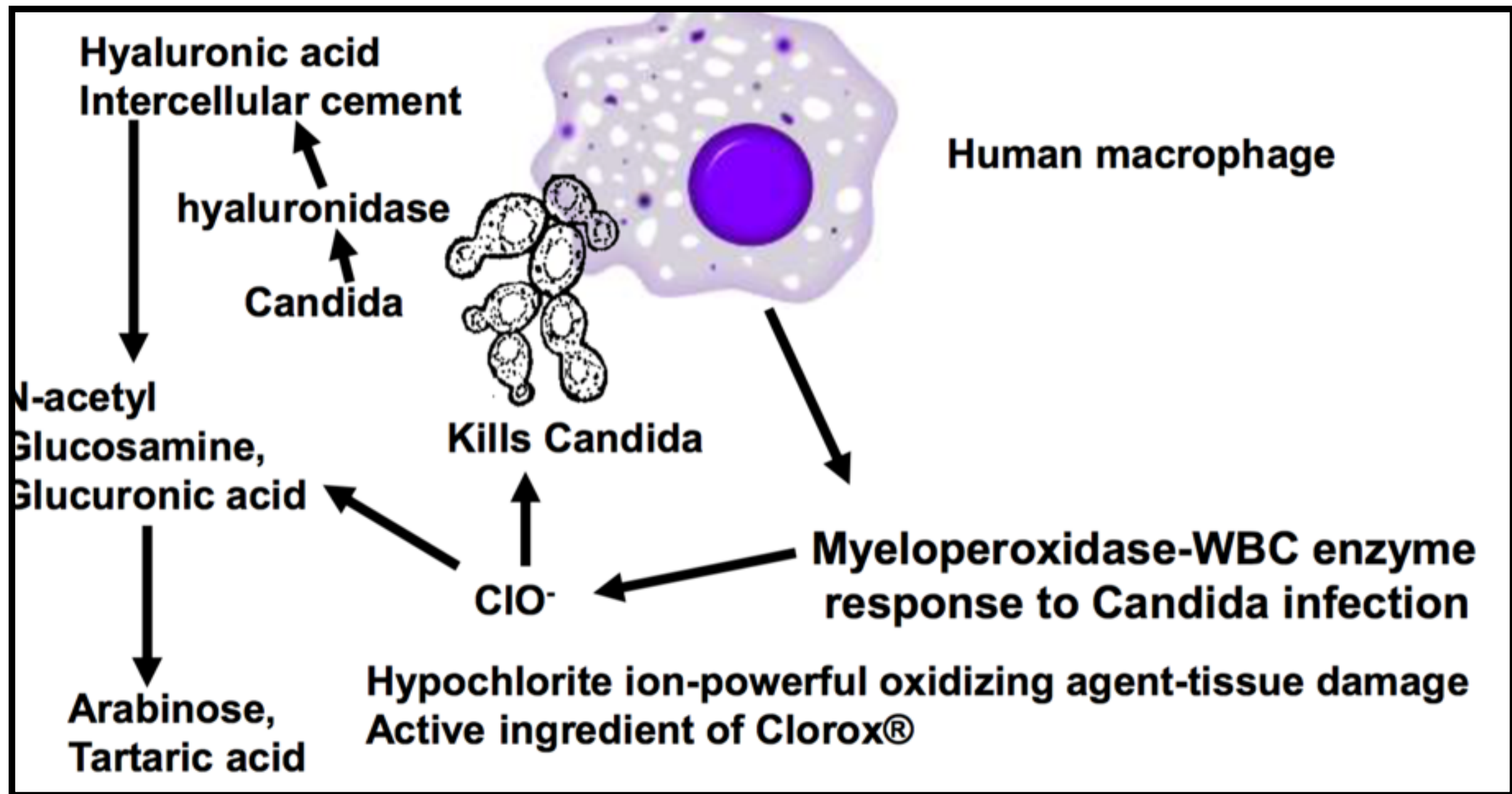
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Alpha Lipoic Acid is also very important for mitochondrial function. It protects the brain from toxicity and helps to create glutathione which is the body's master antioxidant. Children with autism have up to 80% of glutathione depleted in their cells. Glutathione depletion has also been implicated in Parkinson's and Alzheimer's disease. One of the most beneficial effects of alpha lipoic acid is the ability to regenerate other essential antioxidants such as vitamin C, vitamin E, coenzyme Q10, and glutathione.

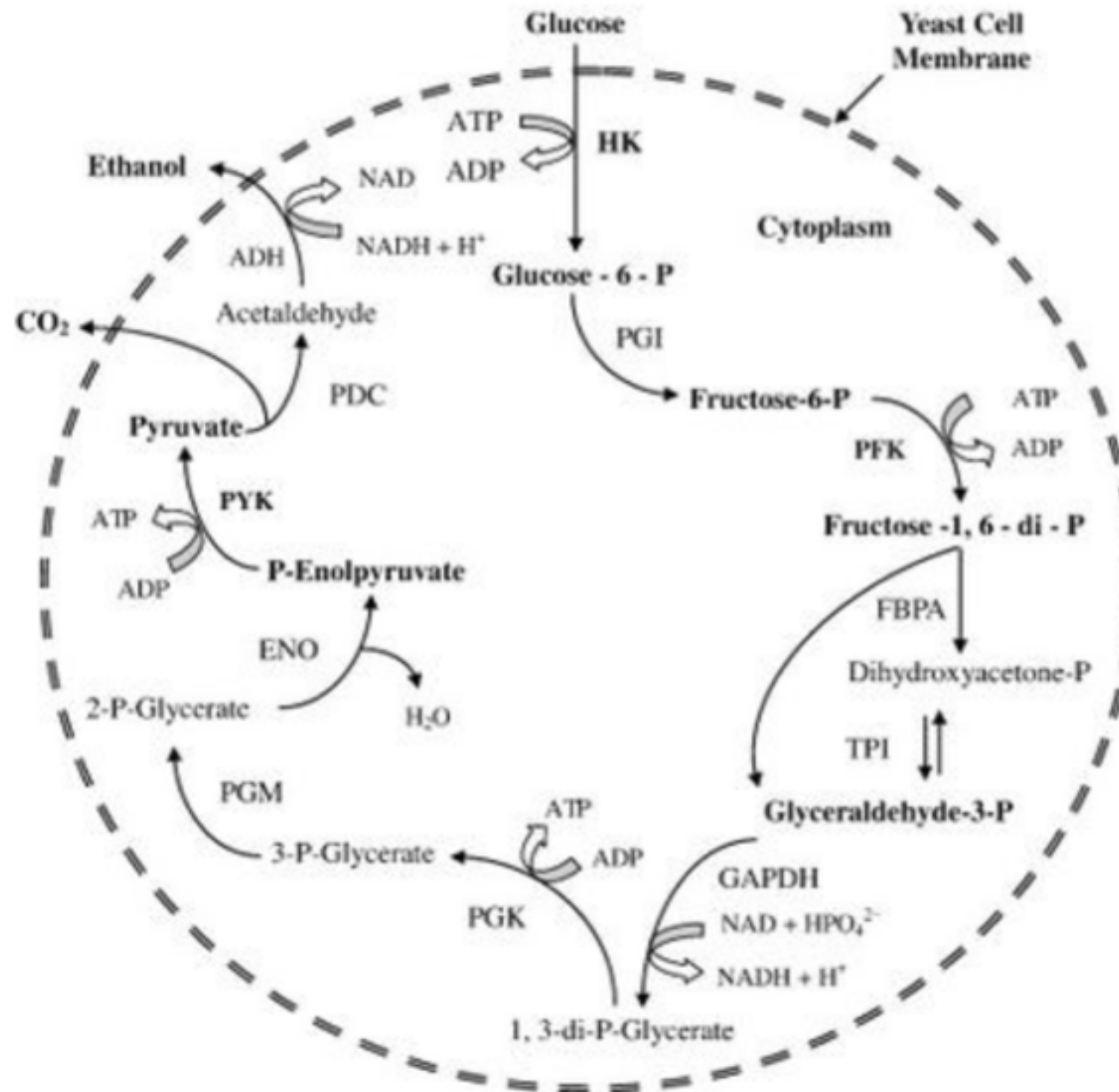
Biotin is a B vitamin that produces cholesterol. Cholesterol, while generally thought of as problematic when high in the adult population, is essential for optimal brain development. *Many children diagnosed with autism have low cholesterol which contributes to delayed language, social and cognitive development.* Biotin is an important treatment strategy when yeast depletes cholesterol.

