Targeting the root of cancer

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Cambridge Scientists develop technology that could lead to effective cancer treatments

University of Cambridge scientists have developed a new technology that could potentially lead to more targeted and effective treatments for some cancers and ultimately rid the body of the disease.
Developed by Dr Toru Kondo, a neurobiologist at the Centre for Brain Repair at the University of Cambridge and colleagues from Kumamoto University in Japan, the technology separates cancer stem cells from cancer cell lines making it possible to target the 'parent' cancer stem cell and potentially destroy the source of the malignant tumours, while leaving normal stem cells unharmed.

The technology, derived from the premise that some cancer cells behave similarly to stem cells in that they are capable of unlimited proliferation, have the ability to give rise to multi-lineage cells, and may be difficult to eradicate with standard anti-cancer treatments. The scientists showed that certain cancer cell lines contain cancer stem cells that are prolific in their ability to produce a massive number of cancer cells and so create malignant tumours.

Dr Kondo says in order to successfully eliminate cancer stem cells, it is important that their unique targetable features be identified. For example, cell-surface proteins (membrane proteins) that are specific to cancer stem cells can be targeted with specific antibodies to kill the cancer stem cells. Similarly, other unique cancer stem cell targets could be hit with additional classes of drug compounds including small

molecules. As a result of this type of targeted therapy the danger of recurrence of cancer would be eliminated.

Current treatments such as chemotherapy and radiation although successful at destroying cancer cells (i.e. tumor bulk) are unable to completely eliminate the critical cancer stem cells, hence allowing them to recreate the cancer. It is therefore believed that cancer stem cells are the root for the malignancy.

The University of Cambridge has licensed the technology to a U.S.-based Biotechnology Company, Stemline Therapeutics, a leader in this area, in return for milestone payments and royalties on products that will be used for cancer treatments. The University believes that Stemline is the ideal partner to protect, develop and advance oncology compounds arising from this collaboration through pre-clinical development and ultimately into human trials.

Dr Kondo will collaborate with Stemline Therapeutics in developing the technology further.

The technology and potential treatment can be used in conjunction with existing cancer treatments, targeting and destroying both cancer stem cells and cancer cells.

"Many cancers contain cancer stem cells that are responsible for their malignancy and in order to cure cancer they have to be eliminated. Our findings provide a simple and general strategy for doing so and I am optimistic that working along with Stemline Therapeutics will yield important advances in cancer treatments," said Dr Kondo.

Ivan Bergstein, CEO of Stemline Therapeutics, added: "Once we have eradicated the cancer stem cells, in essence we have destroyed the engine responsible for treatment failure and disease recurrence, the major

problems when fighting cancer. Importantly, Dr. Kondo has developed an exciting new system to both isolate cancer stem cells and to screen drug candidates for anti-cancer stem cell activity."

Commenting on the agreement David Secher, Director of Research Services at the University of Cambridge said: "Cancer is a disease that affects almost everyone, directly or indirectly. We are very pleased with the agreement between Stemline Therapeutics and the University and hopeful that this collaboration will result in effective cancer therapeutics."

Source: University of Cambridge