# NOBEL PRIZE: TB CAUSED BY MICROORGANISM

## The current state of the struggle against tuberculosis: summary of Nobel Prize Lecture

### ROBERT KOCH, NOBEL LAUREATE, 1905

When Robert Koch received the Nobel Prize in Physiology or Medicine in 1905, he had a great deal to say about the state of tuberculosis. This was to be expected, as it was his work in determining the origin and means of transmission of tuberculosis that resulted in his Nobel Prize. Everything in this article was synthesized from information on the Nobel Prize website, http://nobelprize.org.

Born 11 Dec 1843, at Clausthal in the Upper Harz Mountains in Germany he studied medicine at the University of Göttingen, and went on to become one of the founders of microbiology. His work on determining the cause of tuberculosis resulted in a set of postulates, known as Koch's Postulates, that are used even today to determine sources of disease.

In his Nobel Laureate lecture, Dr Koch made clear his views on exactly how he viewed the danger of tuberculosis. He stated that tuberculosis of human and cattle were not related, and that the chance of developing tuberculosis from the tubercle bacilli from cattle was minute. (More than 100 years later, we know he was incorrect, and we have 2 papers of the serious nature of transmission of tuberculosis from cattle to humans).

In addition, according to Dr Koch, of humans who were infected with the human-type tubercle bacilli, only infections of the pharynx and lungs were a dangerous source of infection. Dr Koch went further,

**Koch's Postulates**

1.The microorganism must be found in abundance in all organisms suffering from the disease, but not in healthy organisms.

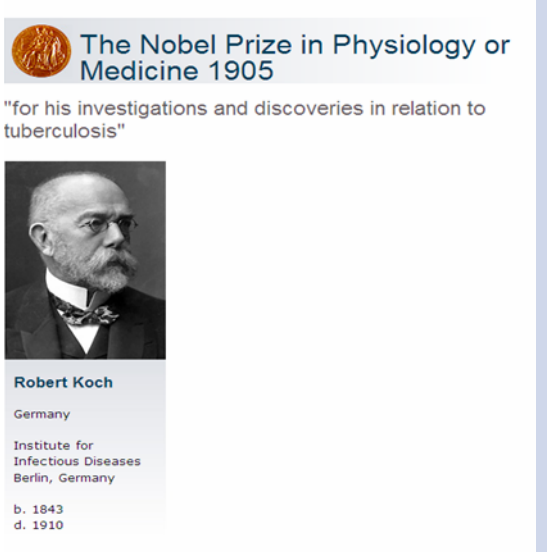
2.The microorganism must be isolated from a diseased organism and grown in pure culture.

3.The cultured microorganism should cause disease when introduced into a healthy organism.

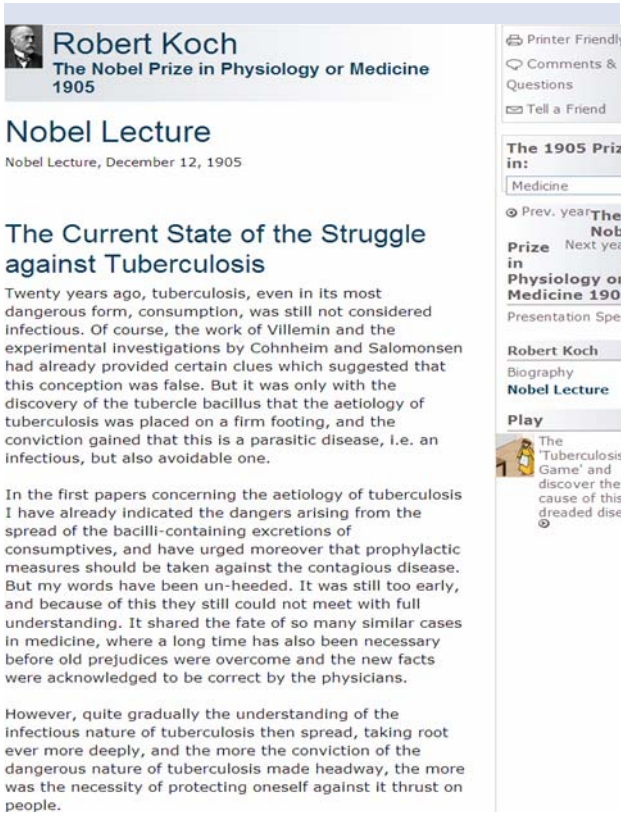
4.The microorganism must be reisolated from the inoculated, diseased experimental host and identified as being identical to the original specific causative agent.)

