

The history about what is tuberculosis biology essay

[Science](#), [Biology](#)



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\n[/toc]\n \nWith a lot of our scientists knowing that the Mycobacterium can be treated and also avoided, however this disease still continues to be one of this nation's main reason for sicknesses and deceases. From an article, that I read, it showed that a third of the USA carries this tuberculosis disease. Early in the 1990s, the government's involvement with this fatal disease was said to be limited but on the good side of things we have kept analyzing and learning more about the disease and created more funding to research more about this bacterium. The United States of America is currently one of a select few contributors to worldwide mycobacterium tuberculosis control efforts. Because of that, in the past we have passed certain laws including the U. S. Leadership against HIV/AIDS, Tuberculosis, and Malaria Act of 2003. Also very recently, President Obama and his organization had started a very interesting program that is known to many people as the Global Health

Initiative which is said to make a very inclusive government tactic for worldwide health and it includes the bacterium tuberculosis as one of about ten of the worldwide health areas (www. kff. org). But there's good things to look forward too because the government In the future, our government hopes to put tuberculosis control programs in the frameworks of frail health systems. It was also said that we look forward to coordinating efforts with other countries and donors including worldwide funding.

Causation

The little mediator that has been found as the cause of tuberculosis is Mycobacterium. Mycobacterium has a cell envelope that leads to the connection of particular structural motifs which comes about to inhibit host-parasite interactions. Several people have researched on the proteins for Mycobacterium tuberculosis using many types of methods made to further analyze the molecules of the spreaded mycobacteria. The Mycobacterium is intercellular pathogens meaning they need to invade host cells in order to initiate the disease.

Spreading of Tuberculosis

Tuberculosis is diffused by airborne droplet nuclei, which is contacted when a person talks or maybe if someone sneezes and or cough. That person's body will then react to the infection by making a like barrier of certain things and also the tubercle. Infectious strains of Mycobacterium have the capability to disrupt phagosomal membranes of alveolar macrophages while the cord factors disarm mitochondrial membranes of phagocytes. This will then allow organisms to persist and make more phagocytes. As soon as the disease is

inhaled, it will take a spot in the bronchial tree landing on the respiratory epithelium and places itself in the alveolus. After all this has taken place the bacilli can duplicate with no At this point the bacilli can replicate with no conflict from the host. The organisms will then be captivated by the white blood cells not doubting that they will remain viable and possibly make life within cells. Many organs and tissues are selectively not in agreement to the duplication of these bacilli. There are 5 steps to the progression of tuberculosis. First the Mycobacterium has to be drawn in to the lungs. Once the nuclei are received, the bacteria are drawn in by alveolar macrophages. These cells will not be activated, therefore will not be able to kill the intracellular organism. The large droplet nuclei gets to the upper respiratory tract, and the small nuclei get in the air sac of lungs where the infection will begin. Next the bacilli will then go in to the alveolus. The bacilli then duplicate within white blood cells, and soon the body's immune system sends other specialized white blood cells and T cells to the site. After that, the replicated giant cells develop as the cells come together. The tubercle will then form, but know that tuberculosis cannot replicate within it because of its pH. Once all of those things have happened, a barrier of cells and other material will eventually cover the tubercle. This later becomes a large antigen load, causing the walls to become necrotic and rupture and results in cavity formation and allows tuberculosis to spread quickly into other airways and to other parts of the lung (Weeks 405).

Signs and Symptoms

When a person has been contacted with this disease for the first time, the tubercle bacilli will produce throughout their body and start to duplicate and make the disease. One of the number of places that tuberculosis is found is in the upper lung region. This is where growth is most rapid. This disease can cause many different kinds of symptoms, but because some people do not have any signals to let them aware of disease at time they are infected it most commonly goes on unnoticed. Some of the signs and symptoms one might need to pay attention to because they will persist weeks and months are things like their appetite, if they are sweating at night, irregular menses. Things like their energy levels, maybe you are fatigued, weight loss, pain in the chest, low grade fevers, anorexia, and a big thing to pay attention to is if you are coughing up blood or sputum (CDC2).

Types

Tuberculosis is not only in the lung region. Another type of tuberculosis is pulmonary tuberculosis. In this disease the person will have a very bad cough basically. It takes a decent amount of time to progress. It can be from anywhere to weeks to months. Tuberculosis pleuritis is also another type. Patients with this mostly have non-severe symptoms. Another one is tuberculosis empyema. These are just some of the other types of Tuberculosis (CDCWONDER).

Diagnosis

Medics, physicians, surgeons and others can identify the bulk of people who are infected with Mycobacterium tuberculosis, using a so called skin test.

This skin test has been the main method of demonstrating infection with *Mycobacterium tuberculosis* (CDCWONDER). To hold this test, a person has to be inoculated with a substance under the skin of the forearm. Within 72 hours, if the person that was given the substance under the skin of the forearm starts to get red welts on skin then they are positive for tuberculosis. Another test a person can be given is a blood test. It is said to be more accurate than the skin test. If the person has an obvious reaction to the skin test, other tests can help to show if the individual has active tuberculosis. In making an analysis, doctors rely on indicators and other physical signs like a person's history of experience to tuberculosis. The reasons doctors use microscopy as a way to examine tuberculosis is because it detects open, infectious cases, and it does so very quickly. Another diagnostic tool doctor's use is chest radiology, which is sensitive but non-specific. Nucleic acid technology has also been used to fingerprint strains of *Mycobacterium tuberculosis* for epidemiological purposes (CDCWONDER).

