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## **Professor Jeong-Seok Nam's research team creates cost-effective chemotherapy to target cancer stem cell through development of new drugs**

- GIST (President Seung Hyeon Moon) The research team of Professor Jeong-Seok Nam of School of Life Sciences succeeded in developing a new anti-cancer strategy that inhibits cancer stem cells, which is the cause of cancer development and recurrence.
  - The early diagnosis and improved treatment of cancer have greatly improved the survival rate of cancer patients, but many patients still suffer from metastatic recurrence after chemotherapy.
- Professor Jeong-Seok Nam discovered a new therapeutic target for niclosamide, a widely used anti-parasitic drug, and found a therapeutic strategy to control surviving cancer stem cells by administering anticancer drugs. This is significant in that it provides an experimental basis for treating refractory malignancies.
- The cause of colorectal cancer is not known, but genetic and epigenetic changes accumulate and it is known that the cells are transformed and tumors develop. The Wnt signal, which is a major signal contributing to the development of colorectal cancer, is known in particular to

activate the formation and proliferation of cancer stem cells, and strategies for understanding and blocking the action of the Wnt signal have been actively studied.

- The research team found that the niclosamide drug, widely used as an insect repellent, effectively suppresses the Wnt signal and controls the formation and proliferation of cancer stem cells and studied its mechanism. As a result, Doublecortin-like kinase 1 (DCLK1) exists as two homologous proteins, DCLK1-B is specifically expressed in cancer stem cells, and is essential for cancer stem cell formation and proliferation and resistance to chemotherapy.
  - The research team tested the efficacy of niclosamide in an inflammatory colorectal cancer model (AOM/DSS) similar to pre-human colon cancer. Inhibition of DCLK1-B expression through niclosamide inhibited the formation of cancer stem cells, lowering the incidence of cancer. In addition, in the model of transplantation of patient-derived cancer tissues (PDX), the rate of cancer stem cells in the cancer tissue treated with the niclosamide was significantly lowered as well as the ability of the cancer stem cells to regenerate the cancer was also lowered.
- Professor Jeong-Seok Nam said, "This study revealed the mechanism by which niclosamide specifically inhibited ameloblast cells through DCLK1-B. This treatment strategy has great significance, as it opens the possibility of developing new cancer therapy to prevent cancer occurrence and to treat malignant cancer in the future.
- This research led by Professor Jeong-Seok Nam was supported by the Korea Health Technology R&D Project through the Korea Health Industry Development Institute, the Korea National Research Foundation, and GIST GRI. The results were published in *Clinical Cancer Research* on November 16, 2018.

