

Supplementary Movie 1. Real-time *in vitro* cytotoxicity assay of non-transduced control human T cells.

HeLa-DR0901 cells were plated onto the Real-Time Cell Analyzer (RTCA) plate wells for adhesion before co-culturing with Mock-T cells. The RTCA was used to capture real-time *in vitro* cytotoxicity time-lapse videos, each spanning 14 hours with frames taken at 30-minute intervals.

Supplementary Movie 2. Real-time *in vitro* cytotoxicity assay of 10F04mc TCR transduced human T cells.

HeLa-DR0901 cells were plated onto the Real-Time Cell Analyzer (RTCA) plate wells for adhesion before co-culturing with 10F04mc TCR-T cells. The RTCA was used to capture real-time *in vitro* cytotoxicity time-lapse videos, each spanning 14 hours with frames taken at 30-minute intervals.