Arabinose blockade of vitamins to proteins





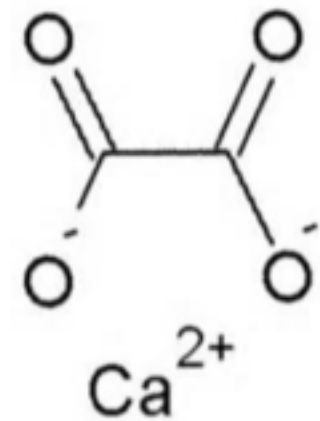
Alcohol-related symptoms have been observed



Plants, yeast and bacteria – can ferment compounds (glucose) into acetylaldehyde and finally into alcohol.

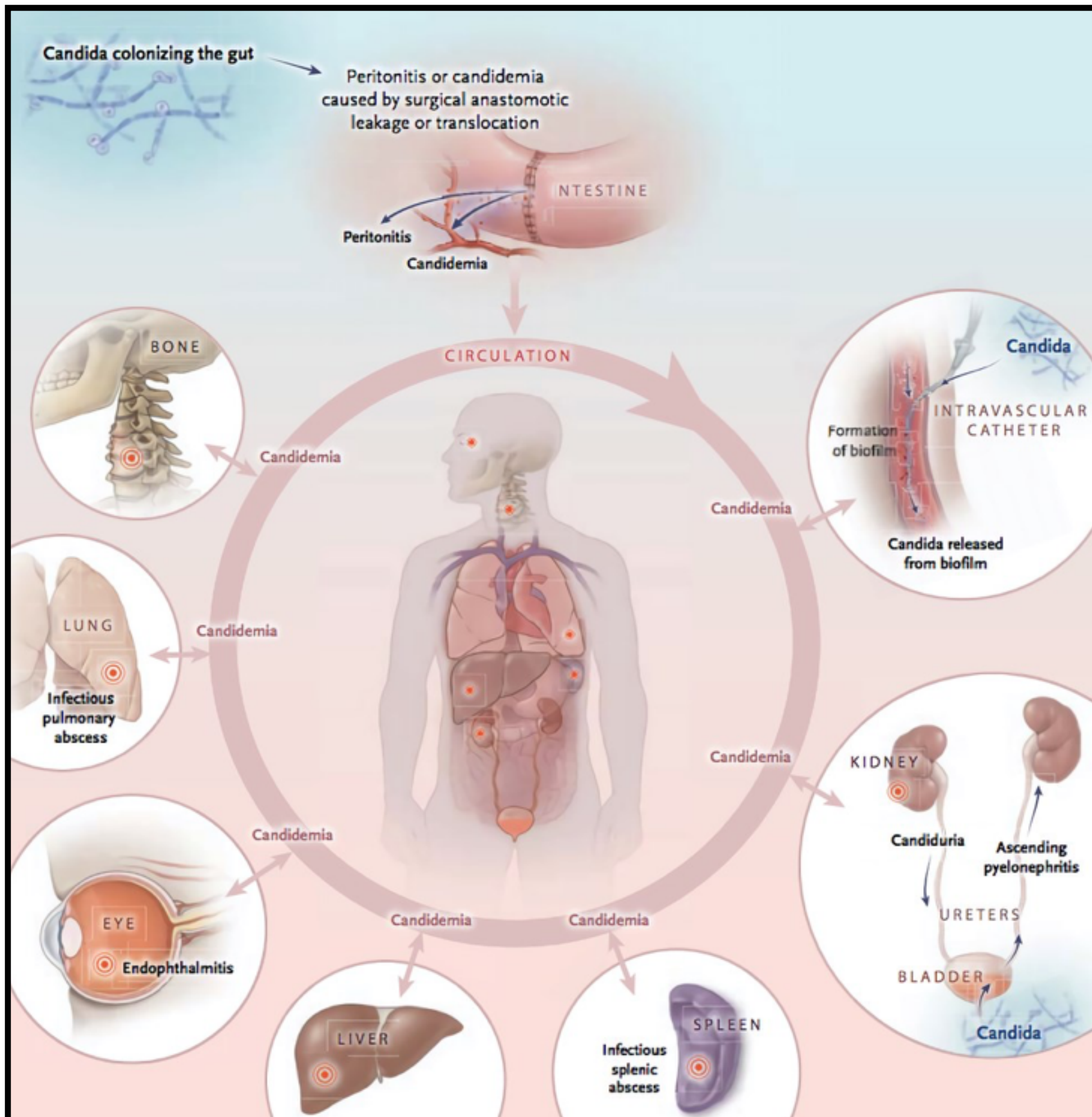
Connection to Oxalates

- Oxalate, and its acid form, are organic acids found from 3 primary sources:
 - *Diet*
 - *Fungus, such as mold and candida*
 - *Cell metabolism*
- Oxalic acid is the most acidic organic acid in body fluids.
- Ethylene glycol (antifreeze) - *primary toxicity effects are from oxalate crystal formation.*



Connection to Oxalates

- Bladder irritability
- Pain on urination – holding penis or groin region
- Eye pain (eye poking in children)
- Body aches, burning feeling in muscles
- Moodiness, irritability, and aggressive behavior – often seen in autism.
- Generalized pain that likely manifests as aberrant behavior.
- Sandy and grainy stools



Signs of inflammation outside the digestive tract include:

- Inability to focus and/or concentrate
- Cognitive and language delay
- Eczema
- Cradle cap
- Behavioral issues
- Chronic illness
- Sleep disturbance
- Headaches
- Itching or itchy bum

Factors that contribute to digestive problems and altered microbiome in ASD

- Food allergies and sensitivities and early introduction of allergens
- C-Section and IV antibiotics – prevent natural colonization of good bacteria
- Toxins like heavy metals and environmental toxins
- Harmful or opportunistic microbes including yeast and clostridia
- GMO – Genetically modified foods disrupt innate immune in the gut
- Glyphosate
- Antibiotics – kill good bacteria alters the balance in the microbiome

RISK FACTORS

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graph TD; A[RISK FACTORS] --> B[WEAKENED IMMUNE SYSTEM]; A --> C[ASSOCIATED FACTORS]; B --> D["• Infants<br>• Elderly"]; C --> E["• HIV/AIDS (Immunosuppression)<br>• Diabetes<br>• Corticosteroid use<br>• Antibiotic use<br>• Contraceptives<br>• Increased estrogen levels"];
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WEAKENED IMMUNE SYSTEM

