Atypical Bacterial and Mycobacterial Infections
Digestive System

Digestive track is a system vulnerable to infection by atypical bacteria such as mycoplasma and mycobacterium through ingestion. Mycobacteria are ubiquitous and commonly found in soil, water and food. It has been thought that they do not cause illness in healthy people and only affect people who have compromised immune system such as AIDS patients. However, due to new better detection methods, mycobacterial infection has been found in immunocompetent individuals. Individuals can become infected when their immune system is weakened due to stress, aging or other acute or chronic infections. Young children whose immune system have not fully matured are especially vulnerable. Digestive tract is one of the most commonly infected systems.

Mycobacteria avium complex (MAC) is one of the most common mycobacteria that infects the digestive tract. MAC consists of two species: M avium and M intracellulare. ***Mycobacterium avium*, subspecies *paratuberculosis* (MAP),** a closely related subspecies of MAC, can also invade the digestive tract. They are found in many places including tap water, fresh and ocean water, milk, bird droppings, soil, and house dust.

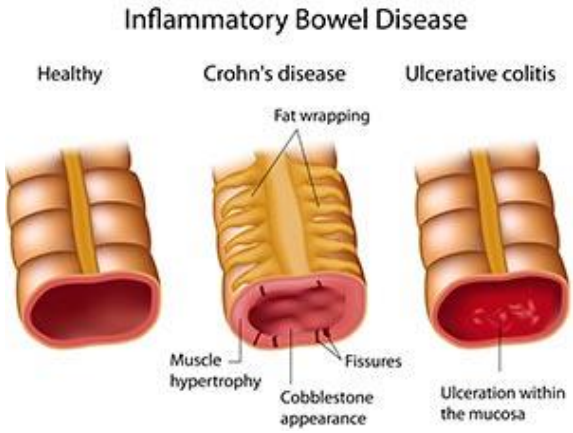
Mycobacteria tuberculosis is an airborne pathogen which mainly infect lungs and cause TB with lung structure damage. Research results have suggested that *M. tuberculosis* can also cause digestive tract infections because the infected macrophage can carry the bacteria to the digestive system through blood circulation. Each year, tuberculosis (TB) results in the death of 3 million people globally. In 2000-2020, an estimated 1 billion people will be infected, 200 million people will become sick, and 35 million will die from TB, if controls are not taken.

Multiple strains of **Mycoplasma** can infect the digestive tract including Mycoplasma pneumoniae, Mycoplasma incognitus, Mycoplasma penetrans, Mycoplasma genitalium, and Mycoplasma hominis. *Mycoplasma pneumonia* is a common respiratory pathogen that produces respiratory diseases ranging from upper respiratory tract infection to atypical pneumonia. The macrophage can become the host of mycoplasma through phagocytosis and carry the bacterium to multiple locations of the body and produce a wide spectrum of non-pulmonary manifestations. Extra pulmonary manifestations may sometimes overshadow the respiratory manifestation. Many patients infected with *M. pneumoniae* may experience extra pulmonary complications after the onset of or even in the absence of respiratory illness and symptoms. Gastrointestinal manifestations are frequent and have been described in roughly 25% of cases with the acute manifestation of nausea, vomiting, abdominal pain, diarrhea and loss of appetite.

Toxicities:

***1) Mycobacterium avium*, subspecies *paratuberculosis* and Inflammatory Bowel Disease**

Mycobacterium avium, subspecies *paratuberculosis* (MAP) has been consistently identified in biopsies of the intestinal lining of Crohn's disease patients. Research results also suggest that ulcerative colitis is also caused by MAP. Crohn's disease and ulcerative colitis are chronic gastrointestinal tract diseases that together are referred to as idiopathic inflammatory bowel disease (IIBD), a disease commonly viewed as



an autoimmune condition. Although the mechanism how this gram positive intracellular pathogen triggers autoimmunity is not fully understood, *MAP* has been viewed as the common culprit for both Crohn's disease and ulcerative colitis.

