



“Integrating the Nutrition-Health Connection”

Vol. 2, #3, Jul-Aug 1995

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Candidal infections are more **common** than all other fungal infections combined. Vaginal candidiasis is **one of the most frequently diagnosed diseases** in gynecology; **3 out of 4 women** experience the infection at least once during their childbearing years. However, the infection does not limit itself to the female population. When the yeast infection is in the intestines, **both men and women** can suffer any combination of the following **symptoms**: acid stomach, indigestion, abdominal pain, constipation, diarrhea, itching, and even symptoms of drunkenness. (Michaud E& Feinstein A. Prevention Magazine’s 30 day immune power program. Rodale Press, Emmaus, Pa. 1989. p144). See inside for details on how to cope with this common ailment.

“A strength of nutrition is that it encompasses molecular biology and clinical practice and practitioners of each can benefit from an understanding of the complementary area” (Freake, HC. *J Am Coll Nutr* 1993 12(3):294-302).

NUTRITION IN THE NEWS: Garlic makes the press!



Folklore has always claimed that garlic is a great healer, but is there any scientific basis for that? Seems so, or at least that’s what the research is showing. A double-blinded, controlled study in 1987 gave 18 mg garlic oil to 20 healthy volunteers over a four week period. In the treated group, cholesterol dropped 16%, HDL levels rose 23%, and **blood pressure** dropped from 94 to 88 mmHg. (Barrie S et al. Effects of **garlic oil** on platelets, **serum lipids** and **blood pressure** in humans. *J Orthomolec Med* 1987; 2:15-21)..

Garlic’s therapeutic properties are many, and these are just some of the ones that are being reported:

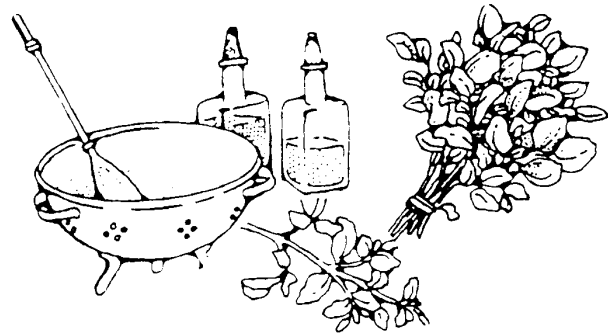
- a significant antiarrhythmic effect on the heart (*J Ethno pharmacol* 1994;43(1):1-8)
- cancer inhibition (*Carcinogenesis* 1994; 15(9):1881-5; *J Cell Biochem Suppl* 1993;17F:91-4; *Pharm Res* 1992;9(12):1668-70).
- radiation protection (*Photochem Photobiol* 1993;58(6):813-7)
- sinusitis relief (*Vestn Otorinolaringol* 1991;(2):62-3)
- cholesterol/triglyceride reduction (*Arzneim.* 1993;43(9):978-81; *J Postgrad Med* 1991;37(3):132-5)
- reduced incidence of gastric cancer (*Prev Med* 1993;22(5):712-22), and esophageal cancer (*J Cell Biochem Suppl* 1993;17F:91-4)
- treating parasites (*J Egypt Soc Parasitol* 1991;21(2):497-502).

The Journal of Clinical Gastroenterology reported the case of a patient with severe hepatopulmonary syndrome who failed conventional somatostatin therapy, and declined liver transplantation. This syndrome is believed to arise from disordered gut peptide metabolism. On her own, she took doses of powdered garlic, and experienced improvement (J Clin Gastroenterol. 1992;15(3):248-50).

Relief from the Kitchen?

It sounds like the beginning ingredients for an aromatic casserole, however, there are actually many common **spices/herbs** that have reported **therapeutic value in Candidiasis**. In fact, “**thyme, ginger and cinnamon** contain some of the **most powerful candida substances available**” (Duke, JA. Handbook of Medicinal Herbs. CRC Press, Boca Raton, FL.1985.

Thyme, recommended for Candida treatment also by Heinerman (Heinerman, John. Heinermen’s Encyclopedia of Fruits, Vegetables and Herbs. Parker Publishing, West Nyack, NY p339), **promotes better blood circulation**. The spice **cinnamon** is useful, “in the **prevention and treatment of Candidiasis**” in clinical trials (ChungHua Hu Li Tsa Chih 1993;28(12):711-2).



