Wild rats have heart disease! A survey of cardiovascular pathology in wild urban rats

What was the study about?

Very little is known about wild rat ecology, including causes of illness and death. In general, wild rats live less than 1 year, which is comparatively shorter compared to laboratory rats (up to 3 years)!

Understanding why rats die is important since this information can be used to designing control strategies and determine if rat deaths are caused by natural disease or something more serious, such as plague.

Cardiovascular disease may be one of the reasons wild rats die, yet this has never before been thoroughly investigated.

How was the study conducted?

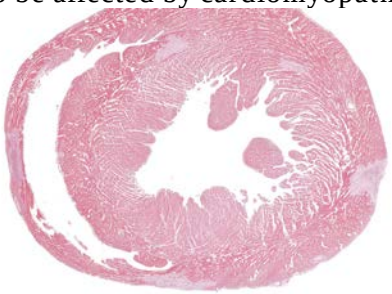
The goal of the study was to determine if rats collected in Vancouver's Downtown Eastside (DTES) have evidence of cardiovascular disease, and to characterise the distribution of cardiovascular lesions in these rats.

Using humane methods, we trapped rats from back alleys in the DTES and from a nearby international shipping port. Small tissue samples of the heart and lung from 200 rats were examined using light microscopy.

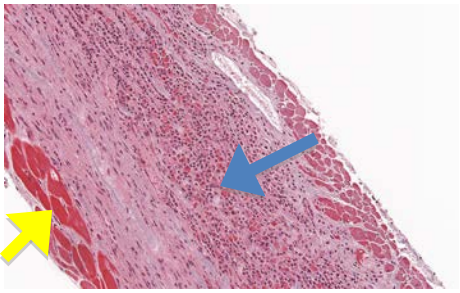
Abnormal changes in the lung blood vessels and heart were categorized and recorded.

What did the study find?

Of the 200 rats examined for cardiovascular pathology, 67 (33.5%) were affected by cardiomyopathy, which includes scar tissue, inflammation and cell death in the heart muscle. Heavier rats and male rats were more likely to be affected by cardiomyopathy.

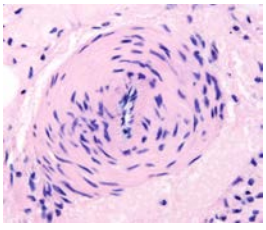


A light microscope image of heart from a DTES rat with many areas of scar tissue and inflammation (pale areas).



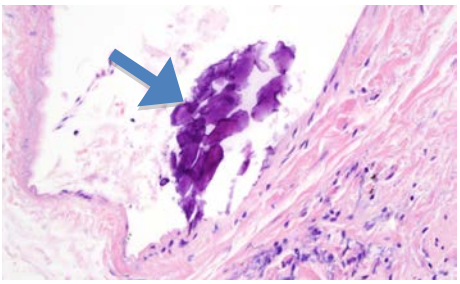
Higher magnification of the heart shown above. There is inflammation and scar tissue (blue arrow) replacing normal heart muscle (yellow arrow).

Abnormally thick blood vessels were present in 40 (20%) rats and were more likely to occur in rats that were sexually mature.



A microscopic image of an abnormally thick blood vessel in the lung of a rat.

Abnormal mineral deposition, found in 38 (19%) rats, was more common in heavier rats and black rats.



An area of mineralization (arrow) in the wall of a blood vessel in the lung of a rat

This suggests that:

1) Wild rats are affected by similar heart disease as laboratory rats and other species, including humans.

Lab rats, which are the same species as wild rats, are commonly affected by cardiomyopathy. This is the most important background change in drug discovery studies. Finding similar disease in wild rats suggests this is a species tendency rather than something induced by domestication, experimental medications, or lab environments.

2) The effect of cardiovascular disease on individual rats is unknown, but may be an important factor contributing to the short lifespan of wild rats.

This document is a summary of the article:

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