

3D bioprinting technology developed for cancer immunotherapy

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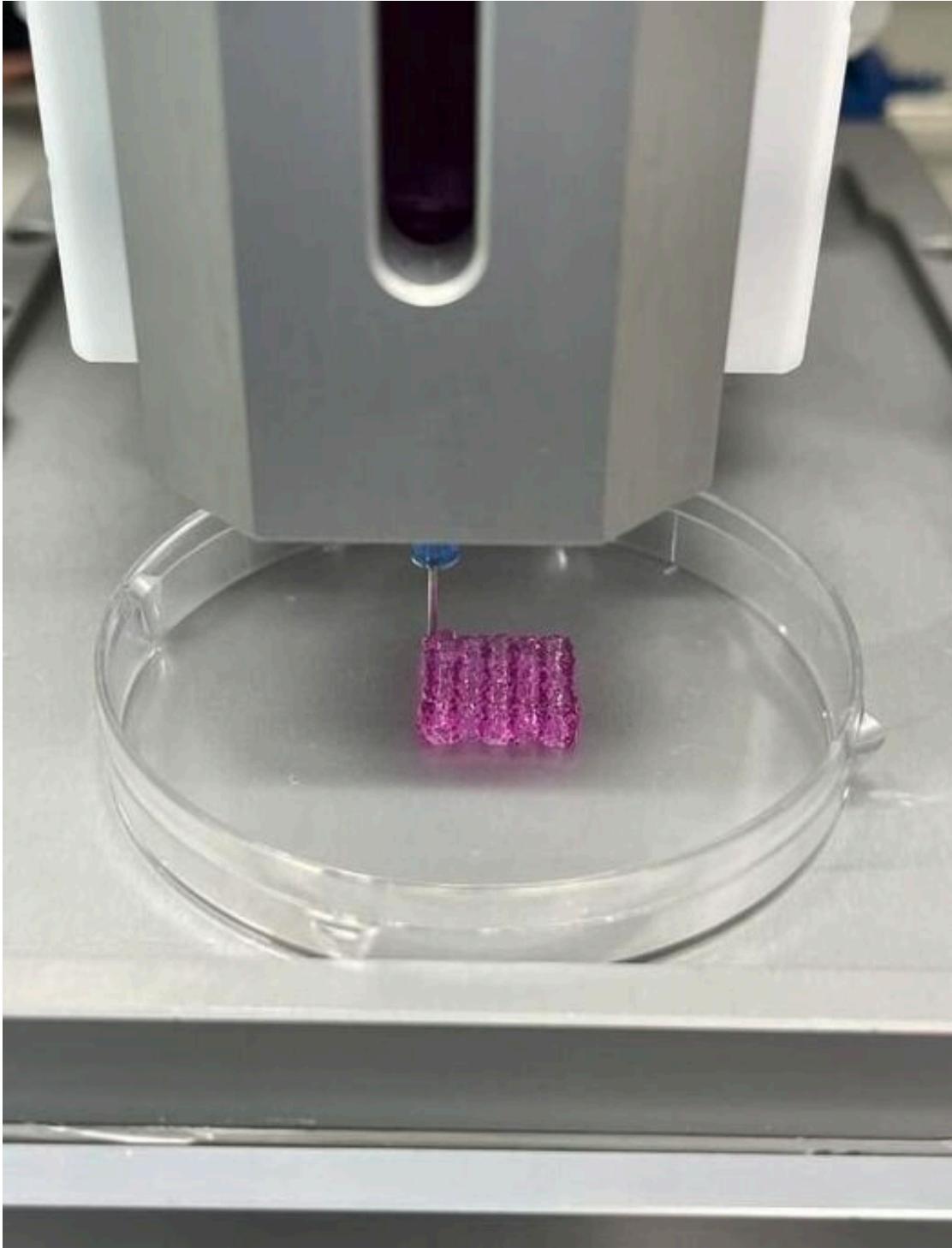