Basil is another spice used to treat Candida albicans (Heinerman, ibid, p20). **Cloves**, a sweet smelling spice, possesses **antioxidant activity** (Mol Cell Biochem 1992;111:117-24; Indian J Biochem Biophys1993; 30: 130-4), and is touted for its therapeutic value in **Candidiasis**. And speaking of aroma, the **antibacterial** characteristics of **garlic** (one of the most aromatic compounds around!) are so powerful, that when tested against drug-resistant varieties, had therapeutic activity (Indian J Med Res1991;93:33-6).

Another common kitchen food is **cabbage juice**, which suppresses Candida yeast infection. (Heinerman, ibid, p56). The Merck Index reports that cabbage contains vitamin U, the anti-ulcer vitamin, used in “treatment of gastric disorders” (Merck Index, Merck & Co., Rahway, NJ. 1989, p 1581). Some of the healing properties of cabbage may be due to its high **L-glutamine** content. L-glutamine is essential for the synthesis of the mucoproteins present in the mucous secretions of the GI tract. These secretions are responsible for protecting the lining of the GI tract. In addition to **protective qualities**, L-glutamine administration has been known to actually **improve mucosal structure and healing** (Arch Surg 1990;125(8):1040-45).

THE LARGE INTESTINE

In our last two issues, we looked at the intricate process of digestion and absorption. We began with starch and protein digestion (Part I) in the mouth and stomach. In Part II, we focused on the small intestine (digestion of fats, absorption of nutrients). We’re now ready to examine the functions of the large intestine. The large intestine, or colon, is the site for the reabsorption of most of our water and many minerals. Beneficial bacteria are produced and flourish in the colon, contributing to an immune defense system. Several vitamins, including vitamin K and B vitamins, are synthesized by some of these bacteria, and then absorbed in the colon.

Finally, the colon is a necessary pathway for elimination of undigested matter, including some fat and cholesterol. In the absence of a healthy diet, diseases such as colon cancer and diverticulitis can arise. Fortunately, though, attention to nutrient maintenance affords protection in this area.

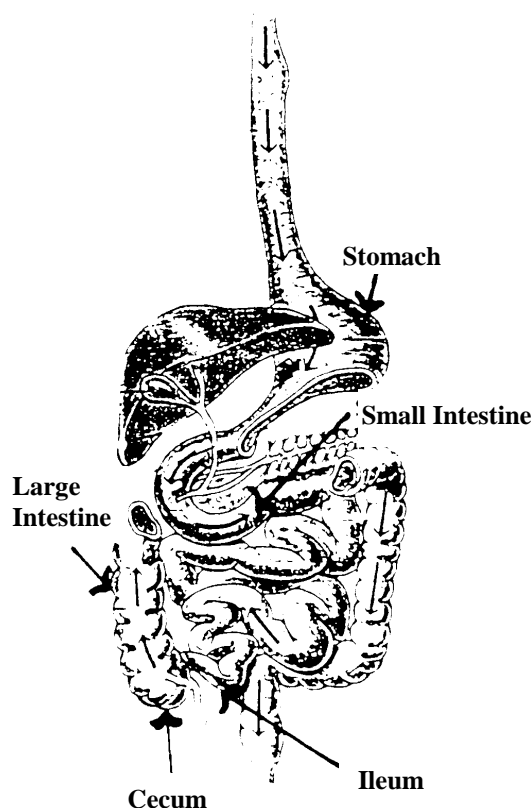
LARGE INTESTINE PHYSIOLOGY:

The **diameter of the colon** is much **larger** than the **small intestine**; three longitudinal bands make up the external muscular layer. The fact that the bands are shorter than the rest of the colon makes for “**outpouchings**” on the wall of the colon. The colonic mucosa has no villi, however it does have glands, short inward projections that secrete mucus.

When food leaves the stomach, the cecum relaxes, and the chyme passes through the ileocecal valve. This is thought to be a **vagal reflex**, and **sympathetic stimulation increases** the tonic **contraction** of the valve. Contractions and peristaltic waves move the contents through for eventual elimination.

