

# Oxyuriasis (Pinworms)

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**Background:** Oxyuriasis, pinworms; are a persistent problem of well-managed animal colonies. Pinworms that commonly infect laboratory colonies include *Syphacia muris*, *S. obvelata*, and *Aspiculuris tetraptera*.

**Transmission:** The pinworm life cycle is direct. Adult worms inhabit the colon and cecum. Eggs are shed in the feces or deposited on the perianal region of the rodent. The eggs are very light and aerosolize easily, facilitating infection. Embryonated eggs are ingested, resulting in infection.

It has been shown that embryonated eggs can survive at room temperature for extended periods of time.

**Clinical Signs:** Clinical signs are related to the parasite burden in a particular animal. In general, weanling animals and males tend to be more heavily parasitized.

The infection is usually subclinical, with no apparent clinical signs. However, infected mice can develop rectal prolapses, intussusceptions, fecal impactions, poor weight gain, rough hair coats, bloody feces, and perianal irritation. The disease is usually more severe in athymic nude mice.

**Diagnosis:** Diagnosis is usually based on identification of the parasite eggs in a fecal flotation (*Aspiculuris* sp.) or by examining a tape test (*Syphacia* sp.). Adult worms can also be seen with direct examination of the cecum and colon with a dissecting microscope.

**Effects on Research:** Pinworm infections have resulted in significantly higher antibody production to sheep red blood cells, reduced occurrence of adjuvant-induced arthritis, and impaired intestinal electrolyte transport. As athymic nude mice are more susceptible to these infections, increased morbidity can interfere with research using infected mice.

**Prevention:** To prevent this disease, obtain replacement stocks from sources that are known to be free of disease. Personnel working with infected animals should not enter rooms that contain naïve animals.

All animals should be placed in microisolator caging environments that are handled with the aid of a laminar flow hood using sterile techniques during handling and observation of the animals.

**Eradication:** Currently there are two widely accepted

medication regimens for eradicating pinworms from rodents: ivermectin or fenbendazole. Both methods have advantages and disadvantages for the researcher, animal and animal care staff.

Ivermectin is either applied topically to the perineum of the affected animals or administered in the drinking water. Although ivermectin is not expensive, this treatment regiment is extremely labor intensive. All animals need to be handled daily for 7 to 10 days if it is being applied topically. MI bottles need to be changed daily for 7 to 10 days if it is being administered in the water. Ivermectin can interfere with neurological function and is generally not recommended in colonies doing behavioral research.

Fenbendazole is administered orally through specially prepared rodent chows. These diets are expensive when compared to normal rodent diets. Typically, the rodents are fed the diet containing fenbendazole for at least four 7 to 10-day treatment periods with intervening 7 to 10-day periods of feeding with non-medicated chow. Alternatively, the diet may be given for 6 weeks straight. Fenbendazole may interfere with liver function, making it an undesirable choice for studies that require normal liver function,

Regardless of medication selected, increased sanitation should be practiced. All caging, equipment, and room surfaces should be disinfected as directed by the veterinarian. Generally, compounds such as chlorine disinfectants and quaternary ammonia compounds are recommended. Autoclaving and power washing may also be of benefit.

A recent study (Huerkamp, 2000) suggests that if five fenbendazole treatment periods are used (for a total of 9 weeks of treatment) to treat *Syphacia*, intensive sanitation may not be required for colonies of rats. This is promising information, but may not be applicable to *Aspiculuris* sp. or infections in mice. Further information is required before this can be uniformly recommended, but this method may be suggested by the veterinary staff.

## References:

- Baker, DG. 1998. "Natural Pathogens of Laboratory Mice, Rats, and Rabbits and Their Effects on Research." *Clinical Microbiology Reviews*. 11:231-266.
- Huerkamp, MJ *et al.* 2000. "Fenbendazole treatment without environmental decontamination eradicates *Syphacia muris* from all rats in a large, complex research institution." *Contemporary Topics*. 39(3): 9-12.