**Supplementary Figure Legends**

**Supplementary Figure 1**

Determining the presence of ITK in immune cell subtypes infiltrating the tumor and the effect of ITK ablation on the cell cycle of the melanoma cells. (A) Immunofluorescence Analysis for ITK colocalization in Immune Cell Subsets within a Primary Melanoma. Panel (a) shows a H&E stain of a representative section from primary melanoma. Panel (b) shows a magnified view (yellow box) of a tumor-infiltrating immune cell cluster. Panels (c) – (i) show adjacent tumor sections that were probed with ITK (red) and immune cell markers (green) followed by counterstaining with DAPI (blue). Immune cell markers are CD19 (panel c), CD3 (panel d), CD68 (panel e), MPO (panel f), MCT (panel g), CD56 (panel h), and CD57 (panel i). (B) Treatment of melanoma cell lines with BI 10N. Concentrations of BI 10N similar to those that inhibit RPMI 8322 and VMM 39 melanoma cell proliferation and migration also increases the percentage of cells in G0/G1 and decreased the number of cells in S phase. The cell cycle of PMWK cells, which express little ITK, is unaffected by BI 10N up to the 100 nM concentration shown.

**Supplementary Figure 2**

Effects of ITK activity on specific cellular proteins. (A) Westerns of extracts made from RPMI 8322 cells that were treated with the indicated concentrations of BI 10N were probed with antibodies to the indicated proteins. The data in this figure indicates that the concentration of Cyclin D2 (CCND2) (indicator of proliferation) is decreased by the presence of ITK while LC3 (MAP13LC3A) (indicative of autophagy) is unchanged. (B) A portion of a pathway diagram generated through the use of QIAGEN’s Ingenuity® Pathway Analysis (IPA®, QIAGEN Redwood City, CA). The data analyzed was produced by the MD Anderson (Houston TX) reverse phase protein array (RPPA) facility. Extracts from PMWK and RPMI 8322 cells treated with BI 10N concentrations of 0, 10nM, 25nM and 50nM inhibitor were provided to the RPPA facility in triplicate and were then probed using an antibody array. A statistical treatment of the data suggested that the presence of ITK activity decreased the concentration of cyclin D1 (CCND1) (p=0.14), consistent with the decrease of cyclin D2 shown in Supplementary Figure 2a. The presence of high levels of BI 10N increased the total concentration of p53 (TP53) (p=0.11) in the RPMI 8322 cells while decreasing the concentrations of the cell cycle inhibitors p16 (CDKN2A) and p21 (Cip1, CDKN1) (p=0.08 and p=0.11, respectively). Red indicates an increase, green a decrease, and grey unchanged detected protein with an FDR of <0.15. (C) Panel C shows the mean values of the proteins analyzed by RPPA that were found to have an FDR value < 0.15 and flagged by IPA as being involved in the p53 pathway. The first four bars for each graph show the values in the PMWK cell lines and the second set of four bars depicts the RPMI 8322 cell line results. The PMWK cell line does not show any phenotypic change up to the 50 nM concentration of BI 10N used in this experiment and should show little to no change in protein levels. Significant pathways identified by Ingenuity Pathway Analysis for RPPA results are shown in Supplementary Table S6.