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## **Professor Jae Il Kim and Professor Jeong-Seok Nam's joint research team discovers a peptide targeting cancer cells that enhance efficacy and reduce side effects**

- The number of cancer patients has increased significantly with the rapid aging of the population. Although the survival rate of cancer patients has greatly improved through the early diagnosis of cancer and the development of new treatments, many patients still suffer from side effects of chemotherapy.
- Recently, the discovery of cancer cell specific binding peptide ligand\* that does not act on normal cells but specifically binds to tumor cells has attracted attention in the development of new cancer diagnosis and therapeutic substances. Peptides have the advantage of being highly biocompatible, less toxic to metabolites, and capable of chemical transformation.

\* ligand: A substance that specifically binds to large molecules such as receptors. Ligands are important elements *in vivo* and play a large role in the development and use of pharmaceuticals.

- GIST (Gwangju Institute of Science and Technology, President Kiseon Kim) School of Life Sciences Professor Jae Il Kim and Professor Jeong-Seok Nam's joint research team discovered a new peptide ligand (AGM-330) that specifically binds to nucleolin (NCL). NCL is a protein that is specifically over-expressed on the surface of cancer cells, and the discovery of a novel peptide ligand (AGM-330) that

binds to NCL is significant in that it is receiving attention as a biomarker for predicting and diagnosing tumor risk.

- The research team confirmed that the new peptide ligand (AGM-330-PTX) linked with the anti-cancer drug Paclitaxel (PTX) was significantly more effective in suppressing tumors than the PTX by itself in animal models where human breast cancer was induced. Therefore, the new peptide ligand (AGM-330) is expected to be used as a carrier to enhance the efficacy of anticancer drugs.
  - Paclitaxel (PTX) is a poorly soluble anti-cancer agent that is used in conjunction with a toxic agent such as a surfactant, but, by improving the solubility of PTX in water by linking it to the new peptide ligand (AGM-330), it does not require the use of toxic agents. Therefore, the new peptide ligand (AGM-330) is expected to reduce the toxicity of the anti-cancer agent itself as well as the side effects of the toxic agent.
- Professor Jae Il Kim said, "This study's greatest significance is in confirming that the new peptide ligand (AGM-330) specifically binds to cancer cells. The discovery and development of new peptide in the future can be used for early diagnosis of cancer and is expected to enhance the efficacy of existing anticancer drugs and reduce side effects."
- This research was led by GIST School of Life Sciences Professor Jae Il Kim and Professor Jeong-Seok Nam and conducted by Ph.D. student Jae-Hyun Kim as first-author with support from the National Research Foundation of Korea, the Ministry of Education, and the GIST Research Institute and was published on July 14, 2020, in *Theranostics*, a leading international journal in biomedical sciences.

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