- Infants
- Elderly

ASSOCIATED FACTORS

- HIV/AIDS (Immunosuppression)
- Diabetes
- Corticosteroid use
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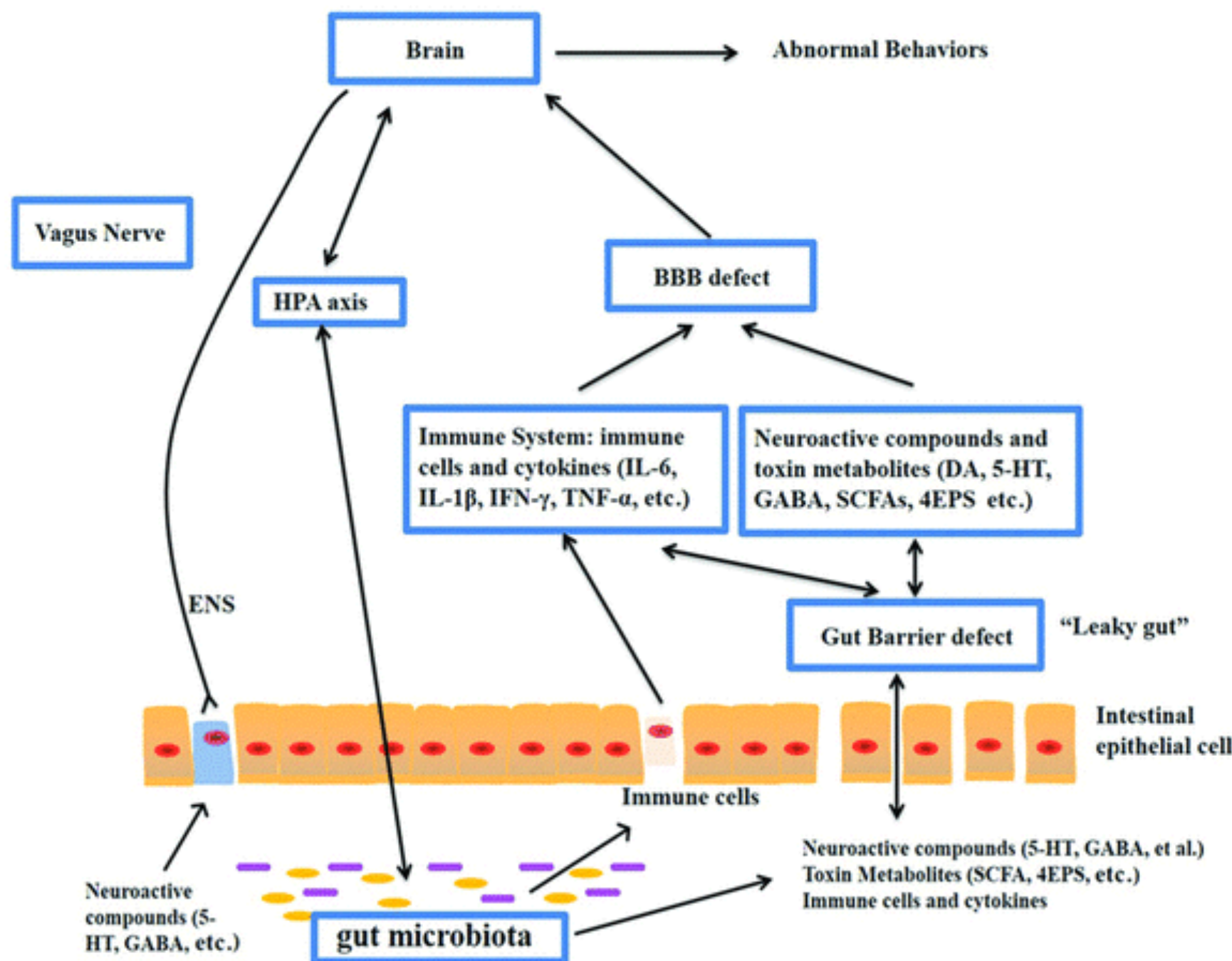


FIGURE 1 | Potential relationships between the microbiota and ASD (the gut-brain axis). The production of metabolites, such as SCFAs and toxin metabolites, by certain microbiota (e.g., *Lactobacillus*) can cross the "leaky gut" to affect brain function. Some microbiota can produce neuroactive compounds (e.g., 5-HT and GABA) that cross the "leaky gut" and influence brain function and induce abnormal behaviors. These neuroactive compounds can directly influence the HPA axis and increase circulating levels of cortisol. Metabolites, certain microbiota and neuroactive compounds can activate enteric neurons and affect brain function through the vagus nerve. Some microbiota and metabolites can activate gut immune cells, which can release cytokines into circulation. 4-EPS, 4-ethylphenyl sulfate; 5-HT, serotonin; HPA, hypothalamic-pituitary-adrenal; SCFAs, short-chain fatty acids; BBB, blood-brain barrier; 5-HT, 5-hydroxytryptamine; ENS, enteric nervous system; GABA, γ -aminobutyric acid; DA, dopamine.

Key Virulence Factors of *Candida albicans*

Metabolic Flexibility:
Efficient use of alternate carbon sources, stress resistance, cell surface changes

Hydrolytic Enzymes
Saps, Lip, Plp:
Degradation of host connective tissues, cleavage of host immune factors, nutrient acquisition

Candidalysin:
Secretory cytolytic peptide damaging host immune cells

Phenotypic Switching:
Opaque cells resistant to neutrophil engulfment

Biofilm formation:
Resistant to antifungals and host immune defence

Adherence to Host Surfaces:
Expression of adhesins

Yeast to Hyphal Morphogenesis:
In response to temperature, serum, alkaline pH, nutrient starvation, CO₂

Countering Host Nutritional Immunity:
Micronutrient uptake transporters and redundant proteins with alternate cofactors

Escape from phagocytosis:
Vomitosis, hyphal lysis of host cells, phagolysosomal neutralization, pyroptosis

Evasion from host immune system:
Changes in cell wall architecture and composition, masking of PAMPs

Parasites

What are parasites? Any living creature that lives off of another living creature, consuming its nutrition, and ultimately harming it in the process. Parasites come in many different forms. Bacterial parasites, like Giardia and Cryptosporidia, are responsible for severe diarrhea. Others are intracellular single-cell varieties, such as those that cause Lyme Disease and malaria, and larger types such as liver flukes and tapeworms. Some parasites lay eggs (tens of thousands per day from a tapeworm or fluke) and others, microscopic single cell parasites, reproduce through cell splitting. Each type requires a slightly different approach to achieve elimination.

How do people get parasites? They are everywhere and largely unavoidable. Most come from oral or direct cross-contamination from soil, feces, urine, or saliva, including mouthing of toys in children, sandboxes, diaper changing tables, toilets, shopping carts, food preparation utensils, and countertops. We may even be born with them. Some spread through the air, through insect bites, if the insect is a carrier, and through our food. Lean meat is the most common food source. Pork, beef, fish, chicken, all contain parasites (not found in the USDA inspections). Pork is the most dangerous, because the tissue of pigs is so similar to that of humans that anything that thrives in them also thrives well in us. Even produce may contain parasites or carry them on the surface from the air, soil, water, insects, or animals that graze nearby. Watercress is frequently contaminated with a parasite linked to seizures. Drinking water may be contaminated as well.

Parasites

What are the symptoms of parasites? Most people have few if any signs of parasites because symptoms like unsociable behaviors or sleepless nights at the full moon are subtle. More obvious are immune system weaknesses. Parasites are very opportunistic and thrive when the immune system is stressed and cannot fight them off. The inflamed gut is an easy open way for parasites, and a compromised immune system, classic hallmarks of autism, drew our attention to parasites. Parasites can produce very bizarre, unpredictable aggressive, angry behaviors in their hosts, many of which are classic autism.

Should I test for parasites? Really depends on lab. Many parasite specialists agree that laboratory testing is imperfect and often misleading. Labs test for only 40 or 50 out of literally thousands of varieties of parasites; false negatives are common.

Parasites

SYMPTOMS OF PARASITES

- Fecal retention and/or smearing
- Rectal itching, digging
- Aggression
- Nail biting
- Mouthing of articles/fingers/hands
- Playing with saliva and/or genitals (stimming)
- Bruxism or grinding of teeth
- Pica or eating dirt and indigestible items
- Insomnia
- Hand-flapping
- Prolonged straining at stool
- Urination/defecation outside toilet, though toilet trained
- Enuresis in older children
- Chronic diarrhea
- Bizarre facial expressions, behaviors, worsening during full moon
- Seizures
- Obsessions and compulsions
- Anxiety over change
- Poor response to intensive biomedical and alternative treatments

Parasites

Treatment Options

Find a good professional who understands how complicated parasite removal is.

Practitioners must recognize that a certain degree of gut health is necessary before beginning. They must then observe a specific order of elimination. The goal is not just eliminating parasites. Because parasite removal is a taxing event as the body excretes them and their by-products, simultaneous support of detoxification pathways and boosting the immune system is as important as removing the offenders.