The colon has an immense absorptive capacity, mainly for water, sodium and minerals. “Some enteric microorganisms synthesize vitamin K and a number of B complex vitamins, and the folic acid produced by bacteria can be shown to be absorbed in significant amounts” (Review of Medical Physiology, 1987, Appleton & Lange, San Mateo, Ca. p.425)

These microorganisms are the “healthy” bacteria, and they usually keep the “unhealthy” bacteria in check, partly by creating lactic acid from carbohydrate. However, an upset in the immune system, such as that caused by antibiotic administration, kills off the beneficial bacteria and ultimately allows the harmful bacteria to flourish.



The pathway of food: Food travels down the esophagus, through the stomach, then the small intestine, and finally the large intestine

CANDIDIASIS : “There’s a Fungus Among Us”



A microscopic view of *Candida albicans*

Yeast was first observed microscopically in 1680, however, the importance of **fungi** in **causing disease** was not appreciated for almost 200 years later.

Candida albicans is a **yeast-like fungus**, and **candidiasis** refers to the **diseases caused by this pathogen**.

Normally, the large intestine hosts a balance of beneficial bacteria (*Lactobacillus acidophilus* and *Lactobacillus bifidus*) along with the harmful *Candida*. *Candida* is usually kept in check by the *Lactobacillus* bacteria, partially by the production of lactic acid. *Candida* actually provides growth factors for *Lactobacillus*. They exist in a natural balance, until something happens to upset that balance.

“The yeast Candida albicans is clearly the major agent inciting human mycotic infections, and is capable of causing diseases ranging from superficial disorders such as diaper rash to invasive, rapidly fatal infection in the host with abrogated (abolished) immunity” Candidiasis: Pathogenesis, Diagnosis and Treatment. Ed. GP Bodey. 2nd ed. Raven Press Ltd. NY, NY 1993, p.1)

WHEN THE BALANCE IS UPSET...

Although there is **no “single factor”** responsible for turning this naturally occurring organism into an **agent of disease**, the candidal species is notorious for being an **“opportunistic” pathogen**: “They **incite disease** in hosts whose local or systemic **immune attributes** have been **impaired, damaged, or innately dysfunctional**” (Ibid, Bodey, p. 13). Candida has a tenacious ability to adhere to mucosal surfaces. This is a necessary step for the initiation of candidiasis, and adherence depends on the immune status of the host. Candida secretes enzymes which destroy membrane integrity, leading to dysfunction. Candida also secretes toxins which activate the immune system, overload the liver, and deposit in body tissues. There are 3 types of infection: **Superficial** (most common) - characterized by inflammation of tissue linings, i.e. skin, GI tract, pharynx, upper and lower respiratory tract etc.; **Locally invasive** - i.e. pneumonia, cystitis, esophagitis, the most common being ulcerations of the intestinal, respiratory or genito-urinary tract; and **Systemic** - an invasive infection, characterized by lesions of the heart, kidneys, liver, spleen, lung, brain and other organs. There are several things to consider in a state of candidiasis: **a)** The inflammatory response must be treated; **b)** Lactobacillus count needs to be increased in order to keep Candida in check; **c)** The immune system needs strengthening, which decreases adherence ability; **d)** Antibiotics, steroids, and other immune-suppressing drugs, along with simple carbohydrate foods, should be avoided; **e)** Digestive secretions should be increased; **f)** Nutrient deficiencies should be reversed; **g)** Liver function should be optimized to increase ability to filter toxins.

CANDIDA RELIEF: What Works?

GOLDEN SEAL: Golden seal reduces Candida infections (Heinerman, John. Heinerman’s Encyclopedia of Fruits, Vegetables and Herbs. Parker Publishing, West Nyack, NY p158). It contains berberine, which is antibacterial, antipyretic and antimalarial (Merck Index, 11th ed. Merck & Co. Inc., Rahway, N.J. 1989).



