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Consideration of expanding the use of N-NOSE for pets

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Caenorhabditis elegans, a type of nematode has an excellent sense of smell, and it is known that there are approximately 1200 olfactory receptors, which is about 1.5 times that of dogs. Hirotsu et al. have already reported that *C. elegans* is not attracted to the urine of cancer patient by disrupting a neural gene involved in the reception of volatile substances. Imaging experiments confirmed that the sensory nerves of *C. elegans* were significantly activated for the cancer urine. From these results, it was suggested that *C. elegans* detects cancer odor in urine. Nematode nose (N-NOSE) was developed as a cancer screening test using the sense of smell of *C. elegans* with such characteristics. This test is non-invasive and has been suggested to be able to detect 15 types of cancer so far. In clinical trials by N-NOSE, *C. elegans* showed high sensitivity, especially for early cancers. Among them were early pancreatic cancer, which is said to be difficult to detect.

Like humans, cancer is one of the most serious illnesses in veterinary medicine. Therefore, we evaluated the responsiveness of *C. elegans* to canine and feline urine samples by N-NOSE. Previous studies in humans have reported that the reactivity of *C. elegans* differs depending on the dilution rate of urine even in the same sample. In this case, considering the urinary characteristics of dogs and cats, we evaluated samples with four concentrations of 10⁻¹ to 10⁻⁴. The statistical analysis by Welch's t-test showed a significant difference between healthy and cancer values at all concentrations. Statistics in dogs were good at all four concentrations, while cats were particularly good at low concentrations. In summary, we have shown that *C. elegans* can significantly detect cancer in the urine of dogs and cats.

Biography

Toshimi Sugimoto has research experience specializing in transcription factors and stem cells. Based on her expertise, she has also been involved in the development of anti-cancer, immunosuppressive and anti-pancreatitis treatments. She joined Hirotsu Bioscience Inc. in 2017 to take advantage of her extensive research experience. In her current affiliation, she is enthusiastic as one of the practical members of N-NOSE and as the leader of clinical analysis projects.

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