Pharmaceutical drugs alone are rarely successful, as many parasites have become resistant to these pesticides, and long-term use could kill not only the parasites, but also the host.

Herbs combined with homeopathy are the healthiest means of elimination of parasites.

Homeopathy can stimulate detoxification pathways and “keep things moving,” while the herbs create an unhealthy chemical environment for the parasites.

Deal with the larger parasites like worms and flukes first before the microscopic, single-cell, and intracellular parasites, like amoebas and protozoa, so that the larger ones don't create blockages in tissues. Work on removing the biofilm from all the organisms.

Clean up the gut, make sure eating organic, remove glyphosate, take probiotics and prebiotics.

Parasites

Few things to keep in mind

Behaviors often worsen before they get better. Regressions are signs that parasites are actually present and in death throes. As these bugs try to replenish their numbers, you may observe bizarre behaviors, such as eating dirt. Do not undertake a parasite cleanse for children with autism spectrum disorders without the guidance of a knowledgeable practitioner. Many children can become volatile and aggressive. If they are dangerously immune compromised, and do not have adequate support, major problems with diarrhea could occur. *Do not undertake treatment without supervision for children with seizure disorders, as treatment could cause seizures to worsen temporarily or launch a major seizure event.*

Parasite removal can take four to nine months, sometimes longer. Be patient, and don't stop even though symptoms lessen or disappear.

Impact of Clostridium Bacteria in Children with Autism Spectrum Disorder

The association between Clostridium genus bacteria colonization of the intestinal tract and ASD has been documented. *C. perfringens* was found to be associated with some autistic behavioral parameters along with an association with gastrointestinal symptoms.

Recent data showed that ASD subjects suffering from gastrointestinal disorders such as constipation showed a gut bacterial taxon represented by high levels of the Clostridium cluster XVIII.

The detection of Clostridium spp. as a possible cause of ASD can offer effective treatment modalities for these children, such as antimicrobial remedies targeting these microorganisms.

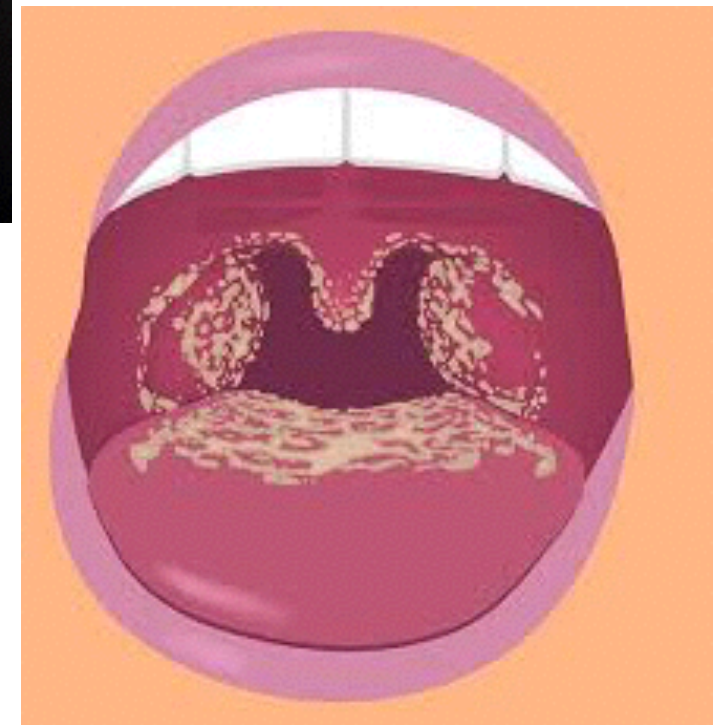
Candida Related Behaviors

- Demanding
- Non-compliant
- Aggressive, self-injurious behaviors and head-banging
- Stimming
- Hands over ears
- Chewing (on everything and anything) and teeth grinding
- Laughing for no reason, in the middle of the night or spontaneously during the day, acting 'drunk'
- Climbing all the time
- Standing on head or hanging upside down all the time
- Brain fog: giddy super-silly behaviors
- Loss of energy
- Hyperactivity
- Seeming out of it
- Toe walking
- Teeth grinding
- Craving for bread, rice, bread, cookies, crackers, pasta and sweets, sugar cravings intensified
- Increased sensory seeking behavior, anxiety, and emotional instability
- Unusual behavior of hanging upside down, pressure seeking activities

Candida Clinical Signs/Clues

- Rashes
- Eczema
- Funky-smelling scalp (the “wet dog” smell)
- Itching: perianal, genital and/or generalized
- Redness: around the anus or vagina, around the mouth
- Abdominal bloating
- Increase in flatulence
- Constipation or diarrhea
- Change in smell of stool (yeasty, bready, foul or sweet)

Candida Clinical Signs/Clues



Interesting Research

- One study published in Microbial Ecology in Health and Disease looked at the **dietary influence of various carbohydrates in vitro on the adherence of Candida to human epithelial cells.**
- The study examined the effect of various carbohydrates including fructose, galactose, glucose, maltose, sorbitol, and sucrose.
- The results found that galactose and glucose promoted a higher adhesion as compared with maltose and fructose.

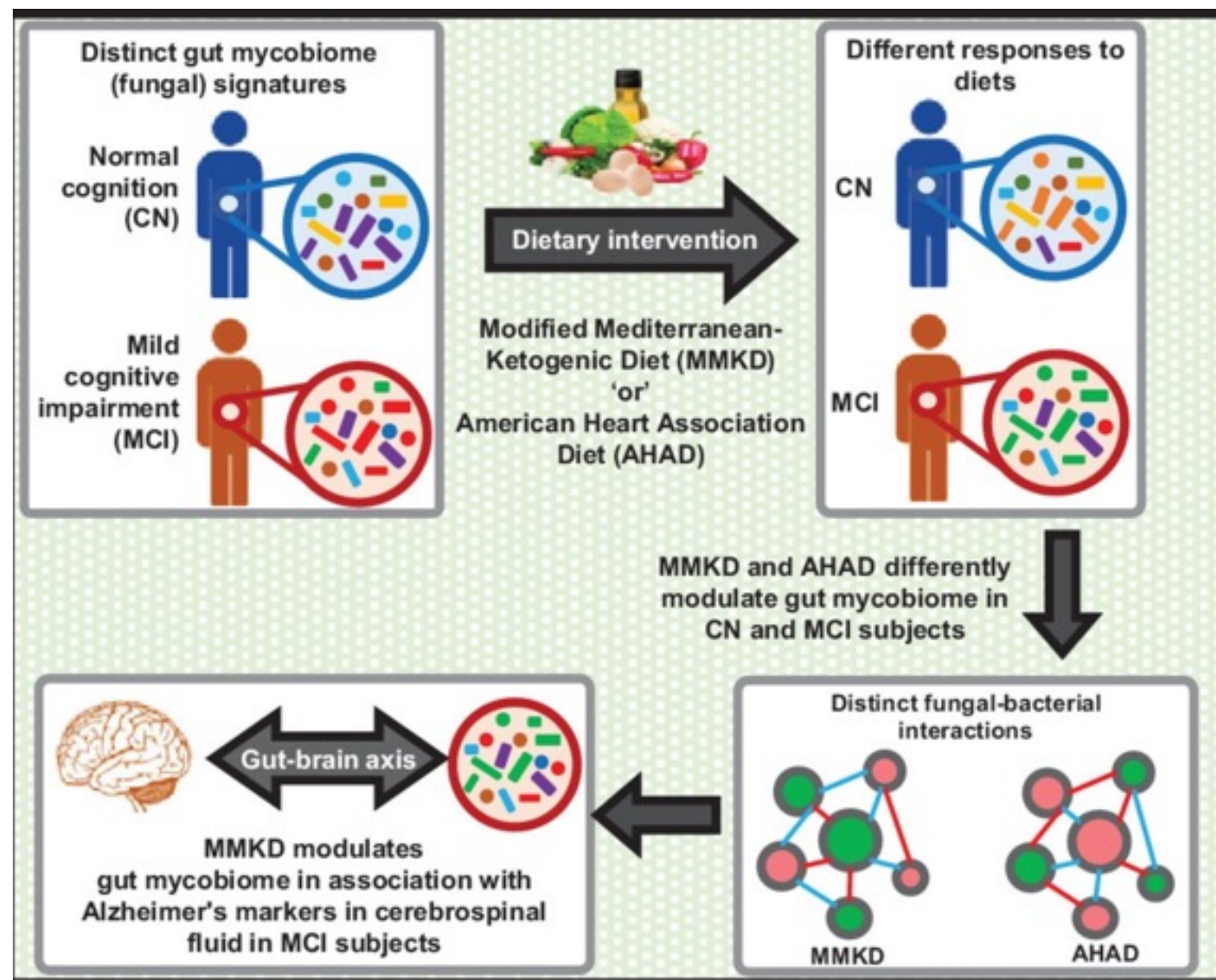
Gut mycobiome and its interaction with diet, gut bacteria and alzheimer's disease markers in subjects with mild cognitive impairment

