

# Tuberculosis in Wild animals



**Dr Deepak Kumar**

*Assistant Professor*

*Department of Veterinary Pathology*

*Bihar Veterinary College, Patna -14*

*Bihar Animal Sciences University Patna*

# Tuberculosis in Wild animals

- TB is a chronic wasting disease caused by an aerobic, acid-fast rod shaped organisms *Mycobacterium tuberculosis*
- Wildlife tuberculosis (TB) is becoming one of the emerging challenges for conservation globally.
- South Asian region is home to many endangered species like Asian elephants, rhinoceros, and Bengal tigers.
- Recent studies of TB from different wild animals in Nepal and Bangladesh have found that *M.orygis* is an emerging threat of wildlife TB in the region
- Recent studies also revealed an emerging challenge caused by TB to elephants in different South Asian countries like Nepal, India, and Sri Lanka.

# Aetiology

<i>M. tuberculosis</i>	man and animals
<i>M. bovis</i>	man and animals
<i>M. avium</i> , Oryx bacilli	domestic and wild fowl pigs, human monkeys TB
<i>M. paratuberculosis</i>	cattle and sheep- JD
<i>M. leprae</i>	human Leprosy



# Tuberculosis in wild animals



- **A number of cases reported among wild animals worldwide.**
- **In zoo primates TB is due to *M. tuberculosis* and *M. bovis***
- **In Larger land mammals (**Ungulates**), TB is mostly caused by *M. bovis*.**
- ***M. tuberculosis* is the main cause of TB in **Elephants, Rhinoceroses, Tapirs**, and in some exotic bovine spp.**





# Tuberculosis in wild animals

- TB in a chimpanzee at London zoo reported by Owen (1961)
- TB in **Tigers** of Delhi and Darjeeling Zoos (Rathore and Khera, 1981)
- TB in **Lions** of zoological garden Bombay (Das and Jayaro, 1986)



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# animals



Eurasian badger (*Meles meles*) UK



White-tailed deer (*Odocoileus virginianus*)

**Wildlife  
Reservoirs of  
TB**



Cape buffalo (*Syncerus caffer*) A



Wild boar (*Sus scrofa*) S



Brush-tailed possum (*Trichosurus vulpecula*) New

(Wilson *et al.*, 2009)



# Transmission to

# elephants



- Humans activity can lead to an increased level of *M. tuberculosis* being shed into the environment and may result in the spillover of infection into wildlife populations



# TUBERCULOSIS

## Characteristic symptoms

- Low grade fever
- Progressive wasting/ weakness, loss of production
- Coughing



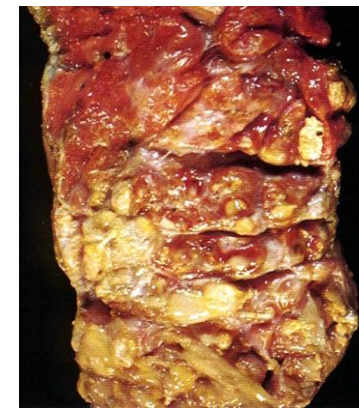
# Pathogenesis

- Development of cell mediated or type IV hypersensitivity to the tubercle bacillus, is probably due to the organism's destructiveness in tissues and also to the emergence of resistance to the organisms
- In response to the lipid content of the bacilli, macrophages are attracted to the area
- Bacilli killed and lipid substance dispersed into the cytoplasm of the macrophage converted into "epithelioid cells"
- Macrophages fuse to form **Langhans'** giant cell with numerous nuclei arranged as horse shoe shaped at the periphery of cytoplasm and together a nodule is formed.

# TUBERCULOSIS

## Macroscopic features

- Consolidation of lungs
- Nodules of tubercle present in lungs containing cheesy mass
- Granulomatous lesions in spleen, lymph nodes, liver and intestines.



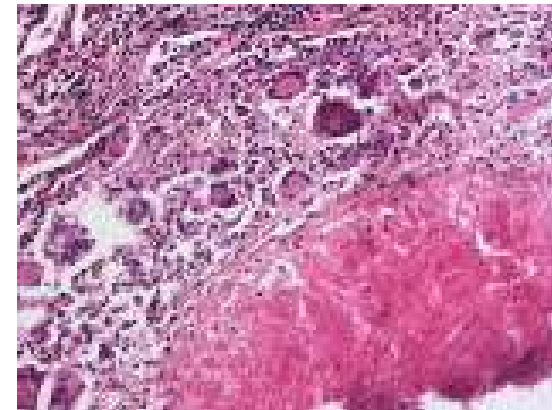
# Microscopically

- **Buffalo** : TB is not characterised by calcification but involvement of retropharyngeal lymph node is frequent
- **Horse** : TB lesions are chronic proliferative; Caseation and calcification rare
- **Sheep and goat** : May get rarely affected by the bovine type with fewer number of foci and early calcification
- **Birds** : calcification is not a feature
- **Swine** : caseo calcareous encapsulated foci mostly affecting lymph nodes of head, neck, mesentery
- **Dogs and cats** : Distinct granulomas with caseous centers

# TUBERCULOSIS

## Microscopic features

- Granulomatous lesions tubercles
- Necrosed area- macrophages, lymphocytes, epithelioid cells and giant cells
- Necrosed area calcified and surrounded by fibrous tissue capsule





# TREATMENT



## Dose and route of administration of Anti-Tubercular drugs in

Elephants

S. No.	Drug	Dose (mg/kg)	Route	Target conc. ( $\mu\text{g/ml}$ )
1.	Ethambutol	30	Oral	2-5
2.	Isoniazid	5	Oral/rectal	3-5
3.	Pyrazinamide	30	Oral/rectal	20-60
4.	Rifampin	10	Oral	8-24

(Guideline for control of tuberculosis, 2008 and Peloquin *et al.*, 2006)

- Standard protocol includes:
    - 2 months with Isoniazid, Rifampin, Pyranzinamide & Ethambutol
    - followed by 4 months of isoniazid and rifampicin
- (Daly *et al.*, 2006)

# References

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