Making cancer-fighting cells in the lab

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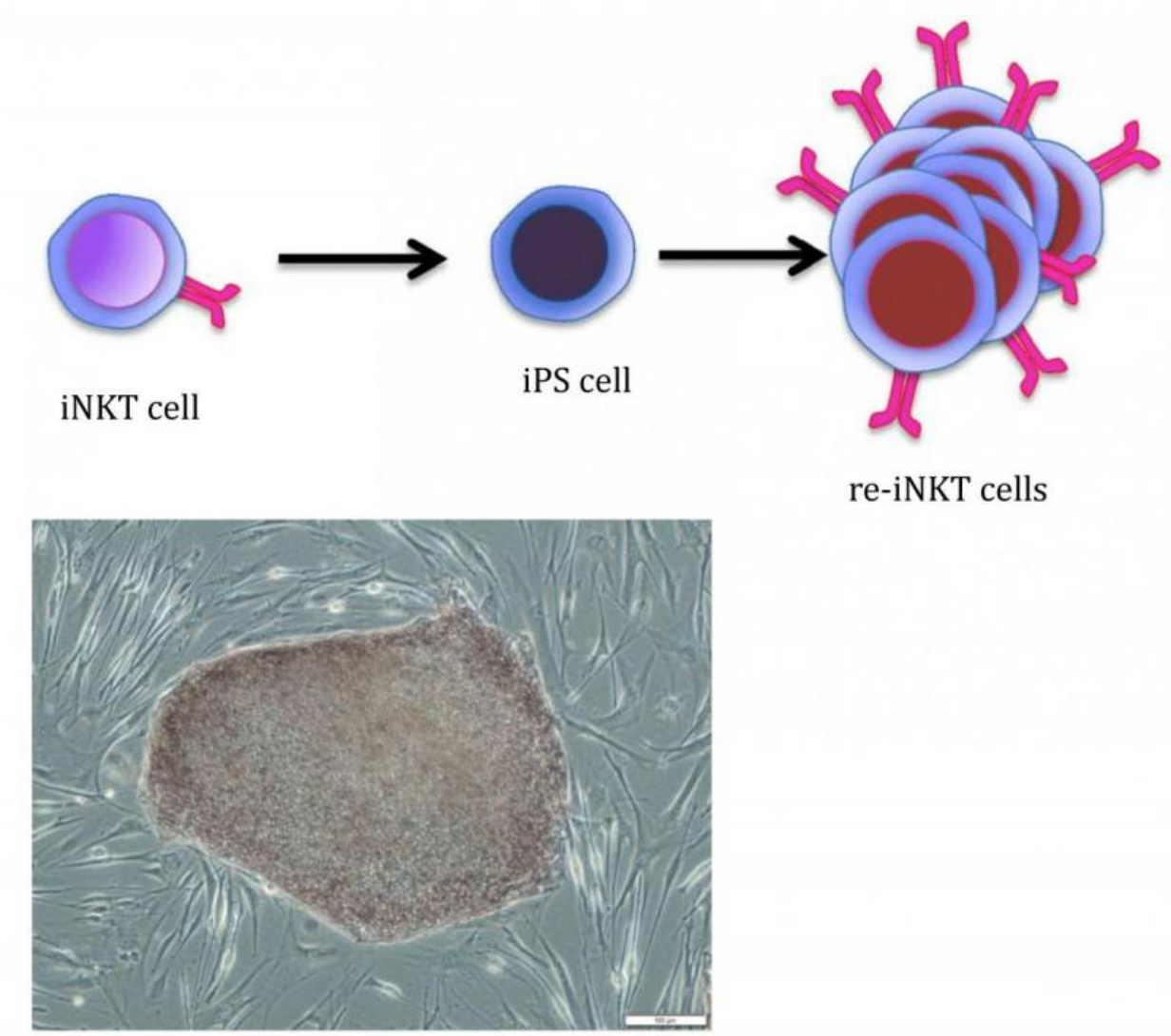

CiRA researchers found that reprogramming one type of iNKT cells to iPS cells and then differentiating them back results in reprogrammed iNKT cells (re-iNKT cells) that show properties of another type. The ability to make expand the number of iNKT cells is expected to advance cancer therapies. The microscope

image is of a colony of iNKT cells reprogrammed to the iPS cell state. Scale bar is 100 micro meter. Credit: Kaneko Laboratory, CiRA, Kyoto University

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One way in which cancer cells flourish is by concealing themselves against cytotoxic immune cells. Invariant natural killer T (iNKT) cells are rare helper immune cells that activate these cytotoxic cells when cancers go into hiding. Indeed, the level of iNKT cells in the blood is a good predictor of clinical outcome.

Increasing the number of iNKT cells, therefore, could be an effective cell therapy against cancers. Shin Kaneko, Associate Professor at the Center for iPS Cell Research and Application (CiRA) at Kyoto University, Japan, and his team are using induced pluripotent stem (iPS) cell technology to investigate this possibility. In their most recent work they report the preparation of reprogrammed (re-) iNKT cells. These cells come from patient iNKT cells that were reprogrammed to iPS cells and then multiplied before being differentiated to re-iNKT cells, thus significantly increasing the number of iNKT cells from before.

Unexpectedly, although the re-iNKT cells behaved like iNKT cells, they showed properties that deviated from their origin and resulted in more potency. These deviations suggest that re-iNKT cells followed a different development pathway than normal iNKT cells. Such an alternative pathway could open the door to the preparation of different cell types for cancer therapy. Kaneko explains, "Cancer patients usually

have severely weakened immune systems. The ability to make potent immune cells is very helpful".

The creation of potent immune cells also has important implications on our understanding of how immune cells are formed. "The immune system is maybe the most complicated system in the body", says Kaneko. "Simplifying it may help us develop new treatments".

The group is now investigating the different pathways in which iNKT cells can be formed and identifying which are best for cancer therapy.

More information: Cellular adjuvant properties and direct cytotoxicity of redifferentiated Vα24 invariant NKT-like cells from human induced pluripotent stem cells, dx.doi.org/10.1016/j.stemcr.2016.01.005

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