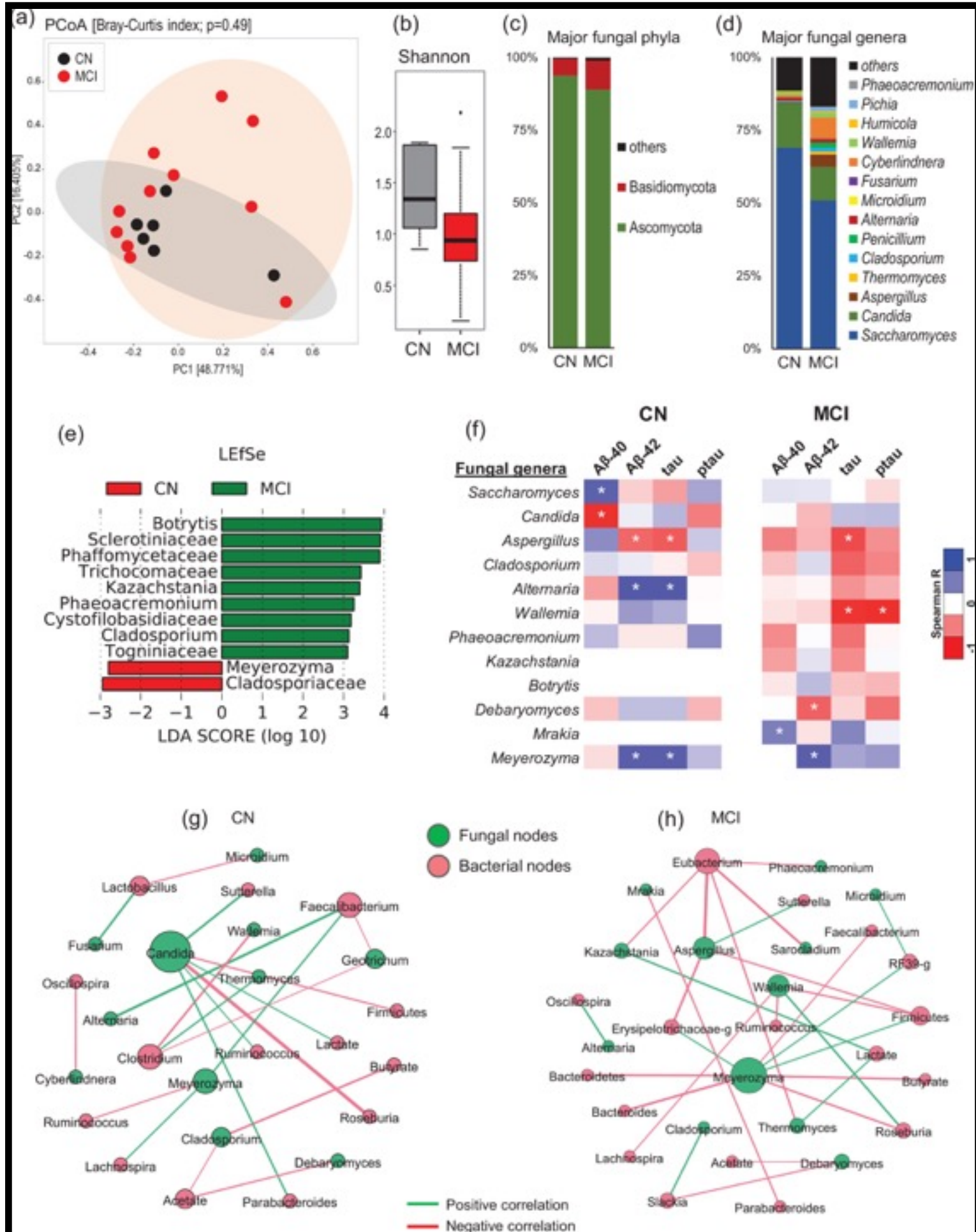
Ravinder Nagpal, Bryan J. Neth, Shaohua Wang, Sidharth P. Mishra, Suzanne Craft, Hariom Yadav