CAPRYLIC ACID: Caprylic acid inhibits fungal growth, and has been used to **reduce Candida** overgrowth in the GI tract. It’s **strong effect on the immune system** is reported in **The American Journal of Clinical Nutrition**, which states that caprylic acid can, “cause lysis of tumor cells with little damage to normal tissue” (AJCN 1991;53(4supp):1082S-1086S). Hepatic tumors in mice treated once daily were totally obliterated after only four days, leaving normal liver cells unaffected. Because of this action of caprylic acid, the American Journal of Clinical Nutrition notes that it represents, “a **novel mode of antitumor action**” (AJCN 1991;53(4supp):1082S-1086S).

PAU d’ ARCO: Compounds from Pau d’arco have demonstrated **anti-candida effects** (A Textbook of Natural Medicine, John Bastyr College Publications, Seattle, Wa. 1988). Widely used by the Indian tribes of the Amazon region for centuries as a healing herb, it has become popular as an antibacterial, antiviral, **antiinflammatory and antifungal agent** (Ibid, Mayell p.44).

ALOE VERA: Aloe vera is a potent antiinflammatory (Davis RH. J Am Podiatr Med Assoc 1994;84(2)77-81). One study showed that aloe vera reduced inflammation, regenerated epithelial cells, and increased overall wound healing by 72 hours - “This acceleration in wound healing is important to **reduce bacterial contamination**” (J Dermatol Surg Oncol 1990;16(5):460-7). Among aloe’s other virtues, it is known to help in **candidal dermatitis** (Heinerman, John. Heinerman’s Encyclopedia of Fruits, Vegetables and Herbs. Parker Publishing, West Nyack, NY p4). Aloe vera is also helpful in **food allergy**, which is suspected in **association with candidiasis** (Encyclopedia of Natural Healing, Prima Publ. Rocklin, Ca. p.178).

LACTOBACILLUS ACIDOPHILUS: Lactobacillus acidophilus is one of the strains of beneficial bacteria, and it is found in natural yogurt (the ones advertising live cultures). “L. acidophilus has



been found to inhibit *Candida albicans*...” (Microbios 1990;62(250):37-46). In a crossover trial, 33 patients experienced a **threefold decrease in infections** when they consumed **yogurt containing *L. acidophilus***. Candidal colonization significantly decreased. **“Daily ingestion of 8 oz of yogurt containing *L. acidophilus* decreased both candidal colonization and infection”** (Ann Intern Med 1992;116(5):353-7). **LACTOBACILLUS BIFIDUS**: “A number of pioneer bacteria, which are the first to arrive in the gut, are capable of effectively blocking growth of other bacteria introduced later in the ecosystem. In some instances, these pioneer bacteria also inhibit production of toxins by pathogenic species... These factors include “bifidus factors”, which promote the growth of bifidobacterium, lactoferrin and immunoglobulins, which prevent colonization of the gut by pathogenic enterobacteria” (Ann Pediatr Paris 1993;40(1):13-22).

COENZYME Q10: This vitamin-like nutrient is important in cellular energy; as one of the electron carriers in the electron transport system (ATP generation in the mitochondria), it helps cells utilize oxygen. Oxygen supply is necessary for tissue repair and immune function; this could be why coenzyme Q purportedly **increases antibody count** and is helpful in treating candidiasis. In a test for oxidative performance in patients with myopathies, treated patients experienced **higher oxygen consumption** and threshold to higher workload, indicating, **“improvement of mitochondrial function”** (Neurology 1992;42(6):1203-8). The **therapeutic potential of this antioxidant** is discussed in, “Antioxidant systems - physiology and pharmacotherapy trends” by P. Grieb (Mater Med Pol 1992 24(4):217-222).



ZINC: Zinc is a powerful antioxidant and immune system enhancer. Some zinc compounds have been shown to decrease GI mucosal injury, due to their protective properties against lipid peroxidation (Free Radical Research and Comm. 1991;14(4):289-96). In addition, zinc deficiencies have been frequently noted in women suffering from Candidiasis (Michaud E& Feinstein A. Prevention Magazine’s 30 day immune power program. Rodale Press, Emmaus, Pa. 1989. p144).

