FUNGUS/MOLD/YEAST/MYCOTOXIN/PRION –Complete list and description

CONTENTS: although each of the categories considered mold have been marked, several of them are classified as yeast but most people are more worried about mold so that is the term that was used.

FUNGUS/MOLD/YEAST

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FUNGI

Fungi are single cell living forms of life which inhabit the land, air and waters of the earth. They are everywhere. They are more highly developed than the bacteria and viruses and there are many more species than are found in the microbes. Single fungal cells can only be seen under the microscope but a colony of these cells makes a visible presence in the form of mushrooms, toad stools and molds on food and habitations. It is estimated that there are 2 ½ million species of fungi, 600,000 have been identified to date. Fungi are so ubiquitous to the environment that it is estimated that one quarter of the planets biological mass is made up of fungi.

Most fungi generally are not pathogenic to healthy humans. Fungi adversely affect human health through three processes 1) allergy; 2); infection; and 3) toxicity. Fungi produce metabolites. During colonization fungi secrete enzyme to digest organic materials into simpler compounds. The simpler compounds are primary and secondary metabolites. The secondary metabolites are called mycotoxins. These metabolites give molds competitive advantages over other surrounding molds growing in the same proximity. In nature, mycotoxins are a defense for fungi and provide advantage when colonizing new strata. More on mycotoxins later.

While plants, animals and humans are alive and well, the fungi around us are unable to overcome the natural defense mechanisms which higher forms of life possess. But once death overtakes the living, the fungi are the principle undertakers and managers: they reduce all that have ever lived into the molecules from which they were assembled. Biologists call this the carbon cycle while philosophers call it "from dust to dust".

However, there is one exception to this simple balanced equation of life and death and that is that the fungi can attack the living while they are alive. At its most simplistic perspective, one has many fungi entering the intestinal tract, the nose and lungs, and organs exposed to the world at large. We generally do not develop an infection from these intruders. However, a person might contract a fungal infection such as "athlete's foot " or a "ring worm" on the skin. Did you know that most seasonal allergies are reactions to fungal spores rather than the commonly believed pollens? How many people have sinus problems? But it is impossible to stop breathing air, the primary method of fungal spore contamination.

At the opposite extreme is the person with AIDS who faces death-threatening major fungal infections because that person's immune system has lost its effectiveness against fungi. In between the extremes are fungal infections associated with diseases such as diabetes, cancer and other conditions including cross infections amongst humans. Fungal infections can cause a variety of symptoms, depending on the type of infection, the area of the body affected, and other factors. Some complications of fungal infections can be serious, even life-threatening.

Some very common types of fungal infections include athlete's foot, jock itch and ringworm. Another common type of fungal infection is a yeast infection, caused by the fungus Candida albicans. This type of fungal infection can infect such areas of the body as the vagina (vaginal thrush), mouth (oral thrush) and the digestive tract (fungal gastroenteritis).

People at risk for fungal infections include those taking strong antibiotics, especially for a long period of time. Antibiotics kill bacteria, including healthy bacteria, which can alter the balance of microorganisms in the mouth, vagina, intestines and other places in the body. This can result in an overgrowth of fungus.

People with weakened immune systems are also more likely to develop fungal infections and have recurrent bouts of fungal infections. This includes people with HIV/AIDS or those taking steroid medications or on chemotherapy, which all suppress the immune system. People with diabetes are more likely to develop fungal infections because the elevated level of sugar in the body which provides food for some fungi and encourage its overgrowth. Other people at risk include the very young and very old.

Department of Medicine, Division of Infectious Diseases, Wayne State University, Detroit, Michigan, Fungus Testing Laboratory, University of Texas Health Science Center, San Antonio, Texas reports: "Melanized or dematiaceous fungi are associated with a wide variety of infectious syndromes. Many are soil organisms and are generally distributed worldwide, though certain species appear to have restricted geographic ranges. Though they are uncommon causes of disease, melanized fungi have been increasingly recognized as important pathogens, with most reports occurring in the past 20 years. The spectrum of diseases with which they are associated has also broadened and includes allergic disease, superficial and deep local infections, pneumonia, brain abscess, and disseminated infection. For some infections in immunocompetent individuals, such as allergic fungal sinusitis and brain abscess, they are among the most common etiologic fungi".

MOLD

Mold is formed by microscopic creatures belonging to the Fungi Kingdom. When tiny airborne spores of mold burst, and then land on a favorable surface, they proliferate into visible colonies, and find new favorable surfaces on which to further develop. Mold spores are too small to detect with the naked eye. They are everywhere around us and you cannot avoid being exposed to them. Once spores enter, they can settle onto carpeting or other surfaces inside your home. You cannot keep spores out of your home, but regular home cleaning and maintenance often can prevent mold problems before they arise.

Mold seeks MOISTURE, WARMTH, and FOOD, and all three conditions are necessary for it to grow. Mold is most likely to find a place to grow in a bathroom, basement or kitchen, but it can grow in other rooms if conditions are favorable. The climate where you live and the living habits in your household can affect the ability of mold to grow. Mold spores can thrive and reproduce in wet or damp parts of your home: areas that have had flooding or where leakage has occurred in roofs, pipes, or walls, or areas around house plants, especially ones that sometimes are over-watered. In just 48 hours, a moist environment combined with room-temperature conditions and an organic food source can lead to mold growth. After it gets the food it needs, mold can move to virtually any kind of surface. Mold growth prefers temperatures between 40 and 100 degrees Fahrenheit. If a warm enough area in your home is humid or damp and contains items that mold likes to eat, your home could develop a mold problem.

Some places where mold can grow in your home are:

- books
- cardboard
- carpet
- ceiling tiles
- cloth
- clothing
- drapes
- ductwork
- household dust
- leather
- paint
- paper
- rags
- upholstery
- wallboard
- wallpaper
- wood products

Common symptoms of mold include nasal congestion, sneezing, coughing, allergies, asthma, itching and skin stains. Extreme mold sensitivity (usually the result of mold overgrowth already in the system) can cause pulmonary hemorrhage and neurotoxic effects like headaches, memory loss, depression, convulsions and even cancer.

YEAST

Yeasts are very common in the environment, but are usually isolated from sugar-rich material. Examples include naturally occurring yeasts on the skins of fruits and berries (such as grapes, apples or peaches), and exudates from plants (such as plant saps or cacti). Some yeasts are found in association with soil and insects. The ecological function and biodiversity of yeasts are relatively unknown compared to those of other microorganisms. Yeasts, including Candida albicans, Rhodotorula and Trichosporon cutaneum, have been found living in between people's toes as part of their skin flora. Yeasts are also present in the gut flora of mammals and some insects and even deep-sea environments host an array of yeasts.

Many types of yeasts are used for making many foods: baker's yeast in bread production; brewer's yeast in beer fermentation; yeast in wine fermentation and for xylitol production. So-called red rice yeast is actually a mold, Monascus purpureus. The yeast species Saccharomyces cerevisiae has been used in baking and in fermenting alcoholic beverages for thousands of years. Yeasts have recently been used to generate electricity in microbial fuel cells, and produce ethanol for the biofuel industry. Carbon is obtained mostly from hexose sugars, such as glucose and fructose, or disaccharides such as sucrose and maltose. Some species can metabolize pentose sugars like ribose, alcohols, and organic acids. Yeasts grow best in a neutral or slightly acidic pH environment.

Some species of yeast are opportunistic pathogens where they can cause infection in people with compromised immune systems. Cryptococcus neoformans is a significant pathogen of immunocompromised people causing the disease termed cryptococcosis. This disease occurs in about 7–9% of AIDS patients in the USA, and a slightly smaller percentage (3–6%) in western Europe. The cells of the yeast are surrounded by a rigid polysaccharide capsule, which helps to prevent them from being recognised and engulfed by white blood cells in the human body.

Yeasts of the Candida genus are another group of opportunistic pathogens which causes oral and vaginal infections in humans, known as candidiasis. Candida is commonly found as a commensal yeast in the mucus membranes of humans and other warm-blooded animals. However, sometimes these same strains can become pathogenic. Here the yeast cells sprout a hyphal outgrowth, which locally penetrates the mucosal membrane, causing irritation and shedding of the tissues. The pathogenic yeasts of candidiasis in probable descending order of virulence for humans are: C. albicans, C. tropicalis, C. stellatoidea, C. glabrata, C. krusei, C. parapsilosis, C. guilliermondii, C. viswanathii, C. lusitaniae and Rhodotorula mucilaginosa. Candida glabrata is the second most common Candida pathogen after C. albicans, causing infections of the urogenital tract, and of the bloodstream (candidemia).

MYCOTOXINS

A mycotoxin is a secondary metabolite, or a toxin produced by a fungus. Mycotoxins can appear in the food chain as a result of fungal infection of crops, either by being eaten directly by humans, or by being used as livestock feed. Mycotoxins greatly resist decomposition or being broken down in digestion, so they remain in the food chain in meat and dairy products. Even temperature treatments, such as cooking and freezing, do not destroy mycotoxins. Health effects of mycotoxins may include immunological effects, organ-specific toxicity, cancer, and, in some cases, death. Agricultural workers are also at risk for dermal and respiratory exposures during crop harvest and storage. Mycotoxin contamination is a worldwide problem affecting staple crops such as corn (maize) and small grains (such as wheat), as well as tree nuts, peanuts, sorghum, and many others. Many countries regulate the maximum allowable concentrations of specific mycotoxins in food commodities and animal feed. Until recently, dietary and occupational exposures were the primary areas of concern, but with growing attention being paid to the problems associated with indoor molds and respiratory exposures, researchers are recognizing that the potential scope of mycotoxin exposures is broader than originally suspected.

Mycotoxin exposure is primarily through food!