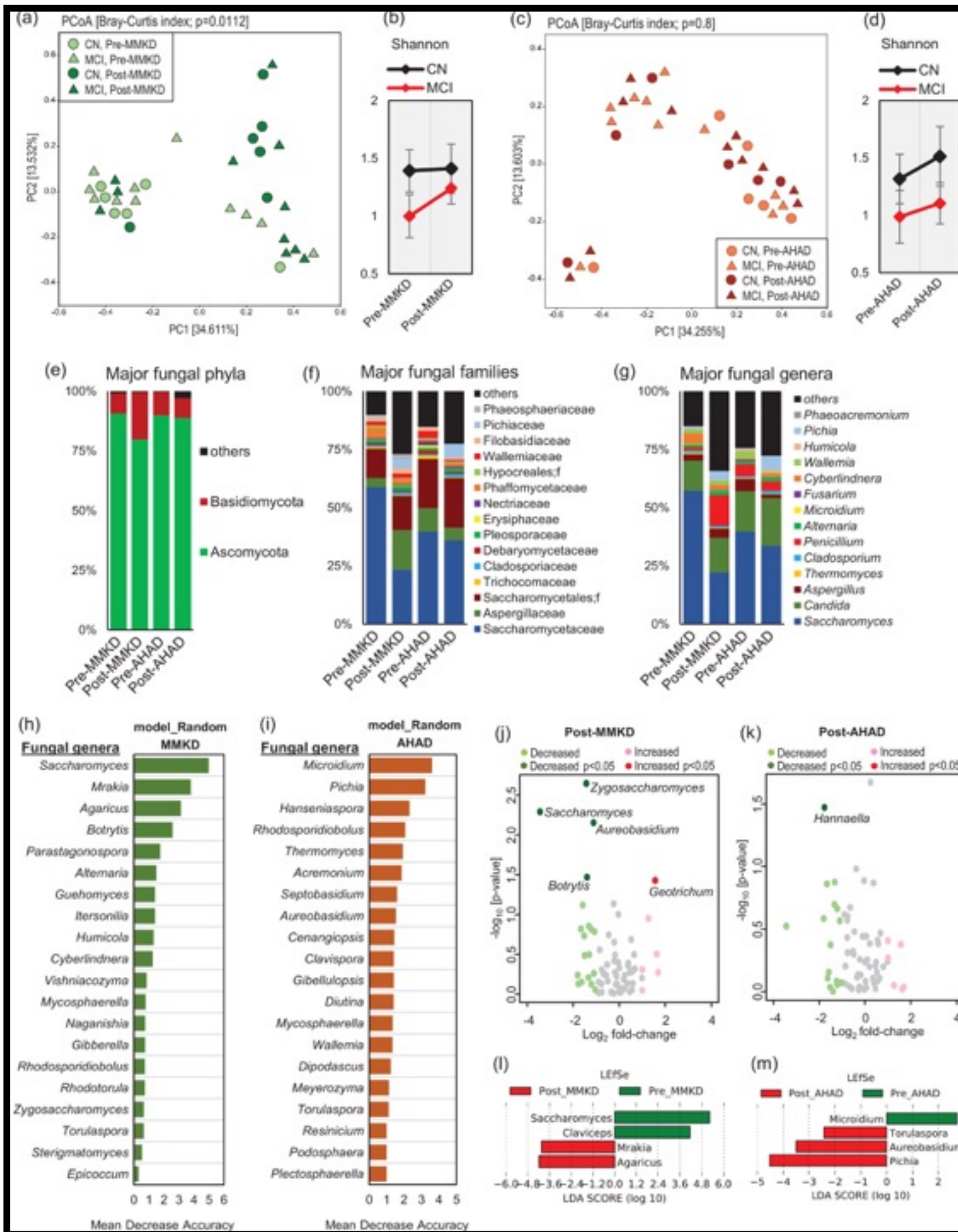
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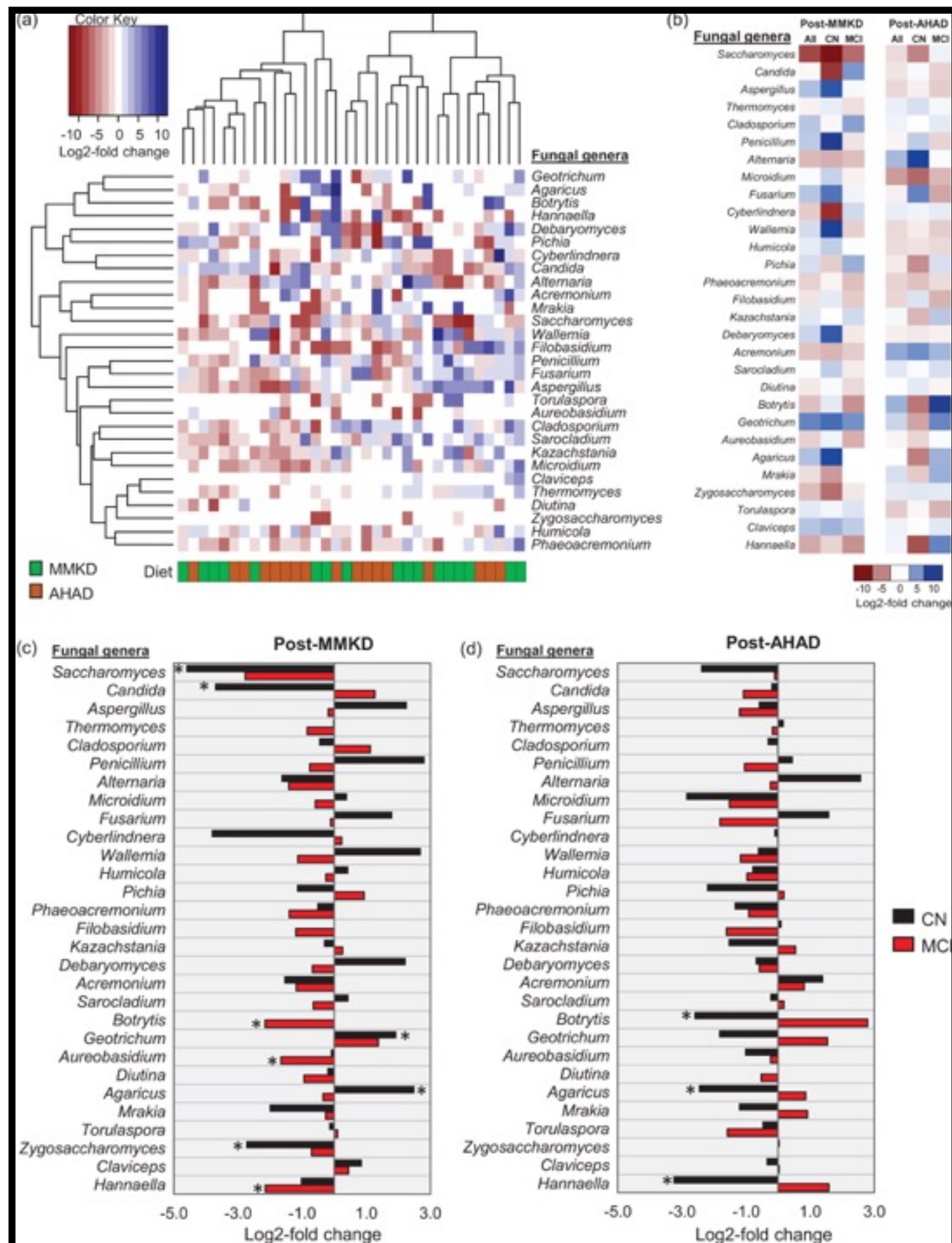
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Natural Treatments

- Candida Plus enzymes
- Candida homeopathic remedies
- Need Lipase enzyme with essential fatty acids Help reduce inflammation. A mix of omega-6 (evening primrose) and omega-3 (fish oil).
- Caprylic acid may have antifungal properties.
- Probiotics, monolaurin
- Silver
- Oil of Oregano, garlic

The Candida Diet

- **Avoid carbohydrates:** Supporters believe that *Candida* thrives on simple sugars and recommend removing them, along with low-fiber carbohydrates (eg, white bread).
- **Avoid yeast-containing foods:** Examples include beer, wine, vinegar, baked goods, and mushrooms.
- **Use probiotics:** Advocates say this will help introduce more "healthy" bacteria to the gut to help prevent a build-up of *Candida*. Yogurt with probiotics and/or supplements may be recommended.
- **Candida cleanse:** These types of diets tend to begin with detoxification, where fasting may be promoted, or a diet restricted to vegetable juice, colon cleansing, or consumption of herbs with antifungal properties.



Natural Remedies

- Choose a diet that boosts immune function, beneficial bacteria, fiber, and nutrients, while decreasing sugar and processed foods.
- Organic Coconut Yogurt
- Whole grains, gluten free limit consumption
- Vegetables over fruits
- Wild caught Salmon & Lean Meat grass finished
- Lots of pure water
- Limit: Simple sugars, refined grains, simple carbohydrates

Natural Remedies

Candida albicans is a common fungal pathogen that lives in the gut, mouth, genitals, urinary tract, and skin. It can be life-threatening in immunocompromised people.

A recent study found that **monolaurin** has potential as an antifungal treatment for **candida** albicans —one that can also reduce a pro-inflammatory response.

Both **monolaurin** and coconut oil, which contains lauric acid, are possibly best known for their **antifungal** effects. The common fungus, *Candida albicans* (C. albicans) can affect the skin, genitals, throat, and mouth of humans. **Monolaurin**, on the other hand, **does** not appear to have an adverse effect on desirable digestive **bacteria**, but rather only on unwanted microorganisms.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4924139/>

Natural Remedies

Monolaurin, on the other hand, **does** not appear to have an adverse effect on desirable digestive **bacteria**, but rather only on unwanted microorganisms.

Considerations:

There are many factors which could contribute to how monolaurin is taken as a dietary supplement. These may include, but are not limited to:

- Age
- Weight
- Personal health goals
- General sensitivity to supplements

Although monolaurin is listed on the FDA's GRAS (Generally Regarded As Safe) list, precautions should always be taken when beginning any new dietary supplement. Results will vary by individual, and one cannot expect to see immediate health changes.

It is recommended to take monolaurin with food to avoid upset stomach and an unnecessary strong soapy taste. Having food in the stomach may also aid in the bioavailability of some supplements.

Vicious Cycle of Feeding Candida

The Effect of Sugar on our Neurotransmitters

Neurotransmitters are chemicals that travel between nerve cells allowing them to communicate with each other. Neurotransmitters are categorized as stimulatory or inhibitory meaning they are either ‘on’ or ‘off’ switches.

