

# Microfabricated platforms for cancer immunotherapy

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## Abstract

Cancer immunotherapy has recently been successful in the treatment of various types of tumors. Cytotoxic lymphocytes, including cytotoxic T lymphocytes (CTLs) and natural killer (NK) cells play an essential role in elimination of tumors by directly killing tumor cells. Therefore, evaluation of lymphocyte cytotoxicity against tumor cells is critical for the improvement of cancer immunotherapy. Lymphocyte cytotoxicity is a strictly regulated function requiring a multi-step “checkpoint” to minimize normal cell damage. First, cytotoxic lymphocytes migrate to tumor sites and make close contact with tumor cells (trafficking). Second, cytotoxic lymphocytes recognize distinct signatures of tumor cells and make stable contact with tumor cells (recognition). Third, cytotoxic lymphocytes exert cytotoxicity by exocytosis of lytic granules containing cytotoxic molecules, including perforin and granzyme B, to lysis tumor cells (execution). Lastly, cytotoxic lymphocytes successfully performed cytolysis of tumor cells detach from dead cells and re-engage tumor cells to perform further cytotoxicity (detach and re-engage). However, current cytotoxicity assays mostly provide information about final outcomes of cytotoxicity. To overcome this limitation, we are developing new assays that allow “stepwise” evaluation of lymphocyte cytotoxicity using dynamic imaging and microfabrication techniques.

**Keywords:** *Microfabrication, cancer immunotherapy*

## Biography

Junsang Doh is an Associate Professor in the Department of Materials Science and Engineering at Seoul National University, Korea. He received his bachelor's degree in Chemical Engineering from Seoul National University in 1999, and received his PhD at MIT in 2006. After completing postdoc training, he worked for POSTECH (2008 ~ 2019) with a joint faculty appointment in I-Bio and Mechanical Engineering. In 2019, he joined Seoul National University as an associate professor.