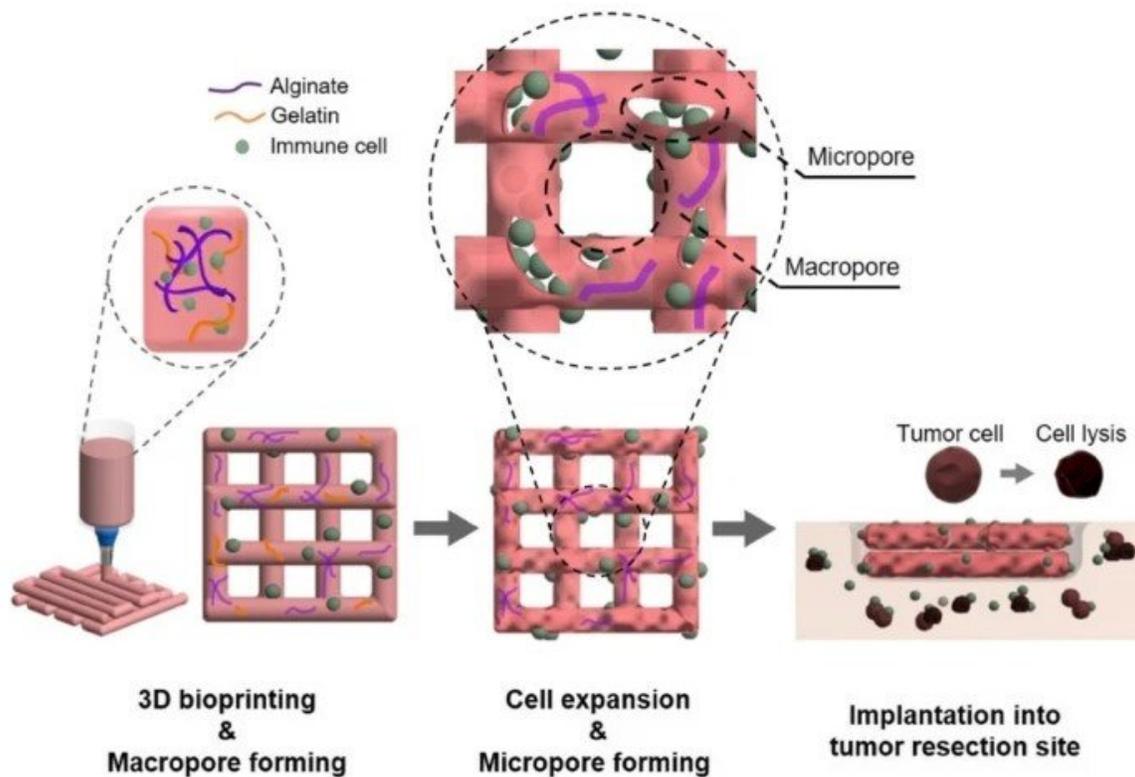
Image showing the preparation of hydrogels that enhance the viability of NK cells. Credit: Korea Institute of Machinery and Materials (KIMM)

A three-dimensional (3D) bioprinting technology capable of eliminating cancer cells using the function of immune cells has been developed for the first time.

Through joint research with the Korea Institute of Machinery and Materials, the Korea Research Institute of Bioscience and Biotechnology, institute under the jurisdiction of the Ministry of Science and ICT, developed a 3D bioprinting technology using [natural killer cells](#) (NK cells) as a new method of immunotherapy for treating cancer. The research has been published in *Biomaterials Research*.

Allowing the 3D-printed hydrogels to encapsulate NK cells helps to prevent the loss of NK cells and enables a majority of those cells to home in on the [tumor cells](#). Pores form in the hydrogel, and NK cells that retain cell viability are released after a certain amount of time, which allows for the performance of immune functions.

Although NK cells are generally used for immunotherapy, the method of injecting NK cells via [intravenous injection](#) has not shown effective results in clinical trials on solid tumors. This is because NK cells are incapable of retaining an appropriate level of viability and fail to target solid tumors.



Schematic illustration of micro/macropore-forming hydrogel with NK cells fabricated by 3D bioprinting and implanted into the tumor site. Credit: Korea Institute of Machinery and Materials (KIMM)

By using the newly developed technology, NK cells can be injected into the hydrogel, printed, and then cultured in a 3D environment, which enhances the cell viability and activity of NK cells and enables those cells to confront cancer tissues.

Principal Researcher Su A Park said, "This technology can help to significantly improve the functionality of NK cells that are used for cancer treatment. We expect to contribute to the treatment of cancer patients through this newly developed technology."

More information: Dahong Kim et al, NK cells encapsulated in micro/macropore-forming hydrogels via 3D bioprinting for tumor immunotherapy, *Biomaterials Research* (2023). [DOI: 10.1186/s40824-023-00403-9](https://doi.org/10.1186/s40824-023-00403-9)

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