Dopamine is a stimulatory neurotransmitter (an ‘on switch’). It is a feel-good hormone that controls reward-motivated behavior. When we eat sugar, or foods that break down into sugar, we get a surge of dopamine in the brain that makes us feel good and gives us a temporary “high”. Unfortunately, in order to maintain this high we must continue to consume more and more sugar.

The other neurotransmitter produced when we eat sugar is called **serotonin**; an inhibitory neurotransmitter (an ‘off switch’) whose main function is to regulate sleep, mood and appetite. A significant amount of serotonin is produced in the cells of the digestive system. After the initial rush of dopamine when you eat sugar, serotonin kicks in and you will crash and get sleepy.

Sugar addiction happens because, when we crash after a sugar high, we crave more sugar to get back to that feel-good place.

Vicious Cycle of Feeding Candida

The Effect of Sugar on Endogenous Opioid Receptors

Opioid is similar to the highly addictive opiate drug class (e.g.: heroine, morphine and oxycodone). The opioids we are talking about are **endorphins** which are normally produced in response to pain and extreme physical exertion.

Endogenous opioid receptors are the cell receptors, located primarily in the brain, spinal cord and digestive tract that opioids bind to make us feel good and decrease pain.

When we eat sugar it stimulates endorphins to bind to these receptors producing another mechanism for feeling good. The net result of this, as with any addiction, is that the more sugar we eat the more sugar we need to eat in order to feel good. The cravings can be so strong that no matter what you do you are unable to control yourself from eating all the sugar in your pantry – and, a word of warning, sugar comes in some surprising forms.

Vicious Cycle of Feeding Candida

What Role Does Candida Play In Sugar Addiction?

When you have an organism such as candida that lives inside you and feeds off sugar, this organism will consume the sugar you eat from your digestive system. Candida is a yeast that consumes the sugar we provide it with and then demands more and more and more; making us crave more and more sugar.

This creates a *vicious cycle of craving sugar*, then eating sugar which feeds the yeast and causes it to grow, causing us more sugar cravings. Usually, once we treat the candida imbalance, people lose their sugar addiction.

The goal is a natural treatment program designed to rebalance your gut bacteria and rid you of candida once and for all.

This is a three-tiered supported treatment that:

- *Eliminates the foods that cause the yeast to grow*
- *Kills off the yeast*
- *Repopulates the intestines with healthy bacteria*

Vicious Cycle of Feeding Candida ‘Budda Belly’

Why Does The Belly Swelling Happen?

Gas and bloating occur when bacteria in the intestines digest the sugars and starches we eat. Different bacteria produce different levels of gas so, when our intestinal bacteria (flora) are out of balance we can have more of the bacteria that produce high levels of gas and this will cause more bloating. In addition to the imbalance in intestinal flora, the sugars in our diet feed an abundance of yeast in our gut causing it to ferment and, just like when making bread, our intestines begin to “rise” resulting in uncomfortable swelling and bloating.

There are a couple of *tests* we can do to determine if you have Candida overgrowth:

- *A simple **IgG blood test** can tell if you are reacting to yeast; if the body is irritated by yeast it will show up as a positive reaction on the test results.

- ***Stool testing** can also be done to look for the species of yeast that is causing your problems and the quantity of overgrowth.

- ***Urine Testing** to check markers.

When you treat the Candida, your gas and bloating, as well as other symptoms such as skin rashes, toe nail fungus, brain fog, food allergies and leaky gut should all disappear.

What Happens If I Don’t Treat My Candida?

Chronic yeast overgrowth in the intestines will lead to increased leaky gut syndrome. This is where the cells of the intestinal wall, that should be tightly packed, swell up causing tiny gaps to appear in the tight junctions. These gaps allow food particles that are not properly digested and broken down to be absorbed into the blood. Any food particle in the blood shouldn’t be there and is therefore considered an antigen and the immune system will trigger an immune response, attacking the foreign body just as it would for a virus that was making you ill. This is a vicious cycle that will lead to more leaky gut, more food reactions and more Candida overgrowth and more unpleasant symptoms.

How Will I Feel After I Treat Candida?

When you treat intestinal overgrowth of Candida the first improvement you notice is that you no longer have the *chronic gas and bloating*.

With the good bacteria growing in the intestines your immune system improves so you get fewer infections.

Your regularity of bowel movements is restored and both diarrhea and constipation either resolve or improve.

In addition to this, creating a well-balanced gut ecology that is full of good bacteria means that we heal our leaky gut so food sensitivities decrease. In addition, you should also notice your energy improving, you should start losing weight and any red, itchy skin will clear up. Finally, amazingly enough, your cravings for sugar will go away too.

Vicious Cycle of Feeding Candida

Chronic sugar addiction can lead to many negative issues on your health.

These include but are not limited to:

- *Weight gain
- *Diabetes
- *Weakened immune system
- *Heart disease
- *Chronic fatigue syndrome
- *Hormonal problems
- *Digestive system complaints
- *Autoimmune disease
- *Anxiety
- *Depression

Vicious Cycle of Feeding Candida

1. Sugar

Any form of processed sugar including white or brown sugar derived from the cane sugar plant and any simple sweetener derived from maple syrup, honey, agave, brown rice syrup or malt. You also need to take great care to avoid high fructose corn syrup – this processed form of sugar, derived from the corn plant, is especially problematic for yeast overgrowth and should be eliminated. Read labels, you may be surprised to find all the hidden sources of sugar that you may be consuming. Packaged soups, coffee creamers, packaged seasonings are all potential sources.

2. Simple Carbohydrates

Processed carbohydrates such as white flours, white rice contain no fiber and turn into simple sugars in the digestive system. Foods in this category include crackers, chips, pasta and noodles.

3. Yeast

Candida is a yeast and, when you consume foods that contain yeast, you are adding more yeast to an already yeast-heavy environment. High yeast foods include:

- *Alcohol which is fermented using yeast. Wine and Beer contain the most yeast and people who are yeast sensitive tend to react more to them than they do to distilled spirits like vodka, gin & tequila which contain less.

- *Fermented products, including all types of vinegar, soy sauce, tamari, salad dressing, mayonnaise, ketchup, mustard and most other condiments that include vinegars.

- *Many breads contain yeast – it is what makes the bread rise so that it is fluffy and light.

Sourdough bread gets mixed reviews on being allowed on a Candida diet. Sourdough is made with a starter so there is no active yeast added to the mix. However, the starter comes from naturally occurring yeast spores that float around in the environment. For this reason, I recommend avoiding sourdough when doing a Candida cleanse. Tortillas do not contain yeast and can be used to replace bread.

Vicious Cycle of Feeding Candida

4. Mold

Foods that are high in mold can add to the fungal spores in the intestinal tract that contribute to the growth of Candida. Foods that may have mold on them include:

- *Meats that are pickled, smoked or dried such as hotdogs, smoked salmon and cured pork bacon.

- *Cheese, especially ‘moldy cheese’ such as brie and camembert. I recommend avoiding all cheeses during the Candida cleanse.

- *Peanuts & Pistachios

- *Dried fruits and fruit that has been bottled, canned or jarred. These belong in the sugar category as well as the mold category as they contain both concentrated sugar and often mold spores on the skin as well.

5. Mushrooms

Mushrooms are a fungus and, as such, can also contribute to yeast overgrowth. Mushrooms have a role to play in medicine and some species can boost the immune system. However, for the purpose of treating Candida, any foods that have a fungal component to them are best avoided to minimize yeast growth in the intestines.

Foods to Eat to Eliminate Candida

The best diet to keep Candida overgrowth to a minimum is one that is high in healthy protein, fats and complex carbohydrates.

1. Protein

Protein from animal sources such as chicken, fish, shellfish, eggs.

Protein from non-animal sources such as beans, legumes (such as red or brown lentils), nuts and seeds (except peanuts and pistachios)

2. Fresh Vegetables

Especially dark leafy greens such as spinach, cabbage, kale and collards. Root vegetables such as carrots and potatoes can be eaten in moderation but beware as they contain carbohydrates that will turn to sugar once eaten. Frozen, canned or jarred vegetables can be eaten but should be consumed in moderation – in general fresh is always best.

