



PRESS RELEASE

## **Commencement of Clinical Trial of Boron Neutron Capture Therapy (BNCT) for Malignant Melanoma and Angiosarcoma**

November 7, 2019

Cancer Intelligence Care Systems, Inc.  
STELLA PHARMA CORPORATION  
National Cancer Center Japan

Cancer Intelligence Care Systems, Inc. ("CICS;" President: Tetsuya Furukawa; headquarters: Koto-ku, Tokyo; consolidated subsidiary of Resorttrust, Inc.) and STELLA PHARMA CORPORATION ("STELLA PHARMA;" President: Tomoyuki Asano; headquarters: Chuo-ku, Osaka; a consolidated subsidiary of STELLA CHEMIFA CORPORATION) will commence a Phase I clinical trial ("the Trial") of Boron Neutron Capture Therapy ("BNCT") for malignant melanoma and angiosarcoma, using the CICS-1 accelerator-based neutron capture therapy device with lithium targets developed by CICS, and the SPM-011 boron compound for use in BNCT developed by STELLA PHARMA, beginning in November 2019. The Trial will be conducted in the National Cancer Center Hospital ("the Hospital;" Director: Toshiro Nishida; Chuo-ku, Tokyo) of the National Cancer Center Japan ("NCC;" President: Hitoshi Nakagama; Chuo-ku, Tokyo).

BNCT is a method of cancer treatment in which a specially formulated compound of boron ( $^{10}\text{B}$ ) is injected intravenously and after the compound selectively accumulates into cancer cells, patients are exposed to external neutron radiation, causing the boron and neutrons to react, producing alpha rays and Li nuclei that selectively destroy cancer cells. This treatment method was first conducted in the U.S. in 1951 using neutron source from a nuclear reactor, and clinical research began in Japan in 1968.

CICS concluded a joint research agreement with NCC, and an accelerator-based neutron capture therapy device was installed when the Hospital's clinical building was completed in 2014. Since then, non-clinical tests have been carried out until now.

The Trial aims to evaluate the safety and tolerability of BNCT using the CICS-1 accelerator-based neutron capture therapy device and the SPM-011 boron compound.

## **Overview of the Trial**

### Participants

The Trial is designed for patients suffering from malignant melanoma or angiosarcoma, both of which are forms of skin cancer. Patients who have been diagnosed histopathologically with tumors originating on the skin and no lymph node metastasis or distant metastasis will be considered for the Trial.

Malignant melanoma and angiosarcoma are currently treated using surgery, pharmacotherapy or radiotherapy, depending on the symptoms and prognosis of the disease. Surgical removal of the cancer is generally preferred. However, extensive surgical excision can deteriorate the patient's quality of life seriously, and research today aims at establishing more effective treatments with fewer side-effects, which reduce patient burden.

### About BNCT

Boron Neutron Capture Therapy (BNCT) is a form of radiotherapy. It utilizes a nuclear reaction –  $^{10}\text{B}(n,\alpha)^7\text{Li}$  – that occurs through boron ( $^{10}\text{B}$ ) neutron capture reaction. Cancer cells selectively accumulate a specially formulated compound of boron ( $^{10}\text{B}$ ), and then the tumor is exposed to external, low-energy neutron radiation. This causes the boron ( $^{10}\text{B}$ ) to capture neutrons and causes a nuclear reaction –  $^{10}\text{B}(n,\alpha)^7\text{Li}$  – releasing alpha rays and Li nuclei. The ranges of these particles are short, with about  $9\mu\text{m}$  and  $4\mu\text{m}$  respectively, about the size of a single cell. Due to their short ranges, the particles lose most energy within the cancer cell itself, selectively killing the cancer cells without affecting the surrounding normal cells.

### About SPM-011

SPM-011 is a boron compound (generic name: borofalan ( $^{10}\text{B}$ )) created by STELLA PHARMA CORPORATION for use in BNCT. In previous clinical research, problems with the compound's instability had become apparent, but SPM-011 resolves these issues through innovations in the solubilizing agent. SPM-011 also uses  $^{10}\text{B}$  at a concentration of more than 99%, thanks to the  $^{10}\text{B}$  concentration technology, unique in Japan, owned by STELLA CHEMIFA CORPORATION, the parent company of STELLA PHARMA.

### About CICS-1

CICS-1 is an accelerator-based neutron capture therapy device developed by CICS. It produces neutrons by bombarding a lithium target with protons which are accelerated by a Radio Frequency Quadrupole (RFQ) linear accelerator. CICS-1 is notable for the low level of contamination of fast neutrons, which are detrimental to the human body. The neutrons produced have a low energy level of 800keV or less, facilitating the miniaturization of the moderator used to slow the neutrons down to around 10keV, a level suitable for BNCT.