Infection of the MAP causes a chronic intestinal immune inflammatory response which results in intestinal ulcerations. In ulcerative colitis, only the lining of the colon is affects. The lining of the colon becomes inflamed and develops tiny open sores, or ulcers, that produce pus and mucous. Crohn's disease can affect any part of the gastrointestinal (GI) tract from the mouth to the anus, and all layers of the bowel wall. In Crohn's disease, the deep tissues that is affected can form fistulas, abnormal connections between organs. Common symptoms of Crohn's disease and ulcerative colitis are persistent diarrhea accompanied by abdominal pain and blood in the stool, vomiting, severe pelvic pain, and weight loss. MAP can also affect the liver and cause hepatitis.

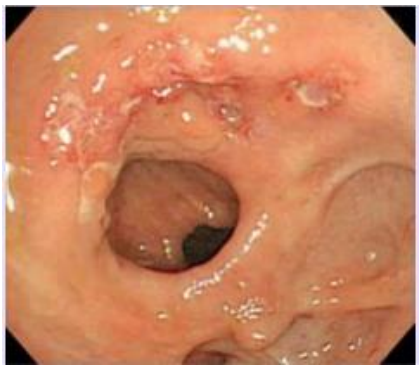
Humans can get the MAP infection through consumption of contaminated milk, products made from contaminated milk, or via contaminated water caused by facet from infected cattle, cows, pigs and other domestic animals. MAP is more robust than tuberculosis, and therefore the risk conveyed to human populations in retail milk and domestic water supplies is high. MAP is harbored in the ileocolonic mucosa of a proportion of normal people and can be detected in a high proportion of full thickness samples of inflamed Crohn's disease gut samples.

MAP infection causes Crohn's disease in some individuals and ulcerative colitis in others. Research on several groups of patients found that for a given age, a small dose of MAP causes ulcerative colitis, while a large dose of MAP causes Crohn's disease. When infected with a small dose of MAP, adults develop ulcerative colitis relatively soon after being infected, while children develop Crohn's disease after a long latency period.

Diagnosis of MAP infection is difficult. It grows extremely slow. Even when present in immense quantities, it can take several months to detect MAP in the clinical setting.

2) **Mycobacteria avium complex (MAC) and Mycobacteria tuberculosis**

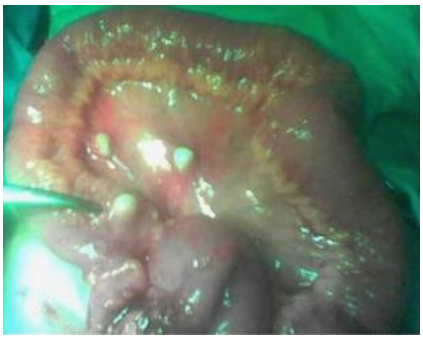
MAC and M. tuberculosis infections share similar toxicity. M. tuberculosis commonly causes TB in the lungs. Sometime, it can manifest as "extra-pulmonary" TB in lymph nodes and other organs such as the intestines. Intestinal TB can be classified into 3 categories: 1) 60% patients develops multiple superficial ulcers on the epithelial surface of the intestine. 2) 10% patients develops thickening of the bowel wall with scarring; fibrosis; and a rigid, masslike appearance that mimics that of a carcinoma. 3) 30% patients develops both ulcer and scarring. Symptoms include fever, night sweats, abdominal pain, a palpable mass, altered bowel habits, and/or bleeding.



Intestinal TB
- Patulous ileocecal valve
- Scar changes
- Multiple ulcers

MAC are common in the environment and cause infection when inhaled or swallowed. They are frequently found in aquatic systems including swimming pools, hot tubs and municipal pipes. These mycobacteria form biofilms, which enhance resistance to disinfectants and other antimicrobial agents. Planktonic cells sloughed from a biofilm can be aerosolized or ingested, and thus contribute to MAC infection. Not all environmental MAC are free living. Via a process reminiscent of mammalian macrophage infection, M. avium can invade and replicate within gram negative bacteria and protozoa. The intracellular space is a refuge that provides the mycobacteria with nutrients and protects them from biocides. Research has showed that amoeba-grown

mycobacteria are more virulent than free living ones. MAC-infected protozoans and gram negative bacteria are important environmental vectors for human MAC infectious disease. The MAC infection can cause digestive tract inflammation with diffuse granulomatous involvement, a distinguishing feature of MAC infection. Symptoms include fever, diarrhea, fatigue, malabsorption, abdominal pain, loss of appetite and weight loss.