As we have always promoted, food should be fresh and raw whenever possible. The highest concentrations of mycotoxins are foun in stored grains, nuts, seeds, meats, grain-fed animal products (meat, animal fats, butter, whole milk) and fermented foods such as beer, bread, cheese and wine. Toxicity caused by mycotoxins is significantly reduced by increasing the amount of fiber in the diet. This is done by increasing the amount of vegetables in the diet. While fruit is also a source of fiber, the high sugar fructose) content of fruit stimulates fungal growth (fructose increases blood cholesterol and uric acid levels which are associated with increased risk of hypertension and atherosclerosis).

PRIMARY MYCOTOXIN CATEGORIES

- The umbrella term aflatoxin refers to four different types of mycotoxins produced, which are B1, B2, G1, and G2. Aflatoxins are largely associated with commodities produced in the tropics and subtropics, such as cotton, peanuts, spices, pistachios and maize. At least 14 different types of aflatoxin are produced in nature. Aflatoxin B1 is considered the most toxic and is produced by both Aspergillus flavus and Aspergillus parasiticus and has been directly correlated to adverse health effects, such as liver cancer, in many animal species.. Aflatoxin G1 and G2 are produced exclusively by A. parasiticus. Aflatoxins are toxic and among the most carcinogenic substances known. After entering the body, aflatoxins may be metabolized by the liver to a reactive epoxide intermediate or be hydroxylated and become the less harmful aflatoxin M1. Crops which are frequently affected include cereals (maize, sorghum, pearl millet, rice, wheat), oilseeds (peanut, soybean, sunflower, cotton), spices (chilli peppers, black pepper, coriander, turmeric, ginger), and tree nuts (almond, pistachio, walnut, coconut, brazil nut). The toxin can also be found in the milk of animals which are fed contaminated feed.

  Virtually all sources of commercial peanut butter in the United States contain minute quantities of aflatoxin, but it is usually far below the United States Food and Drug Administration's (FDA) recommended safe level. High-level aflatoxin exposure produces an acute hepatic necrosis, resulting later in cirrhosis, and/or carcinoma of the liver. Acute hepatic failure is made manifest by hemorrhage, edema, alteration in digestion, and absorption and/or metabolism of nutrients and mental changes and/or coma.

  No animal species is immune to the acute toxic effects of aflatoxins including humans; however, humans have an extraordinarily high tolerance for aflatoxin exposure and rarely succumb to acute aflatoxicosis. Chronic, subclinical exposure does not lead to symptoms as dramatic as acute aflatoxicosis. Children, however, are particularly affected by aflatoxin exposure which leads to stunted growth and delayed development. Chronic exposure also leads to a high risk of developing liver cancer, as aflatoxin metabolite can intercalate into DNA and alkylate the bases through its epoxide moiety. This is thought to cause mutations in the p53 gene, an important gene in preventing cell cycle progression when there are DNA mutations, or signaling apoptosis. The aflatoxin acts as a mutagen, not only mutating DNA randomly, but specifically mutating the p53 gene at base 249 to cause liver tumors.

  Medical research indicates that a regular diet including apiaceous vegetables such as carrots, parsnips, celery and parsley, reduces the carcinogenic effects of aflatoxin.

- Ochratoxin is a mycotoxin that comes in three secondary metabolite forms, A, B, and C. All are produced by Penicillium and Aspergillus species. The three forms differ in that Ochratoxin B (OTB) is a nonchlorinated form of Ochratoxin A (OTA) and that Ochratoxin C (OTC) is an ethyl ester form Ochatoxin A. Aspergillus ochraceus is found as a contaminant of a wide range of commodities including beverages such as beer and wine. Aspergillus carbonarius is the main species found on vine fruit, which releases its toxin during the juice making process. OTA has been labeled as a carcinogen and a nephrotoxin, and has been linked to tumors in the human urinary tract, although research in humans is limited by confounding factors.

- Citrinin is a toxin that was first isolated from Penicillium citrinum, but has been identified in over a dozen species of Penicillium and several species of Aspergillus. Some of these species are used to produce human foodstuffs such as cheese (Penicillium camemberti), sake, miso, and soy sauce (Aspergillus oryzae). Citrinin is associated with yellow rice disease in Japan and acts as a nephrotoxin in all animal species tested. Although it is associated with many human foods (wheat, rice, corn, barley, oats, rye, and food colored with Monascus pigment) its full significance for human health is unknown. Citrinin can also act synergistically with Ochratoxin A to depress RNA synthesis in murine kidneys.

- Ergot Alkaloids are compounds produced as a toxic mixture of alkaloids in the sclerotia of species of Claviceps, which are common pathogens of various grass species. The ingestion of ergot sclerotia from infected cereals, commonly in the form of bread produced from contaminated flour, cause ergotism the human disease historically known as St. Anthony’s Fire. There are two forms of ergotism gangrenous affecting blood supply to extremities and convulsive which affects the central nervous system. Modern methods of grain cleaning have significantly reduced ergotism as a human disease, however it is still an important veterinarian problem. Ergot alkaloids have been used pharmaceutically.

- Patulin is a toxin produced by the P. expansum, Aspergillus, Penicillium, and Paecilomyces fungal species. P. expansum is especially associated with a range of moldy fruits and vegetables, in particular rotting apples and figs. It is destroyed by the fermentation process and so is not found in apple beverages, such as cider. Although patulin has not been shown to be carcinogenic, it has been reported to damage the immune system in animals.

- Fusarium toxins are produced by over 50 species of Fusarium and have a history of infecting the grain of developing cereals such as wheat and maize. They include a range of mycotoxins, such as: the fumonisins, which affect the nervous systems of horses and may cause cancer in rodents; the trichothecenes, which are most strongly associated with chronic and fatal toxic effects in animals and humans; and zearalenone, which is not correlated to any fatal toxic effects in animals or humans. Some of the other major types of Fusarium toxins include: beauvercin and enniatins, butenolide, equisetin, and fusarins.

1. **Absidia** – cause zygomycosis, which involves the rhino-facial-cranial area, lungs, gastrointestinal tract, and skin, especially in the immunocompromised. The disease is associated with acidotic diabetes, malnourished children, severely burned patients, immunosuppressive therapy, use of cytotoxins and corticosteroids, and diseases such as leukemia and lymphoma. These fungi show an inclination for vessel invasion resulting in embolism and subsequent necrosis. Absidia spp. are ubiquitous in most environments. They are often associated with warm decaying plant matter, such as in compost heaps.
2. **Acremonium** -isolated from dead plant material and soil. Many species of Acremonium are recognized as opportunistic pathogens of man and animals, causing mycetoma, onychomycosis, and hyalohyphomycosis. Clinical manifestations of hyalohyphomycosis caused by Acremonium include arthritis, osteomyelitis, peritonitis, endocarditis, pneumonia, cerebritis and subcutaneous infection.
3. **Acrophialophora** –a rare fungus found in soil, can cause very severe infections.
4. **Actinomadura** –found in soil, so far reports have only found in wounds where flesh was exposed to contamination.
5. **Alternaria** - easily carried by the wind, with peak concentrations in the summer and early fall. Alternaria is commonly found in house dust, carpets, textiles, on horizontal surfaces in building interiors, and window frames. It is one of the main fungal causes of allergy, being a common type I & III allergen. Outdoors, it may be isolated from samples of soil, seeds and plants, and is frequently reported in air. The large spore size suggests that this fungus will deposit in the nose, mouth and upper respiratory tract causing nasal septum infections. It has also been associated with hypersensitivity pneumonitis. It is a common cause of extrinsic asthma. Acute symptoms include edema and bronchiospasms; chronic cases may develop pulmonary emphysema. Baker's asthma is associated with inhalation of Alternaria conidia present in flour. Other diseases caused by Alternaria include: Farmer's lung, mycotic keratitis, skin infections, and osteomyelitis. Also, the species A. alternata is capable of producing tenuazonic acid and other toxic metabolites that may be associated with disease in humans or animals. Several species are pathogenic to plants and contribute to the spoilage of agricultural products. Alternaria has been isolated from substrates such as sewage, leather, stone monuments, optical instruments, cosmetics, computer disks, and jet fuel.
6. **Apophysomyces** - commonly found in soil and decaying vegetation. It normally grows in tropical to subtropical regions. cause of the rare infection, known as zygomycosis (simply means an infection caused by fungus, generally infects the eyes or oral cavity, but can spead to other areas), in humans, which is often fatal.
7. **Arthrinium** - It is found on plants including sugarcane and especially swamp grasses & sedges. This genus is often isolated from air near grassy places in the autumn. Only one species is considered to be allergenic. There have been no reported cases of infections or toxin related diseases in humans or animals.
8. **Arthrographis** - a known causative agent of onychomycosis and has been recovered from the skin, nails, and respiratory secretions of patients with chronic pulmonary disease.
9. **Aspergillus** - a common type I & III allergen. They are frequently isolated from forest products, soils, grains, nuts, cotton, organic debris, water damaged building materials, occurs in both outdoor and indoor air, in different types of soil, and on decaying plant material, compost, wood chips, bird feathers and droppings, and also hay and crops. Spores can also be found in moist ventilation systems and house dust. There are more than 160 different species of Aspergillus, sixteen of which have been documented as etiological agents of human disease but rarely occur in individuals with normally functioning immune systems. Aspergillosis is now the second most common fungal infection requiring hospitalization in the United States. Many Aspergillus species produce mycotoxins that may be associated with diseases in humans and other animals. Some of these toxins are carcinogenic including aflatoxins and ochratoxin. Aspergillus is a common cause of extrinsic asthma with symptoms including edema and bronchiospasms, and chronic cases may develop pulmonary emphysema. These fungi are frequently secondary opportunistic pathogens in patients with bronchiectasis, carcinoma, other mycosis, sarcoid, and tuberculosis. Some species can also cause onychomycosis (infection of the nail).
10. **Aureobasidium** - type I & III allergen, and common in a variety of soils outdoors. It is widespread in the indoor environment and is common in places that moisture accumulates like bathrooms, kitchens, shower curtains, tile grout, and windowsills. This genus has 14 species, A. pullulans being the most common. Indoors A. pullulans is often found as a black stain on damp materials in homes such as painted wood. This species has also been reported to cause chromoblastomycosis (in an immunocompromised patient), which is a chronic cutaneous infection of the skin.
11. **Basidiobolus** - type I & III allergen, saprobe and plant pathogen, mainly found in gardens, forests, and woodlands. Spores disseminate during rain or in times of high humidity. Rarely opportunistic pathogens, Basidiospores may produce toxins, including amanitins, monomethyl-hydrazine, muscarine, ibotenic acid, and psilocybin. Basidiospores are an agent of dry wood rot, which may destroy the structure wood of buildings.
12. **Basidiospore** - type I & III allergen, saprobe and plant pathogen, mainly found in gardens, forests, and woodlands. Spores disseminate during rain or in times of high humidity. Rarely opportunistic pathogens, Basidiospores may produce toxins, including amanitins, monomethyl-hydrazine, muscarine, ibotenic acid, and psilocybin (antidotes for these are included in the vial). Basidiospores are an agent of dry wood rot, which may destroy the structure wood of buildings.
13. **Beauveria** - a type I allergen and saprobe reported as mainly an aggressive parasite of insects, and was first recognized as the agent of muscardine disease of the silkworm. B. bassiana is the best known member of this genus and is under research for biocontrol of insects. It is also a rare human pathogen, associated with keratitis and pneumonia in the immunocompromised. B. alba commonly occurs in indoor environments and appears to be less strongly associated with insects. Beauveria is commonly found in plant debris, soils, dung, and foods.
14. **Bipolaris** - Some species are pathogenic to grasses and animals such as the dog, and may cause nasal mycotic granuloma in cattle. It has been reported to produce the mycotoxin, sterigmatocystin that has been shown to cause liver and kidney damage

