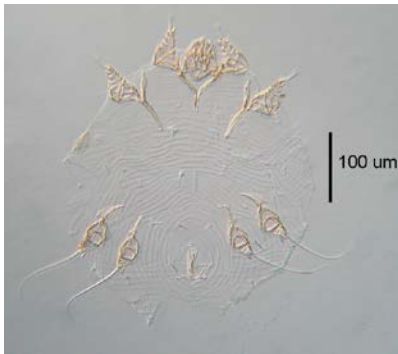




Ear Mange in Rats: The Potential for Importing Foreign Rats and Their Diseases Through International Shipping

What was the study about?

Notoedres muris is a parasitic mite found on rats and other rodent species.



A light microscope image of *Notoedres muris*, collected from a DTES rat

Although *N. muris* cannot infest people, infestation in rats causes an itchy and crusty skin disease primarily affecting the ears and known as 'ear mange'.



A rat with *Notoedres muris* skin infestation affecting the nose and ears. The ear deformity is probably a result of scratching, because the mite infestation is very itchy.

N. muris can only be transmitted through direct physical contact between rats (i.e., it cannot be passed through the environment), therefore studying the distribution of *N. muris* mange in Vancouver rat

colonies can give us clues about rat movement and behaviour.

How was the study conducted?

The goal of the study was to determine if rats collected in Vancouver's Downtown Eastside (DTES) are infested with *N. muris*, and to characterise the distribution of *N. muris* in these rats.

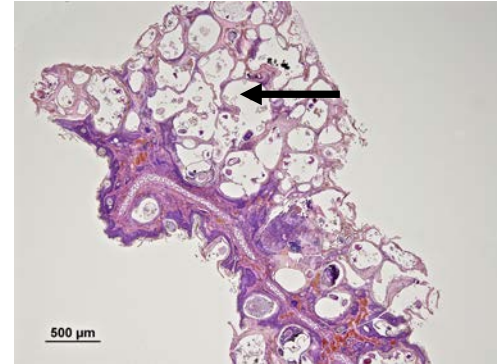
Using humane methods, we trapped 725 rats from back alleys in the DTES and from a nearby international shipping port.

Rats with evidence of mange on physical examination (see example at left) underwent further investigation using light microscopy to confirm the presence of mites.

Knowing the location where each rat was trapped allowed us to analyze the frequency of mange among the different rat colonies.

What did the study find?

Of the 725 rats collected from the DTES, 15 were positive for *N. muris* (2.1%). However, all of these affected rats came from the port (i.e., none of the rats trapped elsewhere in the DTES were positive). In fact, 46.9% of rats trapped in one port facility had mange.



A light microscope image of a rat ear with mange. Note the thickened skin with numerous tunnels containing mites (arrow).

This suggests that:

- 1) Rats stick to their own specific territories and, under normal circumstances, do not interact with rats from nearby colonies. If they did, interact, we would expect to find *N. muris* throughout the DTES.
- 2) The fact that *N. muris* was found only at the port suggests that it was probably brought into Vancouver through international shipping (i.e., through an infested rat 'stow away' from a different country).

Historically, international shipping has been responsible for the importation of rats and their diseases to new areas. This is one of the ways that plague spread around the world, for example.

This document is a summary of the article:

Anholt H, Himsworth CG, Rothenburger J, Proctor H, Patrick DM. *Notoedres muris* in black and Norway rats (*Rattus rattus* and *Rattus norvegicus*) from inner-city Vancouver, Canada. Submitted to Journal of Wildlife Diseases, February 2013.