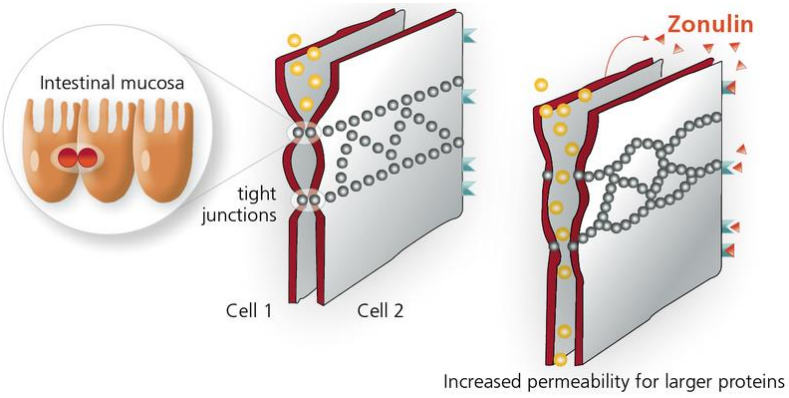
3) Mycoplama Toxicities:

i) Food Allergies, Stomach/Intestinal Ulcer, and Leaky Guts

Mycoplasma *pneumoniae* is a mucosal pathogen. Its pathogenesis begins with attachment to the surface of epithelial cells, followed by release of toxins such as peroxide and superoxide. The attachment induces infiltration of lymphocytes and plasma cells and induces production of multiple arrays of cytokines. These cytokines and toxins cause inflammation and injury to the epithelial tissue structure. Mycoplasma can also fuse its cell membrane with the epithelial cell and become an intracellular organism and further replicate inside the epithelial cells.

The Mycoplasma steals lipids and cholesterol from the mitochondria. This makes the mitochondria 'leaky' and lose electrons thus causing reduced efficiency in ATP production. As they adopt host cellular components to replicate, their cell membrane structure begins to mimic the host cell surface composition, causing autoimmunity, since the immune system could not differentiate them from the host's own cells. The infection can cause cell death. After the infected cell dies, the replicated bacteria are released and infect nearby healthy cells. As more infected cells die, a fluid filled cyst will form on the mucosal membrane.

Mycoplasma infection of digestive tract mucosal membrane can destroy intestinal villi and compromise the intestinal barrier. This allows accelerated damage by lectins in grains (especially wheat), beans, soy, and dairy leading to ulcer formation and leaky guts with increased permeability of the mucosal membrane. Patients may experience symptoms such as food sensitivities, gluten intolerance and abdominal pain/cramps, constipation and/or diarrhea, nutritional deficiency and weight loss.



The infection can cause significantly increase of the proportion of CD4+ and CD8+ T cells that secreted IL-4, and elevated IgE levels which associates with a Th1/Th2 cytokine imbalance. Such disruption to the intestinal immune system can cause an imbalance of gut flora, over growth of unfriendly germs, and infection of the digestive tract by other types of pathogens including gram positive bacteria, gram negative bacteria, fungi, H. Pylori, gram-negative spirochete, protozoa as well as many types of parasites. Chronic infection can cause intestinal degenerative changes that allow the microbes to penetrate the intestine and get to the peritoneal spaces and cause pain or discomfort in the lower abdomen.