when ingested by laboratory animals. This fungus is associated with phaeohyphomycosis, a disease consisting of a group of mycotic infections characterized by the presence of demataceous septate hyphae. Infections of the eyes and skin by black fungi could also be classified as phaeohyphomycosis. This fungus causes allergic fungal sinusitis, characterized by the presence of Bipolaris in the sinuses. In certain people with severe allergies, the large spores of this fungus can travel to the sinuses or upper respiratory tract, where they attach to the mucus and grow; producing an unrelenting allergic reaction that progressively and permanently damages the sinuses.

15. **Blastomyces** - found in acidic, organic soil around waterways and beaver dams. Blastomycosis is generally acquired by inhalation and initially presents with a respiratory infection, which may spread and cause disease to other organs and systems such as the central nervous system (CNS), eyes, skin, sinuses, tongue, reproductive tract, gastrointestinal tract, liver, spleen, and bones. This is a very serious disease that can be fatal, and a compromised immune system is the primary risk factor. This disease is most prevalent in males' ages 40-60 years and in children. Blastomycosis can also infect dogs, which are infected by inhaling the infectious particles.
16. **Blastoschizomyces** - yeast commonly found in soils, beach sand, poultry feces, and wood pulp. As well as being a saprobe to the environment, it is found in the normal microbial flora of human skin, and digestive and respiratory tracts. An opportunistic fungi that is potentially pathogenic in cases of human immuno-supression. Disseminated infections of the lungs, kidneys, liver, spleen, and brain may occur and are likely in neutropenic patients with leukemia or those undergoing bone marrow transplantation. Development of endocarditis, osteomyelitis, meningitis, encephalitis, urinary tract infection, mycetoma, and pneumothorax may result.
17. **Botrytis** - a Type I & III allergen, not a known toxin producer or opportunistic pathogen. Mostly reported to be found in tropical and temperate areas. This fungus is a parasite of plants, soft fruits and vegetables. The cause of leaf/root rot on fruits and vegetables such as, strawberries and onions. It is also known as "gray mold" or "noble rot" on wine grapes. Botrytis is known to cause allergies and induce asthma attacks, and is also a rare agent of keratomycosis. In some types of agricultural settings, such as greenhouses, the concentration of aerosolized spores may be greatly enhanced. Botrytis is also used in some types of wine production.
18. **Byssochlamys** - commonly found in soil, dust, canned or bottled fruit, barley grain, silage, and wood in temperate areas; may cause spoilage in acidic foods, such as fruits. Byssochlamys may also produce the mycotoxins, patulin and mannitol.
19. **Candida** - the most significant member of the genus is Candida albicans, which can cause infections (called candidiasis or thrush) in humans and other animals, especially in immunocompromised patients.[1] Many Candida species are members of gut flora in animals, including C. albicans in mammalian hosts, whereas others live as endosymbionts in insect hosts. The rise of yeast infections also parallels the rise in the use of antibiotics. Antibiotics are known to promote GI candida overgrowth, and even penetration of the GI mucosa. Candida are almost universal on normal adult skin[9] and albicans is part of the normal flora of the mucous membranes of the respiratory, gastrointestinal, and female genital tracts which cause no disease. But overgrowth of several species including albicans can cause superficial infections such as oropharyngeal candidiasis (thrush) and vulvovaginal candidiasis (vaginal Candidiasis). Oral candidiasis is common in elderly denture wearers. In debilitated or immunocompromised patients, or if introduced intravenously, candidiasis may become a systemic disease producing abscess, thrombophlebitis, endocarditis, or infections of the eyes or other organs.
20. **Chaetomium** - found on a variety of substrates containing cellulose including paper and plant compost. Several species have been reported to play a major role in decomposition of cellulose-made materials. These fungi are able to dissolve the cellulose fibers in cotton and paper and thus cause the materials to disintegrate. The process is especially rapid under moist conditions. During the Second World War countries lost a great deal of equipment to these species. It is reported to be allergenic, although recent research has indicted that it may be more toxic then Stachybotrus.
21. **Chrysosporium** - commonly isolated from soil, plant material, dung, and birds. It lives on remains of hairs and feathers in soil. It may cause skin infections and onychomycosis in humans. In addition to these superficial infections, Chrysosporium spp. have occasionally been isolated from systemic infections in bone marrow transplant recipients and in patients with chronic granulomatous disease.
22. **Cladophialophora** – little known, other than it can cause some pretty serious infections.
23. **Cladosporium** - often encountered in dirty refrigerators, especially in reservoirs where condensation is collected. On moist window frames, it can easily be seen covering the whole painted area with a velvety olive-green layer. Cladosporium often discolors interior paint, paper, or textiles stored under humid conditions. Houses with poor ventilation, houses with thatched straw roofs and houses situated in low damp environments may have heavy concentrations of Cladosporium, which will be easily expressed when domestic mold is analyzed. It is commonly found on the surface of fiberglass duct liner in the interior of supply ducts. It is also found on dead plants, woody plants, food, straw, soil, paint, and textiles. few species of this genus cause disease, which range from phaeohyphomycosis, a group of mycotic infections characterized by the presence of demataceous septate hyphae. Infections of the eyes and skin by black fungi (also classified as phaeohyphomycosis), and chromoblastomycosis, chronic localized infection of the skin and subcutaneous tissue that follows the traumatic implantation of the etiologic agent are also caused by this fungus. Chromoblastomycosis lesions are verrucoid, ulcerated, and crusted. Skin abscesses, mycotic keratitis and pulmonary fungus ball have been recorded in immuno- compromised patients. It may also cause corneal infections and mycetoma, characterized by localized infections that involve cutaneous and subcutaneous tissue, fascia, and bone consisting of abscesses, granulomata, and draining sinuses, usually in immuno-compromised hosts.
24. **Claviceps** - Ergotism (caused by clavicep species)is the name for sometimes severe pathological syndromes affecting humans or animals that have ingested plant material containing ergot alkaloid, such as ergot-contaminated grains. Severe burning sensations in the limbs are caused by effects of ergot alkaloids on the vascular system due to vasoconstriction of

blood vessels, sometimes leading to gangrene and loss of limbs due to severely restricted blood circulation. The neurotropic activities of the ergot alkaloids may also cause hallucinations and attendant irrational behaviour, convulsions, and even death. Other symptoms include strong uterine contractions, nausea, seizures, and unconsciousness.

