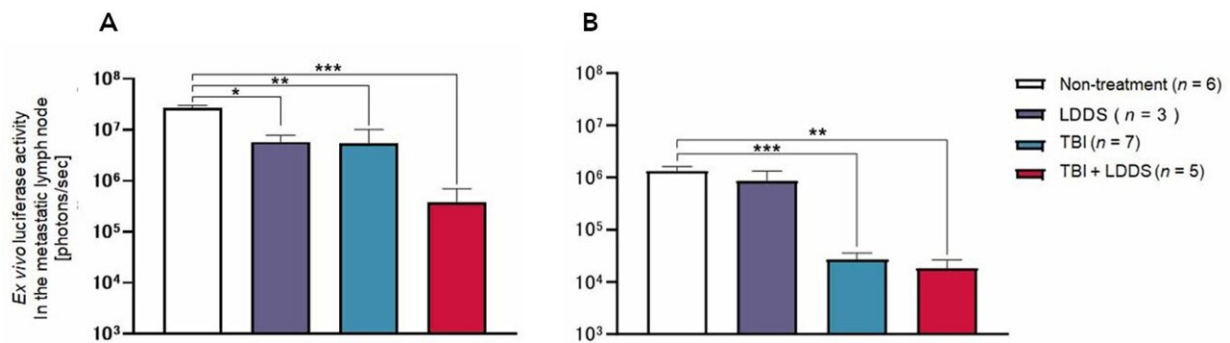


Research team creates more effective lymphatic cancer therapy

September 14 2022



The ex vivo bioluminescence intensity of the metastatic LN was lowest in the Single M-TBI + LDDS group, followed by the Single M-TBI group and the LDDS group, and all these groups exhibited significantly lower levels than the Non-treatment group (Fig. 1A). The ex vivo bioluminescence intensity in the lungs of the Single M-TBI and Single M-TBI + LDDS groups were statistically significantly lower than that of the Non-treatment group (Fig. 1B). Credit: Tohoku University

Lymph node (LN) metastasis is a sign that things are going from bad to worse in cancer patients, and prompt treatment is vital.

A research team from Tohoku University's Graduate School of Biomedical Engineering has developed a lymphatic drug delivery system (LDDS), where [anticancer drugs](#) are injected directly into the metastatic

LNs. When combined with total-body irradiation (TBI), the new LDDS has a superior antitumor effect than conventional chemotherapy on early stage LN metastasis.

TBI provides a uniform dose of radiation to the entire body, penetrating areas in which traditional chemotherapy cannot reach. Recently, TBI has shown positive results in activating immune responses and altering the [tumor microenvironment](#). Meanwhile, LDDS is mainly used for treating metastatic LNs locally.

The research team hoped to widen LDDS's usage to prevent distant metastases—where the cancer spreads from the [primary tumor](#) to a distant lymph node. "We knew a combination of treatment that enhances systemic tumor immune effects would be an important therapeutic strategy," said graduate student Shota Sora, who was part of the research team headed by Professor Tetsuya Kodama.

Sora and his colleagues investigated the dual therapy of LDDS and TBI for LN and distant metastases on metastasis model mice. They used irradiation gamma rays (a onetime dose of 1.0 GY) and anticancer drug CDDP adjusted with a solvent to have an osmotic pressure of 1987 kPa and a viscosity of 11.3 mPas.

An in vivo bioluminescence imaging system, a high frequency ultrasound system, and histology showed the [new therapy](#) was more effective than employing LDDS or TBI alone. After the therapy, the expression of immune-response related genes (CD4, CD8, and IL-12b) increased in the spleen, indicating an activated immune response.

"With the results showing that both TBI and LDDS improve the efficacy of LB metastasis and distant metastases therapy, this novel approach is a promising way to treat [cancer patients](#)," added Sora.

Details of their research were published in the journal *Cancer Science* on September 9, 2022.

More information: Shota Sora et al, Combination therapy of lymphatic drug delivery and total-body irradiation in a metastatic lymph node and lung mouse model, *Cancer Science* (2022). [DOI: 10.1111/cas.15562](https://doi.org/10.1111/cas.15562)

Provided by Tohoku University

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