Karolinska and NTU make cancer discovery

A team of 13 international scientists, including the Swedish Professor Sven Pettersson as one of two principal investigators, in a joint multidisciplinary study by Nanyang Technological University (NTU) and Sweden’s Karolinska Institutet, have announced a significant breakthrough. They discovered that an existing chemotherapy drug used to treat leukaemia could prevent and control the growth of colorectal tumours, commonly referred to as colon cancer.

Colorectal cancer is one of the three most common cancers worldwide and the most common in Singapore. Almost 95 per cent of colorectal cancers are from malignant tumours.

The research team found that Imatinib, an enzyme blocker widely used to treat leukaemia, works by blocking a signalling pathway related to a group of cell receptors called EphB. This means that when used to treat mice with colon tumours, it was able to halve the growth of tumours in the intestines.

The finding is also significant as currently there is no drug available to prevent the recurrence of tumours in the intestine after the cancerous tumours have been removed by surgery.

Sven Pettersson is Professor of Metabolic Disease at NTU’s Lee Kong Chian School of Medicine and senior principal investigator with the National Cancer Centre Singapore.

The discovery was published on April 2 in the prestigious academic journal Science Translational Medicine.

“Our work has important clinical implications, since Imatinib is a potentially novel drug for the treatment of tumour formation and cancer progression in patients predisposed to develop colorectal cancer,” said Prof Pettersson, who is also a Professor of Host-Microbe Interactions at Karolinska Institutet.

Dr Parag Kundu, a senior research fellow with Prof Pettersson’s lab and the first author of the study, said that in their tests, Imatinib was able to block tumour initiation at the stem cell level by half and significantly reduced tumour growth and proliferation.

“In mice which mimicked human colon cancer, Imatinib was shown to prolong their life span,” Dr Kundu said. “The drug was also effective in increasing the survival of mice which had late-stage tumours and rectal bleeding.”

The same effects were also shown when Imatinib was tested on colon tumour tissues taken from human patients.

Colon cancer usually develops first as benign tumours, which when left untreated turn aggressive, and may spread to other parts of the body. The main treatment in the early stages of colon cancer is through resection, where the affected section of the intestine is removed through surgery.

The scientists said these findings also suggest that short term intermittent chemotherapies could be possible as a treatment model, as this would substantially reduce the side effects known to occur when Imatinib is given for longer periods.

“Our findings provide experimental evidence that Imatinib treatment did not interfere with the tumour suppressor function of EphB receptors,” said Jonas Frisén, Professor of Stem Cell Research at Karolinska Institutet, who co-supervised the study.

This is beneficial as EphB receptors also function to keep the tumour intact, which prevents cancerous cells from spreading to surrounding tissue should the tumour break apart.

The multidisciplinary study was conducted over a period of five years, at both NTU and the Karolinska Institutet.

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