25. **Coccidioide** - cause of Coccidioidomycosis, also known as San Joaquin Valley Fever, an infectious fungal disease endemic in American deserts. The host acquires the disease via respiratory inhalation of spores disseminated in their natural habitat. The primary disease is auto-limited, although fewer than 1% of the cases develop complications, which result in high morbidity. The causative agents of coccidioidomycosis are Coccidioides immitis and Coccidioides posadasii. The most important endemic areas in the U. S. are found in Southern California and Southern Arizona, and in Mexico, in the states of Sonora, Nuevo Leon, Coahuila and Baja California.
26. **Conidiobolus** - Conidiobolus species is a causative agent of subcutaneous infection in humans which involves the nasal mucosa and maxillofacial tissues. It is an inflammatory infection that involves facial subcutaneous tissues and paranasal sinuses and is characterized by the formation of firm, subcutaneous nodules or polyps. The infection may be acquired through breathing in of airborne mold spores or through a minor trauma such as an insect bite. The infected host is commonly a healthy individual working outdoors in tropical areas. However, the infection may also develop in patients with underlying pathologies such as neutropenia or Burkitt's lymphoma. Thus, the species is considered as an opportunistic pathogen as well. Fatal, deeply invasive infections are encountered very seldom. Health cases involving pulmonary and pericardial have also been reported. Conidiobolus species are the causative agents of infections in humans, sheep, dogs, deer, and horses.
27. **Cryptococcus** - The majority of species live in the soil and are not harmful to humans. Of all species, Cryptococcus neoformans is the major human and animal pathogen, causing a severe form of meningitis and meningo-encephalitis in people with HIV/AIDS.
28. **Cunninghamella** - Commonly found as saprophyte in soil. Can cause disseminated and pulmonary infections in immune compromised hosts.
29. **Curvularia** - Reported to be allergenic. It may cause corneal infections, mycetoma and infections in immune compromised hosts.
30. **Emmonsia** - isolated from soil and some mammalian species, such as small rodents. Emmonsia is the causative agent of adiaspiromycosis particularly in rodents, and very rarely in humans. Adiaspiromycosis is an asymptomatic pulmonary infection which may disseminate in immunocompromised hosts, such as patients with AIDS. Adiaspiromycosis develops following inhalation of conidia of Emmonsia. These conidia, known as the adiaspores, enlarge in the alveoli and hinder regular pulmonary functions. Adiaspores do not reproduce and remain localized at their primary implantation site. They eventually become calcified and lead to a minimal reaction in the host tissue.
31. **Epicoccum** - It is commonly found as a secondary invader in plants, soil, grains, textiles and paper products where Cladosporium and Aureobasidium are present. Reported to be an allergen but not in a high frequency.
32. **Epidermophyton** - causes superficial and cutaneous mycoses, including E. floccosum, a cause of tinea corporis (ringworm), tinea cruris (jock itch), tinea pedis (athlete's foot), and onychomycosis or tinea unguium, a fungal infection of the nail bed. The fungus lacks the ability to penetrate the viable tissue of the immunocompetent host thus, the infection is only restricted to the non – living cornified layers of epidermis. However, infection due to invasive Epidermophyton floccosum has been reported in an immunocompromised patient with Behcet's syndrome. Furthermore, Epidermophyton floccosum infections are communicable and can be transmitted by contact, particularly in common showers and gym facilities.
33. **Exophiala** - Exophiala species are common environmental fungi often associated with decaying wood and soil enriched with organic wastes. However, several species notably E. jeanselmei, E. moniliae and E. spinifera, are well documented human pathogens. Clinical manifestations include mycetoma (especially for E. jeanselmei), localized cutaneous infections, subcutaneous cysts, endocarditis and cerebral and disseminated infections. Subcutaneous cyst formation caused by Exophiala species has been reported in both normal and immunosuppressed patients.
34. **Exserohilum** - common environmental molds found in soil and on plants, especially grasses. Several species have been reported as agents of phaeohyphomycosis (subcutaneous cyst formation). Clinical manifestations include mycotic keratitis, subcutaneous phaeohyphomycosis, endocarditis, osteomyelitis and sinusitis in both normal and immunosuppressed patients.
35. **Fonsecaea** - The genus contains two species, Fonsecaea pedrosoi and Fonsecaea monophora which are recognized etiologic agents of chromoblastomycosis (a long-term fungal infection of the skin and subcutaneous tissue. The infection occurs most commonly in tropical or subtropical climates, often in rural areas. It can be caused by many different type of fungi which become implanted under the skin, often by thorns or splinters. It spreads very slowly; it is rarely fatal and usually has a good prognosis, but it can be very difficult to cure). Considered a soil fungi and also associated with forest litter decomposition.
36. **Fusarium** - Commonly found in soil, plants, grains, and often times it is found in humidifiers. This fungus is the most common cause of mycotic keratitis. This mold has been isolated from skin lesions on burn patients, nail infections, ear infections, varicose ulcer, mycetoma , osteomyelitis following trauma, and disseminated infection. This fungus produces very harmful toxins, especially in storage of infected crops. These toxins, known as trichothecene (scierpene) toxins target the circulatory, alimentary, skin, and nervous systems. Fusarium can produce 1). Vomotoxin on grains which has been associated with outbreaks of acute gastrointestinal illness in humans. 2). T-2 Toxin and related trichothecenes are some of the deadliest known toxins. If ingested in sufficient quantity, T-2 toxin can severally damage the entire digestive tract and cause rapid death due to internal hemorrhage. 3). Fumosin, commonly found in corn and corn based products, with recently outbreaks of veterinary mycotoxicosis causing "crazy horse disease". 4). Zearalenone toxin which is similar in chemical structure to the female sex hormone estrogen and targets the reproductive organs.

37. **Geotrichum** - found worldwide in soil, water, air, and sewage, as well as in plants, cereals, and dairy products; it is also commonly found in normal human flora and is isolated from sputum and feces. Generally acquired via ingestion or inhalation, it can cause bronchial and pulmonary issues. Geotrichum fici has an intense smell resembling that of pineapple.
38. **Graphium** - grows on wood, dung, seeds, and plant debris. It is the asexual state of Ceratocystis, Ophiostoma, and other ascomycetes. Can cause disease but not much known about it.
39. **Helminthosporium** - most frequently associated with grasses, plant material, decaying food, and soil. It is commonly found on celery and rooted vegetables. This has been known to cause asthma and other respiratory problems. It is an allergen and a toxin. Various species of this fungus can produce the mycotoxin - sterigmatocystin which has been shown to produce liver and kidney damage when ingested by laboratory animals. This can also alter human DNA.
40. **Histoplasma** - found in bird and bat fecal material. Histoplasma contains a few species, including—H. capsulatum—the causative agent of histoplasmosis; and Histoplasma capsulatum var. farciminosum, causing epizootic lymphangitis in horses. Histoplasma capsulatum is most prevalent in the Ohio and Mississippi river valleys.
41. **Hortaea** –a mold that lives in certain murky waters, but may be used in industrial imported yeasts and crops.
42. **Lacazia** –known to infect bottle nosed dolphins and cause lobo's disease in humans, infection most commonly develops after minor scratches or insect bites, but many patients cannot recall any skin trauma, the disease is only acquired from the environment. The appearances are of a chronic keloidal nodular lesions occur on the face, ears, or extremities.
43. **Leptosphaeria** - a plant pathogen, particularly of canola. Leptosphaeria are agents of human mycetoma (a serious foot disease when fungus infected grain comes in contact with lesion on skin) in Africa. No information is available regarding other inhalation health effects or toxicity. Allergenicity has not been studied.
44. **Madurella** - among the fungi responsible for mycetoma infection in humans (primarily in Africa). The fungus spores enter the body via trauma and the development of the mycetoma infection is very slow which may take several years. The infection involves the cutaneous and subcutaneous tissues, the fascia, and the bones and the infection remains localized only. Other effects include tumefaction and draining sinuses.
45. **Malassezia** – naturally found on the skin surfaces of many animals and humans, it is known to cause most skin diseases in humans, including the most common cause of dandruff and seborrhoeic dermatitis. The skin rash of tinea versicolor (pityriasis versicolor) is also due to infection by this fungus. As the fungus requires fat to grow, it is most common in areas with many sebaceous glands: on the scalp, face, and upper part of the body. When the fungus grows too rapidly, the natural renewal of cells is disturbed and dandruff appears with itching (a similar process may also occur with other fungi or bacteria). The number of specimens on a human head can be up to ten million.
46. **Malbranchea** – little known other than it is found in some sinus infections.
47. **Memmoniella** - commonly found in soil. Known to produce phenylspirodrimanes and griseofulvins as well as simple trichothecenes (mycotoxins).
48. **Microascus** - inhabits soil, plant material, feathers, animal dung, and insects. It is distributed worldwide. reported as the etiologic agent of a human nail infection, an agent of maxillary sinusitis coesixting with Aspergillus repens, suppurative cutaneous granulomata in a patient with chronic granulomatous disease, endocarditis of a prosthetic valve, and a brain abscess in a bone marrow transplant recipient. Microascus cirrosus has been reported as an agent of onychomycosis and of a disseminated infection in a pediatric bone marrow transplant recipient.
49. **Microsporum** - one of the three genera that cause dermatophytosis which is the general term referring to the infection that occurs in hair, skin or nails caused by any dermatophyte species. Microsporum species has the ability to degrade keratin and thus, can dwell on skin and its appendages and still remains non – invasive. The fungus is bestowed with virulence factors such as its keratinase enzyme, proteinases, and elastases. Microsporum species particularly infect the hair and skin, except for Microsporum persicolor which does not infect the hair. The pathogenesis of the infection depends on the natural reservoir of the species in such a way that the geophilic species are acquired through contact with soil, zoophilic species are transmitted from the infected animal, and direct or indirect human – to – human transmission is of concern for anthropophilic species. Infections involving the nails are rare. Immunocompromised patients are infected as well as the otherwise healthy hosts. Causes tinea capitis, tinea corpus, ringworm, and other dermatophytoses, often found in the domestic cat.
50. **Monascus** - a widespread saprobe found on substrates with high water tension, such as dried foods. Monascus is a yeast known as the "red yeast rice". It contains Mavinolins, which includes Monacolin-K.
51. **Mucor** - a genus of about 3000 species of molds commonly found in soils, dead plant material (hay), horse dung, fruits and fruit juice. It is also found in leather, meat, dairy products, animal hair, and jute. It is almost always in house dust, frequently in air samples and old dirty carpets. Wood chips and sawdust are often attacked by M. plimbeus causing "wood chips disease" and "furrier's lung". Accumulated dust in ventilation ducts may contain high concentrations of viable Mucor spores. Asthmatic reactions to Mucor have been described. It is a Zygomecete fungus that may be allergenic (skin and bronchial tests). It is an opportunistic pathogenic organism and it may cause mucorosis in immune compromised individuals. The sites of infections are the lung, nasal sinus, brain, eye, and skin. Infection may have multiple sites.
52. **Nigrospora** – found growing outside in soil and decaying plant material. Seldom found growing indoors. Can create hay fever and asthma symptoms.
53. **Nigrospora** – lives in soil and decaying matter, it can produce symptoms similar to hay fever.
54. **Paecilomyces** – common in soil and dust, can cause various infections in humans which are referred to as paecilomycosis. The infection ranges from corneal ulcer to keratitis, and to endophthalmitis which is due to the growth of Paecilomyces following an extended contact lens use or ocular surgery. Linked to wood-trimmers disease and humidifier associated illnesses. Some members of this genus are reported to cause pneumonia. It has also been reported as causative agent of

allergic alveolitis. It may produce arsine gas if growing on arsenic substrate, this can occur on wallpapers covered with Paris green. Additionally, Paecilomyces is among the emerging causative agents of opportunistic mycoses in immunocompromised hosts wherein direct cutaneous inoculation may lead to these infections and may involve almost any organ or system of human body. Other infections which have been reported due to Paecilomyces include soft tissue, pulmonary, and cutaneous infections, cellulitis, onychomycosis, sinusitis, otitis media, endocarditis, osteomyelitis, peritonitis, and catheter - related fungemia. Paecilomyces species can also cause allergic alveolitis which is an allergic disorder.