3. Fresh Fruits

1-2 servings of fresh fruit per day will provide good fiber, vitamins and minerals. However, if you notice symptoms of gas, bloating and brain fog after eating fruit you may be sensitive to it and should eliminate it from your diet as well.

Foods to Eat to Eliminate Candida

4. Complex Carbohydrates

Some people can handle having whole grains in their diet. If you find you get gas, bloating, stomach pain, blood sugar crashes or weight concerns after eating whole grains then you will need to avoid them. Otherwise, you may be able to consume grains such as:

- *Brown or wild rice
- *Millet
- *Buckwheat
- *Quinoa

5. High Quality Oils (Good Fats)

All our cells have an outer layer of fat that makes up the cell membrane. When we eat high-quality oils this membrane are healthier and work optimally. When our cell membranes are working properly then we are healthier and have more energy. Unrefined and cold-pressed oils are the best when available. Good fats include (but are not limited to):

- Coconut oil
- Olive oil (avoid olives themselves as they are pickled in a brine so fall under the fermented foods category and should be avoided)
- Avocados & avocado oil
- Sunflower oil
- Fish Oil
- Flax seed oil
- Chia Seed

In addition to eating the right foods it is important to stay well hydrated. Drinking 1-2 liters of water a day will contribute to a healthy digestive system and help minimize yeast overgrowth.

Foods to Eat

Focus on incorporating these foods while on the candida diet:

- Low-sugar fruits: Lemon, limes, berries (may be eaten in small amounts).
- Non-starchy vegetables: Asparagus, Brussels sprouts, cabbage, broccoli, kale, celery, cucumber, eggplant, onion, spinach, zucchini, tomatoes and rutabaga (best if eaten raw or steamed).
- Gluten-free grains: Millet, quinoa, almond, and buckwheat.
- High-quality protein: Chicken, eggs, salmon, turkey and sardines (organic, pasture-raised and wild-caught varieties are best).
- Healthy fats: Avocado, olives, unrefined coconut oil, flax oil, extra-virgin olive oil and sesame oil.
- Certain dairy products: Butter, ghee, organic kefir or plain yogurt.
- Nuts and seeds low in mold: Almonds, sunflower seeds, coconut or flaxseed.
- Herbs and spices: Black pepper, salt, cinnamon, dill, garlic, ginger, oregano, rosemary, paprika, turmeric and thyme.
- Condiments: Apple cider vinegar, coconut aminos and sauerkraut.
- No-sugar sweeteners: Stevia, erythritol and xylitol.
- Non-caffeinated beverages: Herbal teas, chicory coffee, filtered water, homemade almond milk, coconut milk (look for one without additives) and water infused with lemon or lime.

Foods to Eat

Foods That *Fight* Candida:

- Coconut oil
 - This oil is high in caprylic acid, which works to break down the cell walls of yeast. For any women dealing with a tricky yeast infection, coconut oil can be a great topical to provide relief. Adding just a drop of tea tree oil to the mixture can also help due to its anti fungal and antiseptic properties. However, if there are any open sores or cuts, be cautious in using this essential oil - it's very potent!
- Garlic
 - Eaten raw, this acts as an incredible anti-bacterial, antimicrobial and anti fungal. It even has been shown to be effective against killing cancer cells. If you're having trouble eating it raw, there are actually garlic supplements you can take. Garlic can even function as a intra-vaginal suppository during yeast infections.
- Cruciferous Vegetables & Greens
 - Broccoli, cauliflower, brussels and kale are all examples of these! These veggies are great for repopulating the good bacteria in our GI tract. All of the beneficial microbes help to keep candida at bay and prevent overgrowth.
- Ginger
 - An excellent anti-inflammatory and also anti fungal. One great way to incorporate ginger into your daily routine is to make ginger tea. Simply take boiled water and add sliced ginger root. Drinking before bed is wonderful for soothing your stomach, aiding digestion and decreasing inflammation.
- Apple Cider Vinegar & Lemon Juice
 - Both of these act as an anti fungal. Warm water with lemon in the morning can fight candida and ramp up digestion. Add a splash or two of ACV into your water bottle or over a salad and you'll be good to go.
- Wild Caught Salmon
 - Eating a diet rich in omega-3s is wonderful for healing leaky gut, which as we know, contributes to some autoimmune conditions.
- Probiotics, of course!
 - Taking a probiotic each day is a simple, very effective way to give our body a boost. Give me the good bacteria!

Foods to Avoid

The list of foods to avoid on the candida diet include:

- High-sugar fruits: Bananas, dates, raisins, grapes and mango.
- Grains that contain gluten: Wheat, rye, barley and spelt.
- Certain meats: Deli meats and farm-raised fish.
- Refined oils and fats: Canola oil, soybean oil, sunflower oil or margarine.
- Condiments: Ketchup, soy sauce, white vinegar, BBQ sauce, horseradish or mayonnaise.
- Certain dairy products: Cheese, milk and cream.
- Sugar and artificial sweeteners: Aspartame, agave, cane sugar, corn syrup, honey, maple syrup, molasses and table sugar.
- Nuts and seeds higher in mold: Peanuts, cashews, pecans and pistachios.
- Caffeine, alcohol and sugary beverages: Caffeinated teas, coffee, energy drinks, soda, fruit juice, beer, wine or spirits.
- Additives: Nitrates or sulfates.

The candida diet is an anti-inflammatory and nutrient-rich diet that may offer numerous health benefits beyond reduced candida overgrowth.

Herx

A note on the Herxheimer (Herx) Reaction, or "Die Off" symptoms.

The Herxheimer Reaction occurs when bacteria, viruses, or fungi begin to die off and release their endotoxins and lipoproteins into the body faster than they can be removed.

It can cause a sickness that is ironically similar to the flu, including body aches, headaches and sluggishness.

This feeling is temporary, and it has been suggested the reaction might be avoided by a slow introduction of a medication or supplement to your system. This does not suggest monolaurin will cause a Herxheimer reaction.

Can use activated charcoal after 30 to 45 minutes of taking monolaurin to absorb the toxic waste release from the candida.

Herx

Potential Die Off Symptoms

Some people may experience different symptoms when taking medication or supplements in response to a particular infection.

- **Lyme** - Lyme disease die off may be quite uncomfortable and cause fever, chills, body pain, headache, and other flu-like symptoms. If symptoms continue, you should consider lowering or stopping your supplement.
- **Yeast and Fungi** - A herx reaction caused by yeast overgrowth may be site dependent. If there is gastric distress, the herx reaction may be caused by a die off of yeast in the intestine, for example. The rapid killing of yeast may cause nausea, swollen glands, bloating, gas, constipation or diarrhea, or sweating.
- **Viruses** - Die-off symptoms from viral infections may mimic bacterial or yeast die off symptoms. Symptoms may include body aches, fatigue, itchiness, chills, joint or muscle pain.
- **Toxins, Glyphosate, Heavy Metals, Oxalates, Histamine Release**

Candida Go Away

Remember that candida is resilient.

Some people may experience recurrence or vulnerability to candida once they have had a candida overgrowth.

Journaling and progress notes is vital to stay on top of the candida vulnerability.

Many factors are involved with trigger candida such as sleep, stress, eating patterns, medications, sugar levels, bacteria, GI health and much more.

You must stay on top of all of the factors and remember to incorporate candida maintenance regimens to keep the candida at bay.

Week #5 - Why is the Adrenal system key for Behavior & Focus?

Excessive stress may cause an inability to appropriately respond appropriately to stressors, and may be the causative factors to many physical and sensory symptoms in children autism spectrum disorders.

Understanding the Adrenal System Role in ASD

Crucial role of Organic Acid Testing and Neurotransmitter markers

Behaviors associated with Adrenal Imbalances

List of Signs & Symptoms



Week
5