Fungal infections have been mentioned in ancient scriptures of Hinduism e.g. Atharva Veda and also in the writings of Hippocrates who described mouths affected with aphthous ulcerations which is now recognized as oral thrush. The earliest recognition of fungi as a cause of disease came from discovery of infection in silk worms by “budding globules of vegetable kingdom capable of reproducing themselves (later identified as Saccharomyces cervicae) by Bassi in 1837. His seminal work inspired many clinicians to investigate fungi as etiological agent for human infections. Since then many dermatologists, surgeons, gynecologists, physicians, botanists, chemists and scientists from various other fields have contributed immensely to the systematic development of medical mycology.

Raymond Jacques Adrien Sabouraud (1864–1938)

Raymond Jacques Adrien Sabouraud was a pioneer dermatologist and mycologist from France. He did extensive work on investigating fungi as a cause of skin diseases. His extensive body of work includes description of more than 50 different species of fungi causing skin infections, X-ray treatment of ring worm infection of scalp and invention of selective media for fungal culture. He also revived and elaborated the work done by Dr David Gruby.

His innovation of a selective agar medium for growth of fungi containing high sugar with low pH called as Sabouraud’s medium was used by microbiologists and botanists all over the world and is in use even today.

He invented a special device for X-ray depilation of hair in ringworm infection of the scalp and introduced the radiation treatment of ring worm infections. He ran a special bald clinic which attracted patients from all over the world. It was said that Sabouraud could tell your moral character, your yearly income and what you have eaten for breakfast by looking at the root of one of your hairs. In addition to being great mycologists he was also a gifted musician and sculptor.

Elizabeth Lee Hazen: (1885-1975)

Elizabeth Lee Hazen was a microbiologist from Albany, New York. She gained rich experience in diagnostic mycology under Dr. Rhonda Benham. In 1944 she devised her own laboratory for the identification of fungi and other organisms. She also published a book, Lab Diagnosis of Pathogenic Fungi Simplified, which is in use even now.

The most important contribution of Hazen was in the discovery of the first antifungal known to man. This was the era when antibacterials were easily available but no antifungal had yet been developed. Her work involved screening of soil samples and their inoculation into nutrient media for growth of actinomycetes. Once growth occurred, this was cultured in liquid medium and sent to Dr Rachel Brown, a chemist who extracted active ingredients from these organism. This was then tested for antifungal properties. Their efforts paid off when they discovered the first antifungal agent initially named fungicidin, now known to us as Nystatin. This was derived from yet undiscovered species of Actinomycetes which was named as Streptomyces moursei.

The discovery of Nystatin and its commercial preparation by Squibb Industries led to the use of Nystatin in various forms for the treatment of moniliasis of mouth, intestine, vagina etc. This discovery also set pace for future development of antifungals from

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actinomycetes including the discovery of amphotericin B by squib industries.

Samuel Taylor Darling

In 1903, the international efforts to construct the Panama Canal were being threatened by the twin biological hazards of yellow fever and malaria.

Samuel Taylor Darling who had graduated from the College of Physicians and Surgeons of Baltimore and had trained in Louis Pasteur’s laboratory was thrust into the tropical hospitals of Panama where he accepted an internship.

Darling identified an apparently new disease process occurring at the Panama Canal. In 1905, he observed an unusual autopsy in a 27 year old black carpenter from the Caribbean island of Martinique who worked on the canal. His lungs were studded with granulomas, which Darling noted to be not as closely packed or as numerous as was found in military tuberculosis. Smears from white granulomas in the lung and from the spleen, liver, and bone marrow revealed an “intense invasion of large endothelial-like cells by small round or oval microorganisms”. Later there were two similar case.

These three patients had presented with symptoms of irregular fever, cachexia, and splenomegaly which was common among canal workers; however, these cases were expressly different from yellow fever and malaria. These patients presented with pustular eruptions and ulcers often around the face and anus, ulcerations in the gastrointestinal tract, and lymph node, spleen, liver, and lung involvement. Darling examined the autopsy tissue samples in more patients who succumbed to this disease. The oval microorganisms were seen within alveolar epithelial cells in the granulomas, while others appeared to be free in the spleen and bone marrow. These microorganisms were surrounded by a clear refractive nonstaining rim. M. tuberculosis could not be isolated. He proposed that the microorganism causing this newly-discovered disease was a protozoan and named the organism Histoplasmosis capsulatum because it invaded the cytoplasm of histiocyte-like cells and was enveloped by a capsule. Darling recorded his observations in six classical papers published from 1906 to 1909 describing the disease.

Histoplasmosis became known as “Darling’s disease”. Nonetheless, his findings were found to have several flaws. Although the microorganism did reside in histiocytes, it was neither a protozoan nor was it encapsulated. However, Darling’s astute findings led to the discovery of a new illness.

Robert Heinrich Herman Koch (1843 – 1910)

He was a celebrated German physician and pioneering microbiologist. The founder of modern bacteriology, he is known for his role in identifying the specific causative agents of tuberculosis, cholera, and anthrax and for giving experimental support for the concept of infectious disease. In addition to his trail-blazing studies on these diseases, Koch created and improved laboratory technologies and techniques in the field of microbiology, and made key discoveries in public health.

During his time as the government advisor with the Imperial Department of Health in Berlin in the 1880s, Robert Koch became interested in tuberculosis research. At the time, it was widely believed that tuberculosis was an inherited disease. However, Koch was convinced that the disease was caused by a bacterium and was infectious, and tested his four postulates using guinea pigs. Through these experiments, he found that his experiments with tuberculosis satisfied all four of his postulates. In 1882, he published his findings on tuberculosis, in which he reported the causative agent of the disease to be the slow-growing Mycobacterium tuberculosis. His work with this disease won Koch the Nobel Prize in Physiology and Medicine in 1905. Additionally, Koch’s research on tuberculosis, along with his studies on tropical diseases, won him the Prussian Order Pour le Merite in 1906 and the Robert Koch medal, established to honor the greatest living physicians, in 1908.

References