55. **Paracoccidioides** - Paracoccidioides brasiliensis is the etiologic agent of a true systemic mycosis called paracoccidioidomycosis. The range of infection of this chronic illness is wide, varying from an asymptomatic infection or progression in the form of a pulmonary or disseminated infection which is characterized by formation of secondary lesions of the buccal, nasal or gastrointestinal mucosa and may also be infected are the lymph nodes and aortitis may develop.
56. **Penicillium** –used to make the antibiotic penicillin, used as an agriculture inoculants, used in certain cheeses like Brie and Gorgonzola and it is a plant pathogen. Often found in aerosol samples. Commonly found in soil, food, cellulose, paint, grains, and compost piles. It is commonly found in carpet, wallpaper, and in interior fiberglass duct insulation. Although this fungus is less allergy-provoking than the other molds, Penicillium is reported to be allergenic (skin) and it may cause hypersensitivity pneumonitis and allergic alveolitis in susceptible individuals. It can cause other infections such as keratitis, penicilliosis, and otomycosis. Some species can produce mycotoxins including 1). Ochratoxin which is damaging to the kidneys and liver and is also a suspected carcinogen; there is also evidence that impairs the immune system. 2). Citrinin that can cause renal damage, vasodilatation, and bronchial constriction. 3). Gliotoxin which is an immunosuppressive toxin, and 4). Patulin that is believed to cause hemorrhaging in the brain and lungs and is usually associated with apple and grape spoilage. It can also cause extrinsic asthma. P. camemberti has been responsible for inducing occupational allergies among those who work with soft white cheeses on which the fungus grows. P. chrysogenum has been found on building materials, including paints, chip boards, and wallpaper.
57. **Phialophora** - causes an important disease on soybeans, brown stem rot, a vascular wilt disease. Can cause chromoblastomycosis, a long-term fungal infection of the skin and subcutaneous tissue. The infection occurs most commonly in tropical or subtropical climates, often in rural areas. It can be caused by many different type of fungi which become implanted under the skin, often by thorns or splinters.
58. **Phoma** – a common indoor air allergen and it is also commonly found on various plant parts and soil. Phoma species are reported to grow extensively on painted walls, particularly in humid places such as showers. Some species can be pathogenic to humans, causing either systematic or subcutaneous diseases (phaeohyphomycosis).
59. **Pichia** - more than 100 species of this genus are known. Some of them interfere with the fermentation process for alcohol production. Most are found in decaying plants, some live in close symbiosis with insects, which live on decaying plants. Known to be pathogenic when immune compromised, but little else is known.
60. **Piedraia** - found in soil particularly at tropical areas. It is one of the keratinolytic fungi and is the causative agent of black piedra in man, the disease is characterized by formation of brown to black nodules that are very firmly attached to the hair shaft. The nodules are composed of ascostromata which are the fruiting body of the fungus containing asci and ascospores. Scalp hair is the most frequently infected area. Most of the cases are asymptomatic and may remain so for years. However, breaks due to weakness of the hair shaft may occur eventually in severe cases. The infection mostly involves individuals who live in tropical areas (particularly in South America) and use oily substances for hair care.
61. **Pithomyces** - found mainly growing on decaying plants, especially grasses. It produces a mycotoxin called sporidesmin (a piperazinedione) known to be pathogenic in animals causing facial eczema and liver damage.
62. **Pneumocystis** - commonly found in the lungs of healthy people, but being a source of opportunistic infection it can cause a lung infection in people with a weak immune system. Pneumocystis pneumonia is especially seen in people with cancer, HIV/AIDS and the use of medications that affect the immune system.
63. **Pseudallescheria** – one of the fungi responsible for Madura foot (mainly an African disease), it is the species responsible for human scedosporiosis (an opportunistic fungus in humans that rarely affects the lung. It may give clinical presentations that are similar to aspergillosis), a fungal infection with a high mortality rate and which is difficult to treat.
64. **Pyrenochaeta** – has been found under some finger and toe nail infections but little else known about it and human disease.
65. **Rhinocladiella** - found in soil and woody plant materials as a saprophyte. Reported among the principal fungi causing chromoblastomycosis, a disease characterized by a chronic localized infection of the skin and subcutaneous tissue that follows the traumatic implantation of the causal agent. The lesions are verrucoid, ulcerated, and crusted, and may be flat or raised 1-3 cm. The mycosis usually remains localized with extensive keloid formation. Forms of the disease include Verrucous dermatitis, Brain abscess syndrome, Single or multiple cysts, Local or systemic lesions.
66. **Rhizomucor** - is reported to be allergenic and often linked to occupational allergy. It may cause mucorosis in immune compromised individuals. It occupies a similar biological niche to Mucor sp.. The sites of infection are the lung, nasal sinus, brain, eye, and skin. Infection may be multiple sites. It may also cause zygomycosis (rhino-facial-cranial area, lungs, gastrointestinal tract, and skin). This disease is associated with the acidotic diabetes, malnourished children, severely burned patients, and other diseases such as leukemia and lymphoma, immunosuppressive therapy, or use of cytotoxins and corticosteroids. The fungi show a proclivity for vessel invasion resulting in embolization and necrosis of surrounding tissue.
67. **Rhizopus** - found throughout the environment. It has been reported to be allergenic and it is often linked to occupational allergy. It may cause mucorosis in immune compromised individuals. It may also cause zygomycosis (rhino-facial-cranial area, lungs, gastrointestinal tract, and skin). This disease is associated with the acidotic diabetes, malnourished children, severely burned patients, and other diseases such as leukemia and lymphoma, immunosuppressive therapy, or use of

cytotoxins and corticosteroids. The fungi show a propensity for vessel invasion resulting in embolization and necrosis of surrounding tissue.

68. **Rhodotorula** -human disease is extremely rare with Rhodotorula spp but opportunistic cases of endocarditis, septicaemia, meningitis, ventriculitis, and peritonitis are reported in the literature. Ocular infections include chronic dacryocystitis, keratitis, chronic postoperative endophthalmitis, and corneal lamellar graft infection.
69. **Saccharomyces** - considered very important in food production. One example is Saccharomyces cerevisiae, which is used in makingale, wine, bread, and beer. Other members are used in medicine. Saccharomyces cause food spoilage of sugar-rich food, such as maple sap, syrup, concentrated juices and condiments.
70. **Saksenaea** – can cause pretty serious infection in skin, subcutaneous and muscle tissues and deeper if allowed to persist.
71. **Scedosporium** - found in soils, decaying plants matter or dung. Listed among the principal fungi that cause Phaeohyphomycosis. This disease consists of a group of mycotic infections. Species of Scedosporium mostly affect people with compromised immune systems, but healthy people may also become infected.
72. **Scopulariopsis** - can be found on a wide variety of materials including old carpets and water-damaged wallpaper. Exposures from Scopulariopsis brevicaulis have been associated with cases of occupational allergy in the tobacco industry. It can decompose arsenic compounds found on building materials with an arsenic substrate, such as, some types of wallpaper and paints.
73. **Scytalidium** - an occasional agent of nail or skin infections. Some cases of subcutaneous or disseminated infection have also been noted.
74. **Sporobolomyces** - rarely causes infection, has always been found in immunocompromised like transplant or AIDS patient.
75. **Sporothrix** - present in soil, and in vital and decomposing plant material such as peat moss. Infections due to Sporothrix schenckii are more common at certain geographical areas. Peru is an area of hyperendemicity for Sporothrix schenckii infections. Sporothrix schenckii is the causative agent of sporotrichosis or rose-handler's disease. Sporotrichosis is a subcutaneous infection and it starts following entry of the infecting fungus through the skin via a minor injury and may affect an otherwise healthy individual. Following entry, the infection may spread via the lymphatic route (nodular lymphangitis may develop). Patients infected with Sporothrix schenckii may be misdiagnosed as pyoderma gangrenosum due to the large ulcerations observed during the course of sporotrichosis.
76. **Sporotrichum** – reported to be allergenic. Sporotrichum is commonly found on decaying plant matter, wet and rotting wood and in landscaping mulch. Not thought to infect humans.
77. **Stachybotrys** - thrives on water damaged cellulose rich materials such as sheet rock, paper, ceiling tiles, cellulose containing insulation backing and wallpaper. The presence of this fungus in buildings is significant because of the mold's ability to produce mycotoxins, which are extremely toxic, such as Satratoxin H. Exposure to these toxins can occur through inhalation, ingestion or dermal exposure. Symptoms include dermatitis, cough, rhinitis, nose bleeds, a burning sensation in the mouth and nasal passage, cold and flu symptoms, headache, general malaise, and fever. Inhalation of conidia may also induce pathological changes (pneumomycotoxicoses). Satratoxin H has been reported to be abortogenic in animals and in high doses or chronic low doses it can be lethal. S. chartarum produces other macrocyclic and trichoverroid trichothecenes and, like Memnoniella echinata, produces phenylspirodrimanes, which are immunosuppressive. Stachybotrys typically appears as a sooty black fungus occasionally accompanied by a thick mass of white mycelia.
78. **Stemphylium** - most species of Stemphylium are plant pathogens, and are less commonly isolated from soil and decaying plant material. Often found growingoutdoors in soil, wood, decaying vegetation. Some species found on leaves are plant pathogens. Growth indoors is rare. This mold is an allergen. Some people may experience hay fever or asthma. Produces similar allergens that are associated with Alternaria. Can cause a respiratory infection characterized by a solid intracaitary fungal ball. This mold does present human risk. Rare cases reported of phaeohyphomycotic sinusitis. It is not know if this mold produces toxins.
79. **Streptomyces** – these are generally made by soil microorganisms to help kill pathogenic bacteria but can infect immunocompromised people and cause infection.
80. **Syncephalastrum** – commonly isolated from soil and animal feces, primarily in the tropics and subtropics, it is very rarely involved with human infection but has been known to cause isolated cutaneous infections.
81. **Torula** - in its inactive form (usually labeled as torula yeast), is widely used as a flavouring in processed foods and pet foods. It is produced from wood sugars, as a byproduct of paper production. It is pasteurized and spray-dried to produce a fine, light grayish-brown powder with a slightly yeasty odor and gentle, slightly meaty taste.
82. **Tricherderma** - most commonly found in soil. Trichoderma is often found in litter materials (polluted streams, sewage plants and driftwood). It is found on paper, and in kitchens on many common tableware materials. T. viridae is often isolated from indoor air samples and house dust. Materials such as wood construction and mineral fiber panels can be very affected by this fungus.
83. **Trichophyton** - known as "Malabar itch", a skin infection consisting of an eruption of a number of concentric rings of overlapping scales forming papulosquamous patches. It also causes athlete's foot, ringworm, jock itch, and similar infections of the nail, beard, skin and scalp often referred to as Tinea. Some of them naturally live in horses, on feathers, on monkeys, fowl, cattle and hedgehogs.
84. **Trichosporon** - commonly inhabit the soil. They colonize the skin and gastrointestinal tract of humans. Long known as the cause of superficial infections such as white piedra, a distal infection of the hair shaft, the genus is now the second most commonly reported cause of disseminated yeast infections in humans. Known to cause inflammation of lung parenchyma and airways and recognized as a cause of systemic illness in immunocompromised patients. Hematologic malignancies are the

