Program: Malaria: History and Current Status
Speaker: David C. Matlack, DVM, Director, Physiology Teaching Labs, IU, Bloomington
Introduced by: Alan Schmidt
Attendance: 124
Guest: Courtney P. Carter
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Today's talk was by David C. Matlack, DVM. Indiana University – Bloomington, IN. Dr. Matlack is a graduate of Earlham College and received a DVM from Purdue University in 1984. He is currently Director of the Physiology Teaching Labs at IU. Using old educational posters, he gave a brief review of how Malaria was seen going back to the 1840's. Malaria, unlike many infectious diseases is not a neglected disease. The history of malaria stretches from its origin as a zoonotic disease in primates through to the 21st century.

The first treatment came from the bark of the cinchona tree, which contains quinine. The tree was called the fever tree by the Quechua Indians of Peru and used to reduce the shaking effects caused by severe chills. Jesuit Brother Agostino Salumbrino, who lived in Lima, observed the Quechua using the bark of the cinchona tree for that purpose. The use of the "fever tree" bark was introduced in Europe by Jesuit missionary (Jesuit's bark) Bernabe de Cobo, who explored Mexico and Peru. It was over 200 years later that the active principles, quinine and other alkaloids, of cinchona bark were isolated. Dr. Matlack pointed out that for many years the continents of Africa and India were not on the trading routes because of what was called "bad air".

The clinical indications of malaria are undulating fever, headache, coma, and death. The causes and identification of plasmodium and anopheles was recorded by Johann Meckel by seeing black brown granules in the blood and spleen. Scientific studies on malaria made a significant advance in 1880 when a French army physician, Charles Louis Alphonse Laveran, observed pigmented parasites in the blood of malaria sufferers at the military hospital in Constantine, Algeria. He saw the events of exflagellation as the blood cooled and became convinced that the moving flagella were parasitic microorganisms. Laveran was awarded the 1907 Nobel Prize for Physiology or Medicine "in recognition of his work on the role played by protozoa in the causing disease". In 1897 in India, Sir Roland Ross found malaria parasites in the mosquito and won the Nobel Prize.

The United States realized that the cinchona tree was extremely valuable and began to raise it as a crop in the Pacific Islands. This became a big concern as Japan threatened these islands. The bark of the cinchona tree allowed trading in parts of the world with "bad air" but then it became even more important in its use of keeping the military free of disease. China saw this problem and found and isolated a pharmacologist, Tu Youyou, in a special military project tasked with finding a treatment for malaria and chloroquine resistant malaria. By going back as far as 340 BC in the handbook for prescriptions, she found a herb that was referenced to treat fever. This drug became known as artemisinin and was successfully used in 1979. Tu Youyou became the 3rd person to share the 2015 Nobel Prize for Physiology or Medicine.

Artemisinin is a sesquiterpene lactone containing a peroxide group, which is believed to be essential for its anti-malaria activity. It's derivatives, artesunate and artemether, have been used in clinics since 1987 for the treatment of drug resistant and drug sensitive malaria, especially cerebral malaria which is the worst type of malaria.

As we have learned, the disease continues to change and use of the older drugs was no longer always successful. This was seen in 1930 when a new particularly efficient vector of the gambiae mosquito, native to Africa, invaded Brazil. This caused the greatest epidemic of malaria ever seen in the new world and led to efforts to control the spread of malaria by insecticides. DDT was first used, was very effective, and was used in the National Malaria Eradication Program (1947-52). But DDT was later found to cause cancer and was banned in the US in 1972. Other insecticides are available such as Pyrethrum.

Dr. Matlack showed clearly how this one disease did more to change our world than any other.

Dr. David Matlack