Infection of gastric mucosa, stomach lining together with the coinfection of other types of microbes can cause chronic gastritis with nausea and stomach discomfort as well as stomach ulcers, intestinal inflammation and ulcerative changes. Patients may experience stomach and/or

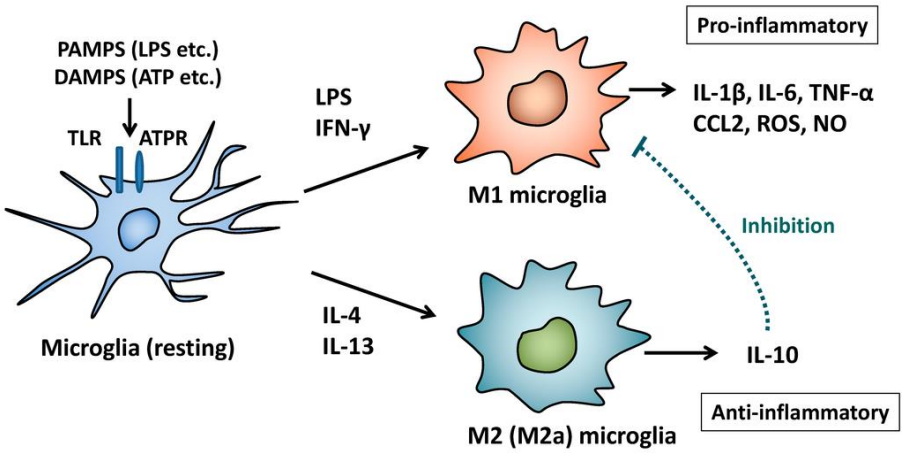
abdominal pain/cramp, gas, bloating, acid reflux, diarrhea and constipations.

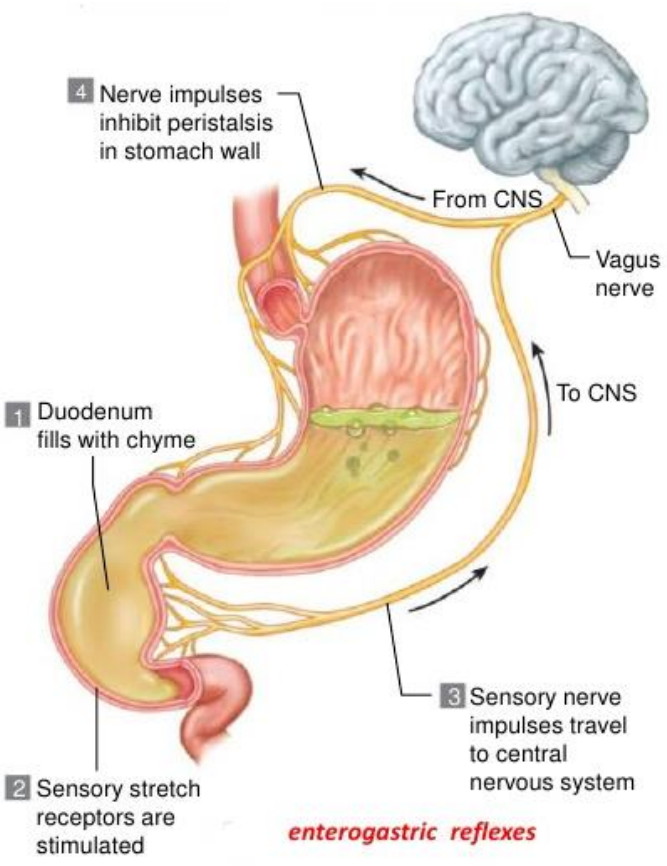
ii) Digestive Tract Cancers

Intracellular Mycobacterial infection can interrupt the regular programed cell death process causing polyps growth. The infection can also make its way into the nucleus and disrupt the host genome causing malignant transformations. Types of cancer associated with *Mycoplasma* include colon cancer, gastric cancer, lung cancer, prostate cancer and renal cancer. Using immunohistochemistry assay and nested polymerase-chain reaction (PCR), researchers have successfully detected *Mycoplasma hyorhinis* and *Mycoplasma fermentans* in gastric cancer tissues, and found the correlation between mycoplasma infection and clinicopathologic characteristics for gastric cancer patients.