best-described risk factors for trichosporonosis, accounting for 63% of reported cases. Additional risk factors include corticosteroid use, hemochromatosis, other deficiencies of granulocyte function, and end-stage renal disease.

85. **Trichothecium** - widely distributed on decaying vegetation and in the soil. It is commonly considered as a contaminant. Trichothecium causes pink rot of apples and is a parasite of fleshy fungi. No human or animal diseases due to Trichothecium have been reported.
86. **Ulocladium** - reported to be allergenic and considered cosmopolitan. It is commonly found as a saprophyte on plant materials and soils. Some species can be also found on dead herbaceous plants, rotten woods, paper, textiles, and other organic substrates (cellulose,)such as water-damaged building materials. Ulocladium is also found in dust and air samples. Ulocladium is known to be a common airway allergen.
87. **Ustilago** –also known as 'smuts,' a yeast that inhabits the soil and plant material. It is a pathogen of seeds and flowers of cereals, wheat, corn, and grasses. Its association with human disease is unclear and it has been isolated as the causative agent in only a very few reports.
88. **Verticillium** - inhabits decaying vegetation and soil. Some Verticillium species may be pathogenic to arthropods, plants, and other fungi. It is commonly considered as a contaminant. Verticillium may very rarely cause human disease.
89. **Wangiella** - an occasional agent of subcutaneous phaeohyphomycosis and of disseminated infection in the immunocompromised patient at times. The infection is usually subsequent to the traumatic implantation of the fungus into the dermis, and the fungus normally remains localized. Wangiella dermatitidis is a neurotropic fungus. Infections in the central nervous system and as well as cases of keratitis, otitis, pneumonia, and endocarditis have been reported. In animals, Wangiella dermatitidis may cause bovine abortion and still birth.

MYCOTOXINS

90. **Aflatoxicol** - a carcinogenic metabolite of the foodborne carcinogen aflatoxin B1.
91. **Aflatoxin 1** - Recognized as the most important mycotoxin, Aflatoxin B1 - produced by Aspergillus. The other Aflatoxins include Aflatoxin B2 - produced by Aspergillus flavus and A. parasiticus, Aflatoxin G1 - produced by Aspergillus parasiticus, Aflatoxin G2 - produced by Aspergillus parasiticus, Aflatoxin M1 –metabolite of Aflatoxin B1 in humanc and animals, can come from mother's milk, Aflatoxin M2 –metabolite of Aflatoxin B2 in milk of cattle fed on contaminated foods.
92. **Alternariol** -a toxic metabolite of Alternaria fungi. It is an important contaminant in cereals and fruits.
93. **Brevianamide A/B** - produced as secondary metabolites in the fungal Penicillum and Aspergillus, they are responsible for inflammatory response in lung cells.
94. **Citreoviridin** - the metabolite of Penicillium citreoviride thought to be the cause of yellow rice poisoning, manifested in humans and experimental animals by respiratory and circulatory failure, paralysis, convulsions and death. Identical to beriberi, originally considered to be a thiamin nutritional deficiency.
95. **Citrinin** - found to be produced by a variety of other fungi which are used in the production of human foods such as grain, cheese, sake and red pigments. Citrinin acts as a nephrotoxin in all species in which it has been tested, but its acute toxicity varies. It causes mycotoxic nephropathy in livestock and has been implicated as a cause of Balkan nephropathy and yellow rice fever in humans. Citrinin is used as a reagent in biological research. It induces mitochondrial permeability pore opening and inhibits respiration by interfering with complex I of the respiratory chain. Currently found produced by Aspergillus, Monascus and Penicillium.
96. **Cyclopiazonic Acid** –produced by Penicillium and Aspergillus it interferes with metabolic muscle relaxation by blocking the calcium-ion/ATP process.
97. **Cyclosporin** - is used as an immunosuppressant drug widely used in post-allogeneic organ transplant to reduce the activity of the patient's immune system, and therefore the risk of organ rejection. Ciclosporin is also used in psoriasis, severe atopic dermatitis, pyoderma gangrenosum, chronic autoimmune urticaria, and, infrequently, in rheumatoid arthritis and related diseases, although it is only used in severe cases. It is commonly prescribed in the US as an ophthalmic eyedrop for the treatment of dry eyes.
98. **Cytochalasins A-F**–have some very positive attributes. They have the ability to bind to actin filaments and block polymerization and the elongation of actin (actin involves muscle contraction, cell motility, cell division and cytokinesis, vesicle and organelle movement, cell signaling, and the establishment and maintenance of cell junctions and cell shape). As a result of the inhibition of actin polymerization, cytochalasins can change cellular morphology, inhibit cellular processes such as cell division, and even cause cells to undergo apoptosis. Cytochalasins have the ability to permeate cell membranes, prevent cellular translocation and cause cells to enucleate. Cytochalasins can also have an effect on other aspects of biological processes unrelated to actin polymerization. For example, cytochalasin A and cytochalasin B can also inhibit the transport of monosaccharides across the cell membrane, cytochalasin H has been found to regulate plant growth, cytochalasin D inhibits protein synthesis and cytochalasin E prevents angiogenesis.
99. **Deoxynivalenol** –also known as Vomitoxin or nivalenol. Reduced feed intake, and the accompanying decrease in performance, are the only symptoms of vomitoxin toxicity livestock producers will likely encounter. This response to vomitoxin appears to occur through the central nervous system. Vomitoxin belongs to a class of mycotoxins (tricothecenes) which are strong protein inhibitors. Inhibition of protein synthesis following exposure to vomitoxin causes the brain to increase its uptake of the amino acid tryptophan and, in turn, its synthesis of serotonin. Increased levels of serotonin are believed to be responsible for the anorexic effects of DON and other tricothecenes. Irritation of the gastrointestinal tract may

also play a role in reducing feed intake... This fact may also partially explain the high incidence of paraesophageal stomach ulcers observed in sows off feed during feed refusal.

