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Louis Pasteur is regarded as one of the greatest saviors of humanity, and was responsible of the discovery of pasteurization.

Pasteur's systematic methods of research, scientific approach and insight revolutionized science. The volume of his medical achievements marks him as the single most important figure in the history of medicine. He made numerous discoveries but he is best remembered for his advocacy of the germs theory and advancement in the causes and preventions of disease.

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Louis Pasteur: Early Life and Education

Born on December 27, 1822, in Dole (Jura, France), Louis Pasteur was not a bright student during his elementary years. He was more interested in fishing and drawing. After completing his degrees in Letters and Mathematical Sciences, Pasteur joined the most esteemed French university Ecole Normale Superieure in Paris for graduation. In 1847, he completed his Doctorate of Science. He was appointed as physics professor at the Dijon high school in 1848 and later moved to University of Strasbourg as professor of chemistry.

Louis Pasteur: Works and Discoveries

Pasteur's scientific and medical accomplishments include cure for rabies, anthrax, chicken cholera, and silkworm diseases. He also contributed towards developing the first vaccines and provided logical grounds for fermentation and brewing. Periodically, we can describe the works and discoveries of Louis Pasteur into three phases:

1. 1847 to 1862 (Pasteur as a physicist and a chemist)
2. 1862 to 1877 (Pasteur as a biologist)
3. 1877 to 1887 (Pasteur as a microbiologist)

1847 to 1862 (Pasteur As a Physicist and a Chemist)

Crystallography

Louis Pasteur launched his remarkable scientific career as a chemist studying organic crystals. Through his comprehensive research on crystallography, chemistry and optics, Pasteur demonstrated that a crystal's shape, its molecular structure and its effect on polarized light are all interrelated. Stereochemistry (or spatial chemistry) which initiated the development of chemical synthesis was originated after Pasteur described this fundamental rule:

"Only products originating under the influence of life are asymmetrical, because the cosmic forces that preside over their formation are themselves asymmetrical".

Alcoholic Fermentation

Pasteur's discovery of molecular asymmetry occurred during experimentation on paratartrate crystals. He discovered that under polarized light, inactive substance became active due to fermentation. Based on his experiments, he associated fermentation with life which led him from studying molecular asymmetry to contagious diseases through fermentation.

Pasteur laid foundation for all microbiological techniques through his research on lactic and alcoholic fermentation and defined these principles:

- All fermentation is caused by a microorganism
- There's a particular ferment for every given fermentation
- A sterile culture medium is required for ferment growth
- Medium has to be seeded with absolute ferment particles

1862 to 1877 (Pasteur As a Biologist)

Spontaneous Generation

Pasteur with his research and ingenious experiments on fermentation rejected the long prevailing spontaneous generation theory. In his paper in 1862, he explained that airborne dust carried the germs of yeasts and microorganisms present during the fermentation process. And even the most perishable liquids could be preserved if they were kept away from these germs. Through different innovative yet simple experiments involving grapes,

fermentable solutions and swan-neck flask he clinched the spontaneous generation argument.

Pasteurization: (Wine & Beer Diseases)

Pasteur continued his research and applied his microbiological techniques to agricultural and industrial sectors successfully. His pasteurization process concluded that all fermentable liquid could be prevented from a spoiling with a special heating treatment. This method was particularly implemented to save wines and beers from diseases by heating at 55°C.

Silk Worm Diseases

The silkworm disease destroyed the silk industry all over the world in 1865. Although, Pasteur had no idea about silkworms but he was asked by the Department of Agriculture to investigate this disease. His microscopic study of the worms revealed that the disease was caused by shiny corpuscles. He further established that two types of the diseases Pabrine and Flacherie were hereditary and contagious as well. He invented cellular egg production to terminate the disease. His study of silkworm diseases laid foundation for prophylaxis rules and provided solution for hereditary and contagious problems, and also inspired him to discover germs theory.

1877 to 1887 (Pasteur As a Microbiologist)

Germ Theory of Disease

The discovery of the germ theory of disease remains the pinnacle of Louis Pasteur's scientific career. With his use of microbiology for medicine and surgery he proved that many diseases were caused by the presence of foreign microorganisms. In that connection, he carefully studied and discovered various infectious diseases such as staphylococcus, streptococcus and pneumococcus. He prescribed methods of attenuating microbe virulence (chicken cholera and sheep anthrax). He followed his discovery of germ theory with the utilization of vaccines to prevent diseased like cholera, anthrax and swine erysipelas.

With his analysis and treatment methods for infectious diseases, Pasteur established the immunology branch of science.

Rabies

Development of vaccine against rabies or hydrophobia was the last and the most famous success in the long career of Pasteur's research. Rabies attacked the nervous system and it was considered a dreadful disease for its symptoms and treatment. At first, Even Pasteur failed to find and isolate the germ, but with his excellent experimental method he built an invisible micro-organism to attenuate the virulence. He used the micro-organism to rabbit marrow successfully. Then, for the first time on July 6th, 1885 he treated 9-years old Joseph Meister with his anti-rabies vaccine and the kid recovered perfectly. This milestone transformed Pasteur into a legend.

In 1888, Pasteur Institute was inaugurated in Paris for treatment of rabies and other diseases. Louis Pasteur - the French National hero, died in 1895 at Marnes la Coquette.