

TUBERCULOSIS

[TB, Consumption]

SPECIES: Nonhuman primates, but also nearly all other species used in lab susceptible

AGENT, RESERVOIR AND INCIDENCE: TB is caused by the gram positive, acid fast, aerobic, bacillus of the Mycobacterium genera. The most common species of mycobacteria are: 1. *M. bovis* (cattle, dogs, swine) 2. *M. avium* (birds, swine, sheep) 3. *M. tuberculosis* (man, nonhuman primates, cattle, dogs, swine, psitticines). 4. *M. marinum*, *M. fortuitum*, *M. platypholis* (fish) Note: Atypical mycobacterium, *M. scrofulaceum*, *M. kansasii*, and *M. intracellulare* have been reported in NHP's and are also present in soil and water. They can cause pulmonary disease refractory to treatment in man, and are most often seen in immunocompromised people. Specific reagents can be used to skin test for these bacteria. TB continues to be a major cause of morbidity and mortality throughout the world. One billion people are infected with the tubercle bacillus, and there are 8 million new cases and 3 million deaths annually. Cases of active tuberculosis are increasing in the United States after years of decline. Rates continue to be higher among urbanites, minorities, the poor, the homeless, substance abusers and persons infected with HIV. All three types are capable of causing disease in man although *M. tuberculosis* (variety hominis) is by far the most common. Nonhuman primates can carry all three types but most infections are caused by *M. tuberculosis* variety hominis. While most nonhuman primates are capable of contracting TB, Old World species appear to be more susceptible to the disease than New World species and great apes. Most cases of TB in monkeys are thought to arise from human contact. Animals may be imported from areas of the world where the incidence of the disease is high and where contact between humans and simians is frequent. In close confinement the disease can spread rapidly.

TRANSMISSION: Mycobacterium bacilli are transmitted from infected animals or infected tissue primarily via the aerosol route. May also be contracted via ingestion or cutaneous inoculation of the bacilli. Personnel caring for infected animals as well as those performing necropsies on infected animals are at risk for contracting the disease. Exposure to dusty bedding of infected animals, coughing of infected animals, and aerosolization of the organism during sanitation procedures may also be sources of the disease in the lab environment. Once within the body the organism may spread throughout the lungs, lymphatics, blood vascular system, and many visceral organs.

DISEASE IN NONHUMAN PRIMATES: The signs of TB may be insidious with only slight behavioral changes noticed, followed by anorexia and lethargy. Often animals die suddenly while appearing to be in good condition. Other signs which might be seen include diarrhea, suppuration of lymph nodes, ulceration of the skin, and palpable splenomegaly and hepatomegaly. The organ of predilection is the lung but lesions may also be seen in the pleura, intestines, lymph nodes, liver, kidney, spleen, and peritoneum. Under the surface of these tissues are yellowish-white to gray nodules filled with caseous material which may rupture and produce cavitation. Although skeletal involvement in primates is rare, tuberculosis of the spine may cause paralysis of the hindlimbs (Pott's disease). .

DISEASE IN MAN: In humans the clinical signs depend on the organ system involved. The most familiar signs related to pulmonary TB are cough, sputum production, and hemoptysis. The patient may be asymptomatic for years. General signs may include anorexia, weight loss, lassitude, fatigue, fever, chills and cachexia. Skin lesions are characterized by ulcers or by papular lesions progressing to dark suppurative lesions. TB may affect virtually every other organ system with signs or symptoms relating to the individual system. Miliary TB is most often seen in the very young and old people.

DIAGNOSIS: The diagnosis of TB is often difficult. Four tests are commonly used for presumptive diagnosis: 1. Intradermal TB test - Mammalian tuberculin 2. Radiography 3. Acid fast stained sputum smear 4. ELISA Confirmation by culture, histopath, or animal inoculation.

TREATMENT: Regimens currently accepted in the USA include isoniazid combined with rifampin, with or without pyrazinamide.

PREVENTION\CONTROL: Multifaceted and includes: personnel education wearing of protective clothing when handling nonhuman primates a regular health surveillance program for humans and nonhuman primates isolation and quarantine of suspect animals rapid euthanasia and careful disposal of infected animals Vaccine - A vaccine, BCG, is available (Bacille Calmette-Guerin, strain of *M. Bovis*) a. Used in humans quite often in G. Britain b. Used in high risk groups c. Effective, but it causes the patient to have a positive TB test. Personnel working with NHP's who convert to a positive skin test should be referred for appropriate medical treatment and follow up and should not work with animals until shown to be noninfectious.

BIOSAFETY LEVEL: BL-3

(This publication is courtesy of the University Research Compliance Office, Kansas State University.)