100. **Diacetoxyscirpenol** – a trichothecene mycotoxin produced by species of Fusarium that contaminate grain and other foodstuffs, causing fusariotoxicosis and hemorrhaging in livestock.
101. **Ergolines** (Ergine, Methergine, Methysergide, LSD, LSA, ergometrine, ergotamine) – ergot alkaloids produced by the Clavicep fungus have a wide range of biological activities including effects on circulation and neurotransmission. Since the Middle Ages, controlled doses of ergot were used to induce abortions and to stop maternal bleeding after childbirth. It is used medicinally for treatment of acute migraine attacks. It has been used to prevent post-partum haemorrhage (bleeding after childbirth). Ergotamine produces vasoconstriction peripherally as well as damages the peripheral epithelium. Ergotamine continues to be prescribed for migraines. In high doses ergotamine is conducive to vascular stasis, thrombosis and gangrene. Contraindications include: atherosclerosis, Buerger's syndrome, coronary artery disease, hepatic disease, pregnancy, pruritus, Raynaud's syndrome, and renal disease. Ergotamine is also a precursor of LSD. Ergot extract has been used in pharmaceutical preparations, including Ergot alkaloids in products such as Cafergot (containing caffeine and ergotamine or ergoline) to treat migraine headaches, and ergometrine. They have a medical use in obstetrics to facilitate delivery of the placenta and to prevent bleeding after childbirth by causing smooth muscle tissue in the blood vessel walls to narrow, thereby reducing blood flow. It is usually combined with oxytocin as syntometrine. It can induce spasm of the coronary arteries. It is used to diagnose Variant (Prinzmetal's) angina. Ergolines can pass into breast milk and should not be used during breastfeeding. They are uterine contractors that can increase the risk of miscarriage during pregnancy. Perhaps the most famous ergoline derivative is the psychedelic drug LSD. Some ergoline alkaloids found in ergot fungi are implicated in the condition ergotism, which causes convulsive and gangrenous symptoms.
102. **Fumitoxin** - also known as Aluminium (III) phosphide, Aluminium monophosphide and Phostoxin. AlP is used as a rodenticide, insecticide, and fumigant for stored cereal grains. It is used to kill small verminous mammals such as moles, and rodents. Evidently poisonous, aluminium phosphide has been used for suicide. Fumigation has also caused unintentional deaths, such as examples in Saudi Arabia and the United States. Known as "rice tablet" in Iran, for its use to preserve rice, there have been frequent incidents of accidental or intentional death. There is a campaign by Iranian Forensic Medicine Organization to stop its use as a pesticide.
103. **Fumitremorgen** -toxic substance isolated from Aspergillus fumigatus. Causes ataxia, lethargy, hypersensitivity and frenzy in horses. It is used as a neurotoxic medication to help the body when cells are drug resistant.
104. **Fumonisin B1** – fumosin B1 and B2, B1 is the most prevalent member of a family of toxins, known as fumonisins, produced by several species of Fusarium molds, such as Fusarium verticillioides, which occur mainly in maize (corn), wheat and other cereals. Fumonisin B1 contamination of maize has been reported worldwide at mg/kg levels. Human exposure occurs at levels of micrograms to milligrams per day and is greatest in regions where maize products are the dietary staple. Fumonisin B1 is an inhibitor of ceramide synthase. Fumonisin B1 is hepatotoxic and nephrotoxic in all animal species tested. The earliest histological change to appear in either the liver or kidney of fumonisin-treated animals is increased apoptosis followed by regenerative cell proliferation. While the acute toxicity of fumonisin is low, it is the known cause of two diseases which occur in domestic animals with rapid onset: equine leukoencephalomalacia and porcine pulmonary oedema syndrome. Both of these diseases involve disturbed sphingolipid metabolism and cardiovascular dysfunction. Fumonisin B2 is a mycotoxin produced by the fungi Fusarium verticillioides and Fusarium moniliforme. Fumonisin B2 is more cytotoxic than fumonisin B1. Fumonisin B2 inhibits sphingosine acyltransferase.
105. **Fusarenon X** –also known as nivalinol, a trichothecene mycotoxin from various Fusarium strains is a known carcinogen found in contaminated grains and cereals.
106. **Fusaric Acid** - typically isolated from various Fusarium species, and has been proposed for a various therapeutic applications. However, it is primarily used as a research tool. Its mechanism of action is not well understood. It likely inhibits Dopamine beta-hydroxylase (the enzyme that converts dopamine to norepinephrine).
107. **Fusarochromanone** -a lethal mycotoxin found in Fusarium roseum; causes dyschondroplasia (a congenital but nonfamilial disorder involving tubular bones, especially of the hands and feet, and characterized by a neoplasmlike proliferation of cartilage in the metaphyses that cause distorted growth in length or pathological fractures) in broiler chickens.
108. **Gliotoxin** - Gliotoxin possesses immunosuppressive properties as it may suppress and cause apoptosis in certain types of cells of the immune system, including neutrophils, eosinophils, granulocytes, macrophages, and thymocytes. It also acts as an inhibitor of farnesyl transferase.
109. **Griseofulvin** - an antifungal drug that is administered orally. It is used both in animals and in humans, to treat fungal infections of the skin (commonly known as ringworm) and nails. It is derived from the mold Penicillium griseofulvum. Many side effects come with use of this substance.
110. **HT-2 toxin** – a trichothecene mycotoxin occurring naturally in various agricultural products. Many in vitro studies have shown that HT-2 toxin is a major metabolite of the parent compound T-2 toxin. In man as well as in animals both toxins have been shown to cause alimentary intoxications and haematological disorders. Considered highly irritating to skin and mucous membranes. Direct contact may cause extensive inflammation and tissue necrosis. May be lethal.
111. **Kojic acid** -a chelation agent produced by several species of fungi, especially Aspergillus oryzae, which has the Japanese common name koji. Kojic acid is a by-product in the fermentation process of malting rice, for use in the manufacturing of sake, the Japanese rice wine. It is a mild inhibitor of the formation of pigment in plant and animal tissues, and is used in food and cosmetics to preserve or change colors of substances. It is used on cut fruits to prevent oxidative browning, in seafood to

preserve pink and red colors, and in cosmetics to lighten skin. Kojic acid also has antibacterial and antifungal properties. It is also used in skin diseases like melasma (dark discoloration of skin often associated with pregnancy).

112. **Lolitrems** -neurotoxins found in endophyte-infected perennial ryegrass. Lolitrems, primarily lolitrem B, are the causative agents of ryegrass staggers in livestock.
113. **Lysergic Acid** - are widely used as pharmaceuticals and as psychedelic drugs (LSD).
114. **Moniliformin** - a quite unusual mycotoxin, a feed contaminant that is quite lethal to fowl.
115. **Ochratoxins A,B,C** - mycotoxins produced by some Aspergillus species and Penicillium species. Toxin A is one of the most abundant food-contaminating mycotoxins in the world. Human exposure occurs mainly through consumption of improperly stored food products, particularly contaminated grain and pork products, as well as coffee, wine grapes and dried grapes. The toxin has been found in the tissues and organs of animals, including human blood and breast milk.
116. **Oosporeine** -a toxin known to cause kidney problems.
117. **Oxalic Acid** –made by a variety of fungi, it is widely used in bleaching agents. Its ability to create calcium oxalate has proven its connection and contribution to breast cancer.
118. **Patulin** - produced by a variety of molds, in particular, Aspergillus and Penicillium. It is commonly found in rotting apples. It is not a particularly potent toxin, but a number of studies have shown that it is genotoxic, which has led to some theories that claim that it may be a carcinogen. Patulin is also an antibiotic.
119. **Paxilline** -interferres with smooth muscle of skeletal and gastrointestinal functions primarily thought to be by interfering with calcium in some way.
120. **Penicillic Acid** - mycotoxin with antibiotic and carcinogenic activity produced by various strains of Penicillium, Aspergillus and Aspergillus melleus. Has been found in tobacco, sausages, and corn.
121. **Penitrem A** -also known as tremortin, a fungal neurotoxin found on ryegrass. It is produced by certain species of Aspergillus, Claviceps, and Penicillium. It inhibits potassium channels in smooth muscles. The maxi-channels targeted have their highest density in the cerebellar Purkinje cells (the largest cells in the human brain, particularly the cerebellar cortex). It causes a stagger in horses and cattle.
122. **Phomopsins** -hepatoxic mycotoxins in the fungus phomopsis leptostromiformis.
123. **Roquefortine C** – a neuro and hepatic toxin, it causes serious toxic effects in cell lines.
124. **Satratoxin** - a trichothecene mycotoxin, is a naturally occurring mold byproduct of Stachybotrys chartarum which is toxic to humans and animals. The clinical condition it causes is known as Stachybotrotoxicosis. It is related to the mycotoxin T-2, but unlike T-2 has not been reported to have been used as a biological weapon.
125. **Sporidesmin** - the toxin in the fungus Pithomyces chartarum; the cause of facial eczema.
126. **Sterigmatocystin** - a carcinogenic mycotoxin produced in high yields by strains of the common molds, Aspergillus versicolor, A. nidulans, and an unidentified species of Bipolaris. It causes necrosis of the liver and kidney and has an inhibitory effect on orotic acid incorporation into nuclear RNA.
127. **T-2 toxin** - a trichothecene mycotoxin, it is a naturally-occurring mold byproduct of Fusarium spp fungus which is toxic to humans and animals. The clinical condition it causes is alimentary toxic aleukia and a host of symptoms related to organs as diverse as the skin, airway, and stomach ingestion may come from consumption of moldy whole grains.
128. **Tenuazonic Acid** –produced by Alternaria and Phoma fungus, it inhibits the protein synthesis machinery of the body and has been found to inhibit skin tumor promotion in mice.
129. **Trichodermin** - a fungal metabolite from Trichoderma viride, is a potent inhibitor of plant growth and produces other phytotoxic effects. It inhibits wheat coleoptile growth, is phytotoxic to tobacco at high concentrations and inhibits growth at lower concentrations. Bean and corn plants are also affected by the metabolite.
130. **Verrucosidin** -little documented but a powerful paralytic neurotoxin often found on moldy meats.
131. **Verruculogen** - a neurotoxin and potent inhibitor of Calcium, formerly used as a cytostatic drug.
132. **Viomellein** - a nephro (kidney) and heatotoxin, found in food stuffs, primarily in barley in the few studies done.
133. **Xanthocillin** – used as an antibiotic, acute contact eczemas and attendent allergodermas have recently been observed in an increasing number of cases, along with an increased rate of sensitization (11%).
134. **Zearalenone** - found worldwide in a number of cereal crops, such as maize, barley, oats, wheat, rice, and sorghum and also in bread. It is a potent estrogenic metabolite, is the primary toxin causing infertility, abortion or other breeding problems, especially in swine.
135. **3-Nitropropionic acid** -excitotoxin shown to cause brain lesions similar to those of Huntington's disease.
136. **Mycotoxin Mix**

* Acetoxyscirpenediol
* Acetyldeoxynivalenol
* Acetylneosolaniol
* Aflatrem
* Altenuene
* Altenuic Acid
* Altenusin
* Altertoxin
* Austamide
* Austdiol
* Austin
* Austocystin
* Avenacein +1
* Beauvericin +2
* Bentenolide
* Brefeldin
* Butenolide
* Calonectrin
* Chaetoglobosin
* Chaetosin
* Chetomin
* Citromycetin
* Cladosporic Acid
* Cochliodinol
* Crotocin
* Deacetylcalonectrin
* Deoxynivalenol Diacetate
* Deoxynivalenol Monoacetate
* Destruxin B
* Diacetoxyscripenol
* Diplodiatoxin+
* Egrine
* Emodin
* Enniatins
* Erythroskyrin
* Fructigenin + 1
* Fumagilin
* Fumitremorgen
* Furanocoumarins
* Fusarin
* Fusarochromanone
* Ipomeanine
* Islanditoxin
* Isosatratoxin
* Koninginin
* Lateritin + 1
* Luteoskyrin
* Lycomarasmin + 1