iii) Autism

The infected macrophage can travel to the neurological system and cause brain infections through blood circulations. The bacterial toxins, including lipopolysaccharide (LPS) can cause brain inflammation due to activation of brain microglia cell. The infected microphage can also travel to the liver through the hepatic portal vein and cause a liver immune response by activating liver Kupffer cells with over production of chemokines, which further amplify the hyperactivity of the brain microglia and increase brain inflammation. Research in the subjects with autistic patients has reported significant increases in the plasma levels of a number of cytokines, prostaglandin E2 (PGE2) and other brain inflammatory markers when compared to controls. Chronic brain inflammation as well as the resulting scarring interrupt the neuron activities and affect cognitive and many other brain functions resulting in autistic symptoms.





The toxins from guts infection can toxify the Enteric Nervous System which is embedded in the lining of the gastrointestinal system, beginning in the esophagus and extending down to the anus. The Enteric Nervous System is connected to the brain through the vagus nerve. The toxicity of the Enteric Nervous System from the bacterial toxins can travel along the Enteric Nervous System and affect the brain. Patients may experience symptoms that are similar to low grade heat shock including dizziness, mental fogginess, mind spaciness, forgetful, headache, fatigue and weakness.

Treatment Recommendations

1) Ulcerative Colitis and Crohn's Disease

Autoimmune conditions and Inflammatory Bowel Disease (IBD) including Ulcerative Colitis and Crohn's disease are referred to as Spleen Damp in TCM. Wei Lab's Java in combination with LC Balancer is recommended to remove the Spleen Damp, improve lymphatic circulation and clear the infections and autoantibodies. Patients can experience symptom improvement in 1 week with less abdominal pain and diarrhea. 2-6 weeks of treatment are required for significant improvement with sustained results. Since the patient's liver may also be affected, Brown, LC Balancer and Levera may also be required to reduce liver inflammation and improve liver function if patients did not experience any symptom improvement with 1-2 weeks of Java/LC Balancer.

To help repair the tissue damage including the fissures and/or fistula in Crohn's disease patients, Colitagen is recommended. Colitagen helps remove blood stagnation in the intestine and helps heal ulcers and fissures. The immune activity that geared toward the healing of intestinal damage, can cause an imbalance of gut flora, over growth of unfriendly germs and pathogenic microorganism. Therefore Probiosis and WhiteHead is also required. Silver may also be required for clearing the gram negative bacteria.

2) Stomach Infections, Food Sensitivities and Stomach Ulcers

Infection of stomach by the mycoplasma and mycobacteria can cause stomach irritation and inflammation leading to ulceration. Symptoms include poor digestion, loss of appetite, stomach pain, acid reflux, food sensitives and bloating, as well as craving for sweets. These kinds of mycoplasma and mycobacteria infection are referred to as stomach Damp Toxin in TCM. Gram negative bacterium and fungi are common co-infections which are referred to as Damp Heat Toxin and Heat toxin in TCM.

Spring Capsule is recommended to enhance blood flow to the stomach. SJ is recommended to repair damage to the stomach lining. Formula B is recommended to enhance stomach immunity. Stomacin is recommended to remove the stomach Damp Toxin and clear the stomach mycoplasma and mycobacteria infections in combination with Silver to remove stomach Damp Heat toxin and clear stomach gram negative bacterial infections. If the gram negative bacteria cannot be cleared completely, Formula E is recommended as the backup.

Formula F is recommended to remove Heat Toxin and clear stomach infections by a fungal pathogens. Probiosis is recommended to remove heat and clear gram positive bacteria. If patients also have stomach co-infection with H. Pylori, Formula D is required to clear the H. Pylori infection used in combination with Spring Capsule, SJ and Formula B.

Chronic infection can cause scar and granulomas formation in the stomach lining. These scars and granulomas become harbors for the mycoplasma and mycobacteria. S-2 is recommended to helps dissolve the scar and granulomas in the stomach. Patients can experience symptom improvement within 1 week. Patients with multiple infections in their stomach, however, may experience fluctuating symptoms due to flourishing of some types of bacteria after their competitor is removed. 1-3 months of multiple round of treatment may be required to thoroughly clean the stomach infections and heal the stomach tissue damage depending on the severity of the condition.