Pathophysiology of the Colon:

The “fiber hypothesis” is one that suggests **fiber consumption protects against many Western diseases**. The **major impact** of fiber is on the **colon**, where colon cancer and diverticular disease can set in. Fiber is a necessary component of a healthy diet; **fiber exercises the muscles of the large intestine**, retaining health and tone (Whitney and Hamilton, Understanding Nutrition 4E, West Publ Co. NY,NY.1987). In fact, the **American Journal of Clinical Nutrition** this year reported that **butyric acid**, (formed from fiber), **“may have an essential function in maintaining the health of the colonic mucosa”** (Am J Clin Nutr 1995;61:75-81).

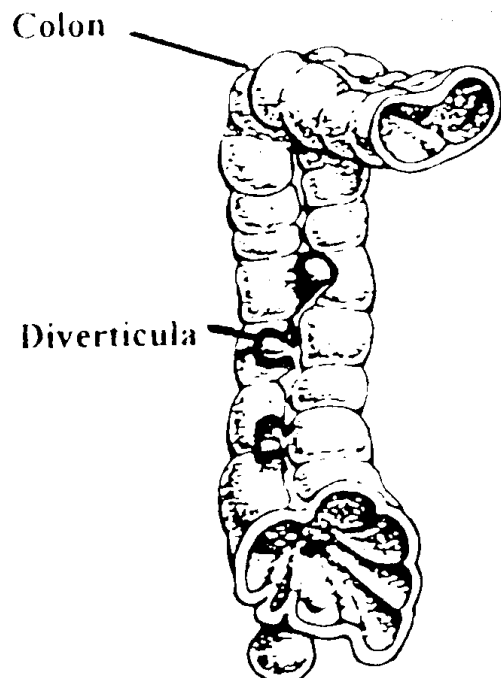
Colon cancer: Consumption of fiber stimulates fermentation, and, “fermentation is probably the key factor in the protective effect of fiber on **colon carcinogenesis**...**Butyrate**, one of the short chain fatty acids, could be significant, as it has anti-neoplastic (**prevents malignant growth**) properties” (Scand J Gastroenterol Suppl 1993;200:80-6). **Butyric acid/ butyrate**, produced during fermentation, **reduces colonic pH** and **inhibits** secondary bile acids that are **carcinogenic** (Ibid p80).

Diverticulosis: **Fiber normally exercises the colon muscles**, so that they can resist bulging out into pouches. However, **weakened muscles predispose to the pouches** characteristic of diverticulosis. If not attended to, the pockets can become inflamed or infected (**diverticulitis**), and may even rupture.

Irritable Bowel Syndrome: This is one of the most common gastrointestinal disorders, where the colon malfunctions. Symptoms can include abdominal pain and distension, constipation, diarrhea, mucous production, and nausea. **Relief is usually found with a high fiber diet**. Oat bran and rice bran are excellent fibers, however wheat bran is usually avoided, because it can trigger food allergies.

Rice bran has also demonstrated potent antioxidant activity, as noted by Life Sciences (1993;53:1383-9), which protects against lipid peroxidation damage. Vitamin K deficiency is not uncommon in this syndrome, because vitamin K is produced by the beneficial intestinal flora.

Ulcerative Colitis: Ulcerative colitis is a general inflammatory response limited to the colon lining. The condition shares many symptoms with **Crohn’s disease**, and together they make up the two categories of **Inflammatory Bowel Disease (IBD)**. In Crohn’s disease, the **entire thickness of the bowel wall** is affected by an



Outside pockets of intestinal lining balloon through weakened wall muscles.

inflammatory reaction. **Food allergies** are suspected to be associated with IBD, and **fiber also plays a role in mitigating this disorder.**

Some of the other Large Intestine maladies that **fiber** seems to **help** are: **hemorrhoids**, because fiber reduces the pressure in the lower bowel; **constipation**, because some fibers attract water and soften stools; and **diarrhea**, because some fibers form gels, such as **apple pectin**, and solidify watery stools. Additionally, apple pectin has a favorable effect on the lipid profile, by binding to and **excreting cholesterol** (Vopr Pitan. 1992(2):47-50). Fiber also binds **Candida** toxins and eliminates them.

Please address any comments/questions to the editor:

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