and declared that even those who had developed pharyngeal or pulmonary tuberculosis could be relatively uninfectious, if specific protocols were enacted. These protocls, which were protective measures, included an infected human taking care where he spat or coughed, living with decent lighting and air circulation, and not crowding the sick into the same rooms as those of the healthy. With these measures, Dr Koch felt that tuberculosis transmission was significantly diminished, except in the case of terminal consumptives.

Dr Koch extolled the virtues of registration of the tuberculosis-infected, the necessity of hospitals in containing the disease, the treatment value of sana-




***Above and right, from the Nobel Prize website, http://nobelprize.org.***



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toria, and the role of social welfare centers. Registration was a necessity, according to Dr Koch, for how else could one combat a disease other than by knowledge of its incidence. Thus reporting of cases, in Dr Koch's opinion, took precedence over the sanctity of a patient's privacy in order to better fight the war on tuberculosis. Hospitals were necessary to remove especially infectious patients, the end-stage consumptives who were too weak to be hygienic and thus prevent the transmission of tuberculosis, from the healthy public.

Dr Koch believed that statistics showing an increased number of consumptives dying in hospitals a good sign, as it meant that these humans were being properly cared for in a place where the chance of their infection spreading was minimized.

Of sanatoria, those places where consumptives were removed from society in the hopes of, with rest, good food, and a healthier climate, recovering from their disease, Dr Koch felt largely in favor of. His complaint was that sanatoria usually just improved the health of a consumptive to the point where he or she could work again. Since the disease was still active, these patients soon became very ill again and in addition were able to spread the disease during their time of productivity. Koch felt that sanatoria should keep patients longer until a full recovery was possible, and that patients should be taken in sooner, not just end-stage consumptives, to increase the likelihood of a full recovery before the disease progressed.


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ANGOLA: TB threatens both workers and patients at Luanda Hospital

Photo: Siegfried/IRIN
The hospital has become a dangerous breeding ground for TB, infecting both staff and patients.

LUANDA, 6 September 2007 (PlusNews) - Luanda Sanatorium Hospital, which has a reputation as being Angola's leading tuberculosis (TB) treatment centre, should be a place of relief and recovery for patients with the disease in the capital, Luanda. But with a lack of protective materials for healthcare workers and crumbling infrastructure, the hospital has become a dangerous breeding ground for TB, infecting both staff and patients.

A survey of 119 of the 400 workers at the healthcare facility found that 70 percent of them were infected by Mycobacterium TB, the bacterium that causes the disease. One in three of these workers will develop active TB and become infectious. "We have workers [that are] infected and sick," the hospital's clinical director, Afonso Wete, admitted.

The survey participants also agreed to be tested for the HI virus. "It's clear that there are some cases of HIV, which are being followed up and put on medication," he told IRIN/PlusNews.

When someone's immune system becomes compromised, for instance by HIV, people infected with TB bacteria are likely to develop an active form of the disease or be more susceptible to infection. TB is a leading cause of death among people who are HIV-positive.

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Social welfare centers, places were treatment and information about tuberculosis could be attained away from the hospitals for poorer humans, helped physicians and hospitals manage the disease. Dr Koch felt that by isolating the sick from their families, thus protecting those families from disease, as well as making it easier for those in their care to recognize signs of tuberculosis, these centers protected the poor from the disease to a greater extent than just the hospitals alone.

Overall, Dr Koch felt the situation of tuberculosis was hopeful, with declining case numbers all over Europe. He believed this the result of improving living conditions for the very poor, enabling them to stay in better health and not in such close proximity, and the dissemination of knowledge of the disease throughout the world. Now that physicians and others alike better understood how tuberculosis was contracted, steps could be taken to avoid the disease. Dr Koch felt that should these promising trends be continued with as victory over tuberculosis was entirely within reach, and until the recent comeback of tuberculosis, he was right.

***By AZD Pekala MS***