* Malformin
* Maltoryzine
* Monoacetoxyscirpenol
* Neosolaniol
* Niidulotoxin
* Nitropropionic Acid
* Nivalenol
* NT-1 Toxin
* NT-2 Toxin
* Oxaline
* Rhizonion
* Roridin A,E
* Rosetoxin
* Rubratoxin
* Rubroskyrin
* Rubrosulphin
* Rugulosin
* Rugulovasine
* Sambucynin + 1
* Satratoxins, F,G,H
* Scirpentriol
* Secalonic Acid
* Slaframine
* Sporidesmin
* T-1 Toxin
* Territrem
* Tremorgenic
* Triacetoxyscirpendiol
* Trichodermol
* Trichoverrins
* Trichoverrols
* Tryptoquivalene
* Verrucarin
* Viomellein
* Viopurpurin
* Vioxanthin
* Viridicatin
* Viriditoxin
* Walleminol
* Xanthomegnin
* Yavanicin + 1

PRION –description

Transmissible spongiform encephalopathies (TSEs), also known as prion diseases, are a group of progressive conditions that affect the brain and nervous system of many animals, including humans. The symptoms of CJD are caused by the progressive death of the brain's nerve cells, which is associated with the build-up of abnormal prion proteins. When brain tissue from a CJD patient is examined under a microscope, many tiny holes can be seen where whole areas of nerve cells have died. The word "spongiform" in "transmissible spongiform encephalopathies" refers to the sponge-like appearance of the brain tissue. Unlike other kinds of infectious disease which are spread by microbes, the infectious agent in TSEs is a specific protein called prion protein. Misshaped prion proteins carry the disease between individuals and cause deterioration of the brain.

TRANSMISSION

The defective protein can be transmitted by contaminated harvested human growth hormone (HGH) products, Immunoglobulins (IVIG), corneal grafts, dural grafts or electrode implants (acquired or iatrogenic form: iCJD); it can be inherited (hereditary or familial form: fCJD); or it may appear for the first time in the patient (sporadic form: sCJD). In the hereditary form, a mutation occurs in the gene for PrP, PRNP. Ten to fifteen percent of CJD cases are inherited. (CDC)

The disease has also been shown to result from usage of HGH drawn from the pituitary glands of cadavers who died from Creutzfeldt–Jakob Disease,[13] though the known incidence of this cause is (as of April 2004) quite small. The risk of infection through cadaveric HGH usage in the US only ceased when the medication was withdrawn in 1985.

It is thought that humans can contract the disease by consuming material from animals infected with the bovine form of the disease. The only suspected cases to arise thus far have been vCJD, although there are fears—based on animal studies—that consuming beef or beef products containing prion particles can also cause the development of classic CJD. When BSE material infects humans the resulting disease is known as (new) variant CJD (nvCJD).

Cannibalism has also been implicated as a transmission mechanism for abnormal prions, causing the disease known as kuru, found primarily among women and children of the Fore tribe in Papua New Guinea. While the men of the tribe ate the body of the deceased and rarely contracted the disease, the women and children, who ate the less desirable body parts, were 8 times more likely to contract the disease from infected tissue.

In 2004 a new report published in the Lancet medical journal showed that vCJD can be transmitted by blood transfusions. The finding alarmed healthcare officials because a large epidemic of the disease might arise in the near future. There is no test to determine if a blood donor is infected while in the latent phase of vCJD.

In the U.S., the FDA has banned import of any donor sperm, motivated by a risk of Creutzfeldt–Jakob disease, inhibiting the once popular import of, for example, Scandinavian sperm. The risk, however, is not known, since artificial insemination has not been studied as a route of transmission. It is also not known whether prions cross the blood-testis barrier.

SYMPTOMS

Human prion diseases (CJD, GSS, and kuru) are characterized by four features: spongiform change, neuronal loss, astrocytosis (death of astrocytes as occurs when tissues are deprived of oxygen or there is severe hypoglycemia) and amyloid (protein) plaque formation. When the prions are absorbed through the intestines, they first appear in the lymph nodes, especially in Peyer's patches at the small intestine. The clinical signs in humans vary, but commonly include personality changes, psychiatric problems such as depression, lack of coordination, and/or an unsteady gait (ataxia). Patients also may experience involuntary jerking movements called myoclonus, unusual sensations, insomnia, confusion, or memory problems. In the later stages of the disease, patients have severe mental impairment (dementia) and lose the ability to move or speak. The disease may be most easily transmitted to human beings by eating food contaminated with the brain or spinal cord or digestive tract of infected carcasses. These diseases are known to be fatal because one must have the genetic predisposition that keeps proline from converting to leucine on chromosome 20. Keep in mind that a person might test for these vials and it be the predisposition of the genetic marker rather than the fatal disease itself.

137. **Prion, PRNP** is the generic form of prion as one can get from contaminated or GMO grains (or the beer, bread or pasta made from it). This can also be acquired from milk from animals eating prion infected grains. This is a subclinical form of prion, not the life threatening version mentioned above.
138. **Prion-Scrapie**, primarily infects sheep and goats.
139. **Prion-TME** (transmissible mink encephalopathy), primarily infects mink.
140. **Prion-CWD** (chronic wasting disease), primarily infect elk, white tailed deer, mule deer, red deer and moose.
141. **Prion-BSE** (bovine spongiform encephalopathy, or mad cow disease), primarily infect cattle.
142. **Prion-FSE** (feline spongiform encephalopathy), primarily infect cats.
143. **Prion-EUE** (exotic ungulate encephalopathy), primarily infects nyala and greater kudu (animals of great britan).
144. **Prion-kuru**, infects humans causing a laughing sickness, mostly seen in Papua New Guinea via cannibalism.
145. **Prion-CJD** (creutzfeldt-jakob disease), human version of mad cow disease, acquired by eating contaminated beef. Prion-CJD includes: varient creutzfeldt-jakob disease (vCJD), iatrogenic Creutzfeldt-Jakob disease (iCJD), familial Creutzfeldt-Jakob disease (fCJD), sporadic Creutzfeldt-Jakob disease (sCJD)
146. **Prion-GSS** (Gerstmann-Sträussler-Scheinker syndrome), infects humans.
147. **Prion-FFI** (fatal familial insomnia), infects humans.
148. **Amyloid** –are insoluble fibrous protein aggregates sharing specific structural traits. Think of amyloids as plaque build-up in tissue much like you see in arteries, but this is build-up of protein fibers instead of fat. All prion based diseases or conditions create amyloid plaque, but so do diseases such as those listed below. Deposition can be systemic (affecting many different organ systems) or organ-specific. Many amyloidoses are inherited, due to mutations in the precursor protein. Other forms are due to different diseases causing overabundant or abnormal protein production - such as with over production of immunoglobulin light chains in multiple myeloma, or with continuous overproduction of acute phase proteins in chronic inflammation. Highly suggest a good form of yoga, tai chi or chi qong although yoga would be my first choice to help break up amyloids in addition to diet. A vegetarian diet, as in vegan, is the diet of choice since most amyloid plaque is the result of animal based protein accumulation or genetic predisposition to metabolize proteins and animal proteins are the hardest to metabolize.

<u>Diseases with Amyloid complications:</u>

- Alzheimer's disease
- Diabetes mellitus type 2
- Parkinson's disease
- Transmissible spongiform encephalopathy
- Huntington's Disease
- Medullary carcinoma of the thyroid
- Cardiac arrhythmias, Isolated atrial amyloidosis
- Atherosclerosis
- Rheumatoid arthritis
- Aortic medial amyloid
- Prolactinomas
- Familial amyloid polyneuropathy
- Hereditary non-neuropathic systemic amyloidosis
- Dialysis related amyloidosis
- Finnish amyloidosis
- Lattice corneal dystrophy
- Cerebral amyloid angiopathy
- Cerebral amyloid angiopathy
- systemic AL amyloidosis
- Sporadic Inclusion Body Myositis

<u>This vial includes:</u>

Secretase inhibitor
Melatonin –inhibitor for anyloid production
Beta Amyloid –known amyloid of Alzheimers disease
Amylin –released by pancreas to control type 11 diabetes
Islet Amyloid polypeptide –released by pancreas to control type 11 diabetes
Alpha-synuclein –known amyloid of Alzheimers disease
Huntington protein + glutamine –associated with Huntington's disease
Calcitonin –helps reduce blood calcium and oppose parathyroid hormone
Atrial natriuretic peptide –see Atriopeptin
Atrial natriuretic factor –see Atriopeptin
Atrial natriuretic hormone –see Atriopeptin
Atriopeptin - hormone secreted by heart muscle cells. It is involved in the homeostatic control of body water, sodium, potassium and fat (adipose tissue). It is released by muscle cells in the upper chambers (atria) of the heart (atrial myocytes), in response to high blood pressure. ANP acts to reduce the water, sodium and adipose loads on the circulatory system, thereby reducing blood pressure.
Apolipoprotein A-I –for lipid metabolism
Milf fat globule-EGF factor 8 protein + phosphatidylserine –part of aortic amylid
Transthyretin –associated with amyloid polyneuropathy
Lysozyme –associated with non-neuropathic systemic amyloidosis
Muramidase –associated with non-neuropathic systemic amyloidosis
N-acetylmuramide glycanhydrolase –part of non-neuropathic systemic amyloidosis
Beta 2 microglobulin – associated with dialysis related amyloidosis
Gelsolin –finnish amyloidosis
Keratoepithelin –associated with lattice corneal dystrophy
Cystatins –cerebral amyloidosis
Immunoglobulin kappa locus –systemic amyloidosis
Immunoglobulin lambda locus –systemic amyloidosis