Drugs which can direct cells from the immune system to attack cancer cells (i.e. immunotherapy drugs) hold promise for the treatment of several cancers. One class of immunotherapy drugs are bispecific antibodies (BsAb), proteins which attach simultaneously to a cell in the immune system and to a cancer cell, prompting the immune cell to kill the cancer cell. Our group has closely studied BsAbs which attach to T cells, a particular type of immune cell, as a way of potentially treating acute myeloid leukemia (AML), a very difficult-to-treat blood cancer. We have shown that these BsAbs work best at directing the T cell to kill the AML cell when the BsAb attaches as close to the AML cell surface as possible.

We have recently developed in interest at harnessing another cell type in the immune system called the natural killer (NK) cell. NK cells may be just as potent at killing cancer cells as T cells, but may be able to do so in people with fewer side effects than T cells. Our overall goal was to study whether BsAbs which attach to NK cells also are most effective when they bind as close to the AML cell surface as possible. In order to test our hypothesis, in this project we developed several BsAbs which can attach simultaneously to NK cells and to CD33, a protein often found on the surface of AML cells. With the support of this funding, we were able to develop 4 such BsAbs, 3 of which were effective at killing AML cells in a petri dish when NK cells and the BsAb were introduced. In no small part because of the substantial support of this Award and the encouraging preliminary data with these BsAbs, an R21 grant submitted by our lab to the National Cancer Institute was well-reviewed. In future, we hope to continue these studies to identify the best NK-engaging BsAbs as a potential new treatment for patients with AML.

Overall, this Award has made it possible for our lab to lay a strong foundation in this project, which is part of our lab’s overall mission to develop new treatments for AML patients like James Lee. We therefore thank the Award Committee Members and the Lee family for their generous support of this work.