***Supplementary Information***

***Supplementary Figure 1.*** *The DNA damage pathway occurs in CD4+ TIL1383I TCR transduced cells upon antigen-specific TCR restimulation.* Antigen-specific TCR restimulation of CD34+CD4+ gated T cells from 3 healthy donors (gray lines) or 3 melanoma patients (black lines) after overnight restimulation with MEL624 or MEL624-28 cells. Similar results were obtained in a repeat experiment using the same donors and additional experiments with 4 different donors. Statistical significance between MEL624 and MEL624-28 restimulated cells was determined using the paired t-test. \*p<0.05, \*\*\*\*p<0.0001.

***Supplementary Figure 2.*** *Pretreatment of T cells with N-acetyl cysteine prevent TCR restimulation induced ROS accumulation.* Cells were pretreated with NAC (50mM) for 60 min prior to restimulation with anti-CD3 for 240 min. Left panel displays representative histogram overlay of DCFDA expression. Right panel shows mean ± SEM from 3 donors. Similar results were obtained in a repeat experiment. Statistical significance was calculated by paired t-test, \*\*p<0.01, ns=not significant.