

Publication of Large-Scale Clinical Study Results
for Nematode-Based Cancer Screening Method "N-NOSE"

– Detection of Over 20 Types of Cancer with High Sensitivity,

Contributing to Early Cancer Detection –

HIROTSU BIO SCIENCE INC. (Head Office: Chiyoda-ku, Tokyo; Representative; Takaaki Hirotsu (Hereinafter referred to as "HIROTSU")), has conducted a collaborative clinical study with the National Cancer Center and published the results of a large-scale clinical trial verifying the effectiveness of the innovative cancer screening test "N-NOSE" using nematodes as an original research paper.

In this clinical study, in addition to the 15 types of cancer previously reported to react to "N-NOSE", it was newly revealed that nematodes also respond to gingival cancer, tongue cancer, parotid gland cancer, thyroid cancer, mediastinal tumors, malignant pleural mesothelioma, thymic cancer, peritoneal cancer, testicular cancer, ureteral cancer, malignant lymphoma, and malignant melanoma.

■ Research Summary

- Period: May 2017 to March 2021
- Participants: Urine samples were collected from 1,664 newly diagnosed cancer patients at the Cancer Center (951 males, 713 females)
- Method: "N-NOSE" screening was conducted

■ Summary of Study Results

1. The overall sensitivity of cancer detection ranged from 60-90%
2. High sensitivity was demonstrated for lung cancer, breast cancer, stomach cancer, colorectal cancer, cervical cancer, and prostate cancer, which are common worldwide
3. Detection of over 20 types of cancer

4. High sensitivity was shown even for early-stage cancers

These results indicate that "N-NOSE" has a high potential to detect small, early-stage cancers even without noticeable symptoms.

■ Details of the Paper

- Title: A Non-Invasive Screening Method Using *Caenorhabditis elegans* for Early Detection of Multiple Cancer Types: A prospective clinical study
- Authors: Hideyuki Hatakeyama, Masayo Morishita, Aya Hasan Alshammari, Umbhorn Ungkulpasvich, Junichi Yamaguchi, Takaaki Hirotsu, Eric di Luccio
- Journal: *Biochemistry and Biophysics Reports*, 39:101778, 2024 (peer-reviewed)

In Japan, over 600,000 people have already undergone the "N-NOSE" test, demonstrating its practicality and effectiveness not only through clinical studies but also in real-world applications. Our company will continue to strive to improve the accuracy of "N-NOSE" daily, contributing to the early detection of cancer worldwide.

■ About HIROTSU BIO SCIENCE

We as HIROTSU aim to protect the health and future security of people through research, development, and practical application of unique technology that utilize the capabilities of living organisms. Established in 2016, N-NOSE was put into practical use thanks to our researchers' abundance of ideas and tireless efforts. Despite the importance of extending healthy life expectancy being emphasized, it is said that one in every two people will be diagnosed with cancer in this age of 100-year life expectancy. We strive to contribute to solving these social issues with our groundbreaking "bio-diagnoses" technology that utilizes the power of nematodes.

Company Name: HIROTSU BIO SCIENCE INC.

Headquarters: 22F New Otani Garden Court, 4-1 Kioi-cho, Chiyoda-ku, Tokyo

Representative: Takaaki Hirotsu, CEO

Date of Establishment: August 2016

Main Service: Research, development, and marketing of cancer screenings using nematodes and nematode olfactory sensors.

Official Website: <https://hbio.jp/en/>

■ About “N-NOSE”

A primary screening test for cancer that utilizes the highly accurate detection of cancer-specific odors in human urine by the nematode *C. elegans*, which has a very good sense of smell. By simply submitting urine, the test is simple, inexpensive, highly accurate, and provides a whole-body comprehensive examination of early-stage cancer risk.

Official Service Website: <https://jp.n-nose.com/>

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