Treatment

An effective way to treat *Mycobacterium tuberculosis* is using an anti-tuberculosis chemotherapy, because it reduces the number of bacilli released into the air. Another type of treatment is the BCG vaccine. It is a live culture of *M. bovis* that has been made a virulent by long cultivation on artificial media and it is fairly effective against tuberculosis (Tortora, 666). Doctors use something known as preventive therapy to help those who have the tuberculosis infection, and those who suffer from the disease should not undergo preventative therapy. In most areas of the country, the initial

regimen for treating the tuberculosis disease should include four drugs Rifampicin, Pyrazinamide, Ethambutol, and Streptomycin. The rifampin is used because it inhibits DNA-dependent tRNA polymerase, thus inhibiting transcription to RNA, making the bacterium unable to produce important proteins. Pyrazinamide is a chemically synthesized bactericidal antibiotic. It converts a special enzyme to an active form which inhibits the synthesis of fatty acids; this disrupts the cell membrane and disables energy production which is necessary for the survival of the tuberculosis bacteria. Ethambutol works by stopping the bacteria that cause this disease from growing and increasing in numbers. Streptomycin inhibits protein synthesis and causes the death of microbial cells. It is a useful broad-spectrum antibiotic. When treating tuberculosis the patient must consume two drugs, in which the bacilli are susceptible. Doctors must prescribe their patients with an adequate amount of medication and make sure they adhere treatment.

Prevention

There are a couple of ways that a person may be able to keep themselves from contracting the disease known as tuberculosis. The global programs in the United States helps to diminish and control the tuberculosis disease. One important way to control the disease is by performing the air ventilation technique. This requires six or more room-air changes in about an hour. Another way to control the airborne disease is by using ultraviolet irradiation of air in the upper part of the room. When a person feels that they are going to cough or sneeze they can cover their mouth with a tissue, this along can lead to the reduction of droplet nuclei release in the air. A lot of the people

that get infected with the disease do not get sick or spread the bacteria to others. This is known as latent tuberculosis (CDC3). Latent tuberculosis is when the bacteria can live in the body without making you sick. The body is able to fight off the bacteria and stop them from growing. People with latent tuberculosis infection do not feel sick and do not have any symptoms. People with latent tuberculosis infection are not infectious and cannot spread the bacteria to others. However, if the bacteria become active in the body and multiply, the person will go from having latent tuberculosis infection to being sick with tuberculosis disease. Tuberculosis disease is when bacteria become active if the immune system can't stop them from growing. When the bacteria are active and multiplying in your body, this is called tuberculosis disease. People with tuberculosis disease are sick rather than the people with tuberculosis infection which can have bacteria in body and never know it or never develop symptoms to find out that they have the infection. They may also be able to spread the bacteria to people they spend time with every day. Many people who have latent tuberculosis infection never develop tuberculosis disease. Some people develop the disease soon after becoming infected before their immune system can fight the bacteria. Other people may get sick years later when their immune system becomes weak for another reason (CDC3). Some people that are at higher risk for developing active tuberculosis are people with HIV infection, people who became infected with tuberculosis in the last 2 years, babies and young children, people who inject illegal drugs really put themselves at high risk. Also people who are sick with other diseases that weaken the immune system. Having a good immune system is always good so make sure you exercise and try and

stay as healthy as you can. Elderly people also have high risk of developing tuberculosis and last is people who were not treated correctly for tuberculosis in the past (www. niaid. nih. gov).

Virulence Factors

The virulence of *Mycobacterium tuberculosis* is very complicated and complex. Antigen 85 complex is one of the factors that contribute to its virulence. Antigen 85 complex is composed of proteins secreted by tuberculosis that can bind to fibronectin. These proteins can aid in walling off the bacteria from the immune system. They also may facilitate tubercle formation. Another factor is the cord factor. This factor is associated with the virulent strains of tuberculosis. It is a glycolipid found in the cell walls of mycobacteria. The cord factor causes cells to grow in serpentine cords in which acid-fast bacilli are arranged in parallel chains. It is also toxic to mammalian cells. Other factors include special mechanisms for cell entry, intracellular growth, detoxification of oxygen radicals, slow generation time, and high lipid concentration in cell wall. Scientists have studied and come to realize that there are some genes needed for the bacteria to become virulent. This bacteria is one that does not make you immediately sick. However, it grows very slowly and can survive in the human body for a long time.

Conclusion

In conclusion I have learned a great detail about *Mycobacterium tuberculosis* disease. This paper gives tremendous amount of familiar information to those who have had experiences with this disease and also gives great detail

and information to those who are trying to avoid getting infected with this disease. Once again, our outlook for the future is looking good as far as our government doing everything they can possibly to make sure that this disease gets contained. The Obama administration just recently here a few years ago passed an Act for more funding of programs to research and find out more about this disease and figure out ways we can treat it. I have never had an experience with this disease or ever known anyone that has had the disease and I pray that I never do. Microbiology has also helped me learn and understand most of the information in this essay. There are many more different bacterium's out there and all we can hope to do is to not get infected with them. My question for scientists would be if they think that this disease can worsen? Overall this bacterium is something not to be messed with and, in my opinion just always keep yourself clean and keeping up good hygiene and trying your best not to get exposed would be my greatest suggestion because you do not have this bacteria in your system (textbookofbacteriology. net/tuberculosis).