



Diseases of Laboratory Rodents: A Brief Outlook

Nileshkumar Pagrut¹, Subha Ganguly^{2*}, Piyusha Bhainsare³, Vikas Jaiswal⁴, Pawan Kumar Kawareti⁵ and Naveen Kumar Shakya⁶

¹Associate Professor, Department of Veterinary Pathology, Arawali Veterinary College (Affiliated to Rajasthan University of Veterinary and Animal Sciences, Bikaner), Jaipur Road, V.P.O. Bajor, Dist. Sikar, Rajasthan, India

²Associate Professor, Department of Veterinary Microbiology, Arawali Veterinary College (Affiliated to Rajasthan University of Veterinary and Animal Sciences, Bikaner), Jaipur Road, V.P.O. Bajor, Dist. Sikar, Rajasthan, India

³Assistant Professor, Department of Veterinary Medicine, Mahatma Jyotiba Fule College of Veterinary and Animal Science (Affiliated to Rajasthan University of Veterinary and Animal Sciences, Bikaner), Jaipur Road, Dist. Chomu, Rajasthan, India

⁴Assistant Professor, Department of Veterinary Pathology, College of Veterinary and Animal Sciences, Sardar Vallabhbhai Patel University of Agriculture and Technology, Dist. Meerut, Uttar Pradesh, India

⁵Assistant Professor, Department of Veterinary Anatomy and Histology, Arawali Veterinary College (Affiliated to Rajasthan University of Veterinary and Animal Sciences, Bikaner), Jaipur Road, V.P.O. Bajor, Dist. Sikar, Rajasthan, India

⁶Assistant Professor, Department of Veterinary Gynaecology and Obstetrics, Arawali Veterinary College (Affiliated to Rajasthan University of Veterinary and Animal Sciences, Bikaner), Jaipur Road, V.P.O. Bajor, Dist. Sikar, Rajasthan, India

***Corresponding Author:** Subha Ganguly, Associate Professor, Department of Veterinary Microbiology, Arawali Veterinary College (Affiliated to Rajasthan University of Veterinary and Animal Sciences, Bikaner), Jaipur Road, V.P.O. Bajor, Dist. Sikar, Rajasthan, India.

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Abstract

The use of rats as a laboratory animal increased demand of rats in the market. So, it is important to provide disease free animal model for various commercial experimental trials. The rat breeders should have idea about the important infectious diseases of rats to avoid economic loss. Various economically important diseases of rats are described below according to causative agent.

Keywords: Infectious Diseases; Laboratory Animal; Rat

Bacterial Diseases

Murine Respiratory Mycoplasmosis (MRM) MRM is caused by *Mycoplasma pulmonis*. MRM is typically a chronic disease of the upper and lower respiratory tract. Transmission occurs through direct contact, aerosol, and intrauterine (congenital) route. Most infections are sub clinical with Mycoplasma carried in the upper respiratory tract and uterus. A purulent discharge may be found on the nasal mucosa and within the tympanic bullae. Purulent exudate can be found in the trachea and in the bronchi. In some cases, the lungs may be grossly normal. In pneumonic lungs yellow foci of bronchiectasis and red to grey areas of consolidation are found in the lung. Histopathological examination of the lungs may show peribronchiolar lymphoid hyperplasia. A purulent bronchopneumonia may also be present [1].

Streptococcal diseases: These diseases are caused by *Streptococcus pneumoniae* that is an alpha-hemolytic, Gram-positive Diplococcus. Fibrinopurulent pleuritis and pericarditis, fibrinous lobar pneumonia, consolidation of lung lobes, frothy, serosanguinous fluid in trachea and otitis media are common necropsy findings. Histopathologic examination of the lungs reveals a fibrinopurulent bronchopneumonia.

Staphylococcal Dermatitis: A syndrome of ulcerated to scabby skin lesions on the dorsal cervical or cranial regions occur frequently in some rat colonies. In many cases, *Staphylococcus* sp., including *S. aureus* and *S. epidermidis*, have been isolated from the wounds. Since Staphylococcus sp. can be frequently isolated from the nasopharynx and feces of rats with dermatitis, the fastidious grooming and scratching activities of the rat provide a constant source of Staphylococcal inoculums for the wound [2].

Pseudotuberculosis (Corynebacteriosis): Pseudotuberculosis is caused by *Corynebacterium kutscheri*, a Gram-positive short rod. Large, often coalescing, white caseated purulent foci are present in the lungs. Unlike the disease in the mouse, lesions in organs other than the lungs are uncommon.

Tyzzler's disease is caused by *Clostridium piliforme* is a Gram-negative, obligate intracellular rod that produces spores. Infection is established via the fecal-oral route by ingestion of spores. Predisposing factors to disease include age (commonly 3 to 7 weeks) and physiological stresses such as concurrent infections, experimental manipulations or poor housing conditions. Clinical manifestations of Tyzzler's disease include anorexia, hunched posture, distended abdomen, rough hair coat and death. Circumscribed, grayish foci may sometimes be observed in the myocardium [3].

Other Bacterial Diseases: Rats are reservoirs for bacterial diseases that are pathogenic to man. Salmonellosis, especially *Salmonella enterica serovars*, *Enteritidis* and *Typhimurium* have been diagnosed in research and pet rats. Another zoonotic pathogen harbored by rats is the agent of rat bite or Haverhill fever.

Viral Diseases

Corona viruses (RCV and SDAV) Corona virus is an RNA virus with two strains identified to cause disease in rats. Rat corona virus (RCV) causes respiratory infection while sialodacryoadenitis virus (SDAV) infects the upper respiratory tract, Harderian and exorbital lacrymal glands and the submandibular and parotid salivary glands. The SDAV strain causes clinical disease. Chronic exophthalmos can result in exposure keratitis. Lesions include enlarged submandibular and parotid salivary glands, brown-red mottling of the Harderian gland is normal due to porphyrin production [4].

Respiratory Viruses (Sendai virus and PVM) Sendai virus is an RNA paramyxovirus of the parainfluenza type 1 group and PVM is an RNA paramyxovirus of the pneumovirus group. The primary route of infection is by direct contact with infected animals during the first two weeks of infection when the virus is shed. Gross and histologic lesions associated with uncomplicated respiratory virus infection are uncommon.

Parvo viruses (RV, H-I, RMV and RPV-1a) Parvoviruses are single stranded DNA viruses. Multiple species of parvoviruses in rats include Rat Virus (RV or Kilham rat virus), H-I (Toolan's H-I virus), Rat Minute Virus (RMV 1a, 1b and 1c) and Rat Parvovirus 1 (RPV-1a). Clinical disease from RV has been reported when virus is introduced to a naive population. Lesions associated with RV infection include cerebellar hypoplasia, hemorrhagic infarction, and thrombosis of multiple organ systems, focal necrosis, hypertrophy, and vacuolar degeneration of hepatocytes. No pathology has been associated with H-I or RPV-1 infections [5].

Rat Respiratory Virus A respiratory disease has been identified in research rats and is believed to be caused by a virus tentatively identified as "Rat Respiratory Virus" or RRV. The lesions associated with RRV are unlike those of other spontaneous rat viral infections and occur sporadically in rats from infected colonies. Gross pulmonary lesions include 1 to 4 mm grey flat to raised foci randomly distributed throughout all lung lobes at the peak of disease [4,5].

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