

A dog can smell diseases

Metabolomics involves the study of the body's metabolic products, also known as metabolites, and their structure and operation in cells, the blood and secretions. The key issue is understanding the significance of metabolites and their effect on human wellbeing and health. Soile Rummukainen is using metabolomics to study canine and human cancers. Her goal is to identify olfactory molecules related to cancer.

Susanna Paavilainen, the Managing Director of the Wise Nose association, which specialises in training dogs to distinguish between various smells, found her dog Kössi sniffing a specific area of another dog's skin. She realised that something was wrong. Eventually, it was discovered that the other dog had gum cancer. She figured out that, thanks to its acute sense of smell, a trained dog could detect cancer in other dogs.

Cancer detected with 100% accuracy

A multidisciplinary research project was started between the University of Helsinki's Faculty of Veterinary Medicine, Wise Nose, Aqsens Health Ltd. and the University of Eastern Finland. First, the dogs are trained to identify signs of canine mammary tumours from urine samples. According to tests, sniffer dogs' results were good, with cancer detection of almost 100 per cent. This method will now be extended to detecting prostate and breast cancer.

Dogs have an extremely acute sense of smell. An average-size dog has up to 220 million olfactory receptors, compared to just 5 million in humans. This means that dogs' sense of smell is thousands of times better than that of humans. A mass spectrometer used for the detection of organic matter generally needs some ten billion molecules before anything shows in the reading. A dog can smell out a disease from a much smaller number. In a test conducted at the University of Eastern Finland, Kössi only needed a sample with ten molecules.

Dogs' findings analysed with mass spectrometer

Metabolites are compounds of low molecular weight that are involved in various cell

metabolism functions. These small molecules cannot be seen or detected directly. Instead, you need measuring devices, such as mass spectrometers, which create signals for subsequent analysis.

Soile Rummukainen, an early stage researcher at the School of Pharmacy at the University of Eastern Finland in Kuopio, uses a mass spectrometer to study cancer samples sniffed out by dogs.