3) Intestinal/ Peritoneal Infection, Leaky Guts, Intestinal Ulcers and Scarring:

Intestine infections of by mycoplasma and mycobacteria can cause intestinal irritation and inflammation leading to leaky guts and ulceration. Symptoms include constipation and/or diarrhea, abdominal pain, gas, and food sensitivities, allergy and intolerance. Patients with severe

condition such as intestine ulcer may experience black stool caused by bleeding. It is very common for the infection to spread to the peritoneal cavity causing non-tuberculous mycobacterial peritonitis with symptoms including abdominal pain, poor appetite, weakness, nausea and fever in severe cases. Chronic infection can cause scar and granulomas formation in the intestine and peritoneal cavity which becomes a harbor for the mycoplasma and mycobacteria.

Peritonin is recommended to remove Damp Toxin and clear the mycoplasma and mycobacterial infection of the peritoneal cavity and intestines in combination with S-2 to help remove Damp Heat toxin and clear gram negative bacterial infection, and dissolve the scar and granulomas in the peritoneal cavity and intestines. If the lower abdomen including the colon is infected, S-3 is also required in addition to Peritonin and S-2 to clear gram negative bacterial infection and dissolve granulomas and scars in the lower abdomen. Probiosis is recommended to clear gram positive pathogenic bacteria. Sissy-2 is recommended if there is fungal infections in the intestine and lower abdomen.

For patients with either diarrhea or constipation, Colomycin in combination with Silver is recommended to remove Damp Toxin and Damp Heat Toxin to clear the mycoplasma and mycobacterial infection and gram negative bacterial infections of the intestinal lining. Colonacin is recommended as the backup for Colomycin. If patient's diarrhea is caused by protozoa such as ameba which may harbor mycobacteria, WhiteHead is recommended to clear infections.

For patients with leaky guts, Pearl and Formula C are recommended to enhance intestinal blood flow and repair intestinal lining damage. For patients with a colon ulcer or deep tissue damage, Colitagen is recommended to help heal the ulcer together with Probiosis to remove pathogenic bacteria and WhiteHead to clear infections by protozoa such as ameba which harbor mycobacteria. Silver may also be required for clearing the gram negative bacteria. Patients can experience symptom improvement within 1 week. 1-3 months of multiple round of treatment may be required to thoroughly clean the infections and heal the intestinal damage depending on the severity of the condition.

4) Autism

Although mycoplasma infection may be the underlining cause, the resulting excessive heat in the blood and brain inflammation from bacterial toxin caused by co-infected bacteria contribute to over 80% of the autistic symptoms. Treatment starts by restoring digestive heath using Spring Capsule, SJ and Formula B; clearing bad germs in the gut using Probiosis; and removing excessive cytokines from the blood using Bitter. If there is a candida blood infection then Bitter, Brown, Qi Boost and LC Balancer are required.

The next step requires Brown, LC Balancer and Xcel to remove liver toxin and enhance kidney function; and Pearl and Formula C to repair intestinal lining damage. If patients also have frequent/urgent urination, restlessness, and cannot wake up in morning; KS and BI are required to clear kidney and urinary bladder inflammation. The third step requires LC Balancer, Brown, Platinum and Hepavin to reduce brain inflammation and calm down the microglia cell. The fourth step is to break down the brain scar tissue using Gold in combination with Qi Booster, Bitter, Probiosis, Brown and LC Balancer.

The last step focuses on clearing mycoplasma and co-infection of gram negative bacteria. Brainin and P-2 incombination with ClearHead is recommended to remove brain mycoplasma, gram negative germ and bacterial toxin in the enteric nerve system. The peritoneal/intestinal mycoplasma treatment described above is also required in combination with liver and kidney support using LC Balancer, Brown and Xcel.

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