Supplementary Fig. S1. B16 tumor model and Melanoma patient biopsies. (A) Measurement of mice body weight during drug treatment. (B) Fraction survival of B16 tumor bearing mice during the treatment. (C) Electron microscopy of tumor biopsies before and on pembrolizumab treatment in a stage IV melanoma patient that progressed on pembrolizumab. *, p < 0.05, testing the hypothesis that the addition of HCQ to anti-PD-1 Ab is significantly different compared to anti-PD-1 Ab+Veh.
Supplementary Fig. S2. Immunophenotyping of CD8+ T cells in the spleen and tumor of B16 Atg7 WT and Atg7 KO mice and LDH release in inhibitor treated or untreated primed splenocytes. (A) Frequency of CD8+Ki67+ T cells in the spleen of tumor bearing mice of the indicted treatment groups. (B) Representation of the frequency of CD8+Ki67+ T cells in the spleen of tumor bearing mice of the indicated treatment groups. (C) Frequency of CD8+GranzymeB+ T cells in tumor. *, p < 0.05, testing the hypothesis that the addition of HCQ to anti-PD-1 Ab is significantly different compared to anti-PD-1 Ab+Veh.
Supplementary Fig. S3. Splenocyte priming. IFN-γ ELISA to confirm irradiated B16 mediated splenocytes priming in the presence or absence of interleukin-2 for 24, 48 and 72h.
Supplementary Figure S4. Gating Strategy for Flow cytometry and immunophenotyping of B16 tumors and proteomics of whole B16 tumor. (A) Flow cytometry analysis and gating strategy for TAMs, Eosinophils, DCs, MDSCs, CD8, NK cells in B16 tumor. (B) Representation immunophenotyping plot for Tumor M-MDSCs, eosinophils, DCs, CD8, CD4 and NK cells. (C) Representation of Immunophenotyping of TILs in B16 tumors. (D) Identification of macrophages proteins that are significantly increased or decreased in HCO+anti-PD-1 Ab vs only anti-PD-1 Ab+Veh. * p< 0.05, testing the hypothesis that the addition of HCQ to anti-PD-1 Ab is significantly different compared to anti-PD-1 Ab+Veh.
Supplementary Fig. S9. Gating strategy for Flow cytometry and Immunophenotyping in Braf<sup>1273</sup>, Pten<sup>fl/fl</sup>, Tyr<sup>CreER2</sup> mice melanoma tumor.

(A) Gating strategy for immunophenotyping in Braf<sup>1273</sup>, Pten<sup>fl/fl</sup>, Tyr<sup>CreER2</sup> mice melanoma. (B) Representation of Immunophenotyping of tumor infiltrating myeloid cells in the excised tumor as indicated. *, p < 0.05, testing the hypothesis that the addition of HCO to anti-PD-1 Ab is significantly different compared to anti-PD-1 Ab+Veh.
Supplementary Fig. S6. Immunophenotyping in Brat\textsuperscript{C57}, Pten\textsuperscript{fl/fl}, Tyr\textsuperscript{:CreER\textsuperscript{T2}} mice melanoma. Immunophenotyping of tumor infiltrating leukocytes in excised tumor of Brat\textsuperscript{C57}, Pten\textsuperscript{fl/fl}, Tyr\textsuperscript{:CreER\textsuperscript{T2}} mice. *p < 0.05, testing the hypothesis that the addition of HCQ to anti-PD-1 Ab is significantly different compared to anti-PD-1 Ab+Veh.