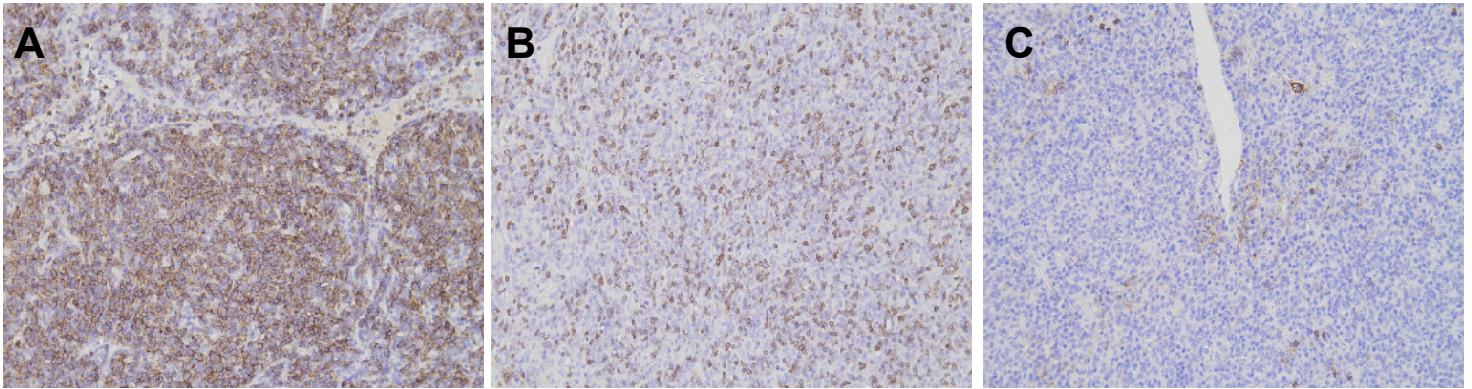
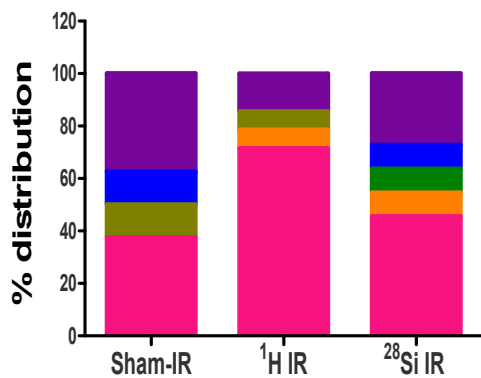


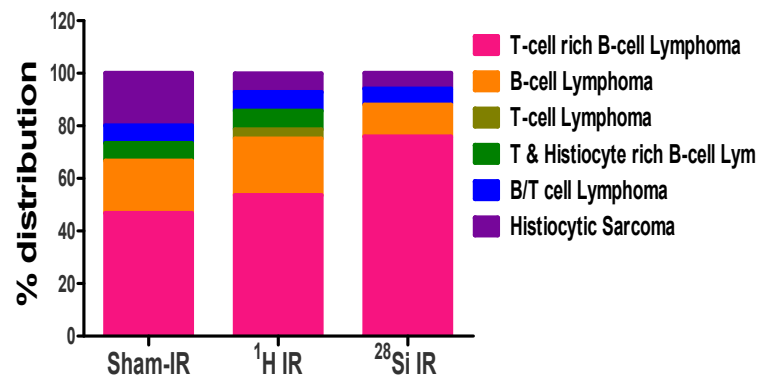
Supplementary figure 1: HSC differentiation measured by complete blood counts (CBC). (A) Total RBCs (M/ μL), (C) Platelets (K/ μL), and (E) WBCs (K/ μL) at 5 months and 9 months post 0 cGy, 10 cGy, or 100 cGy of ^1H ion irradiated *Mih1*^{+/+} or *Mih1*^{+/-} mice (36-44 mice per each cohort). (B) Total RBCs (M/ μL), (D) Platelets (K/ μL), and (F) WBCs (K/ μL) at 5 months and 9 months post 0 cGy, 10 cGy, or 100 cGy of ^{28}Si ion irradiated *Mih1*^{+/+} or *Mih1*^{+/-} mice (36-42 mice per each cohort). Data are means \pm standard error of means. * = $p < 0.0001$.



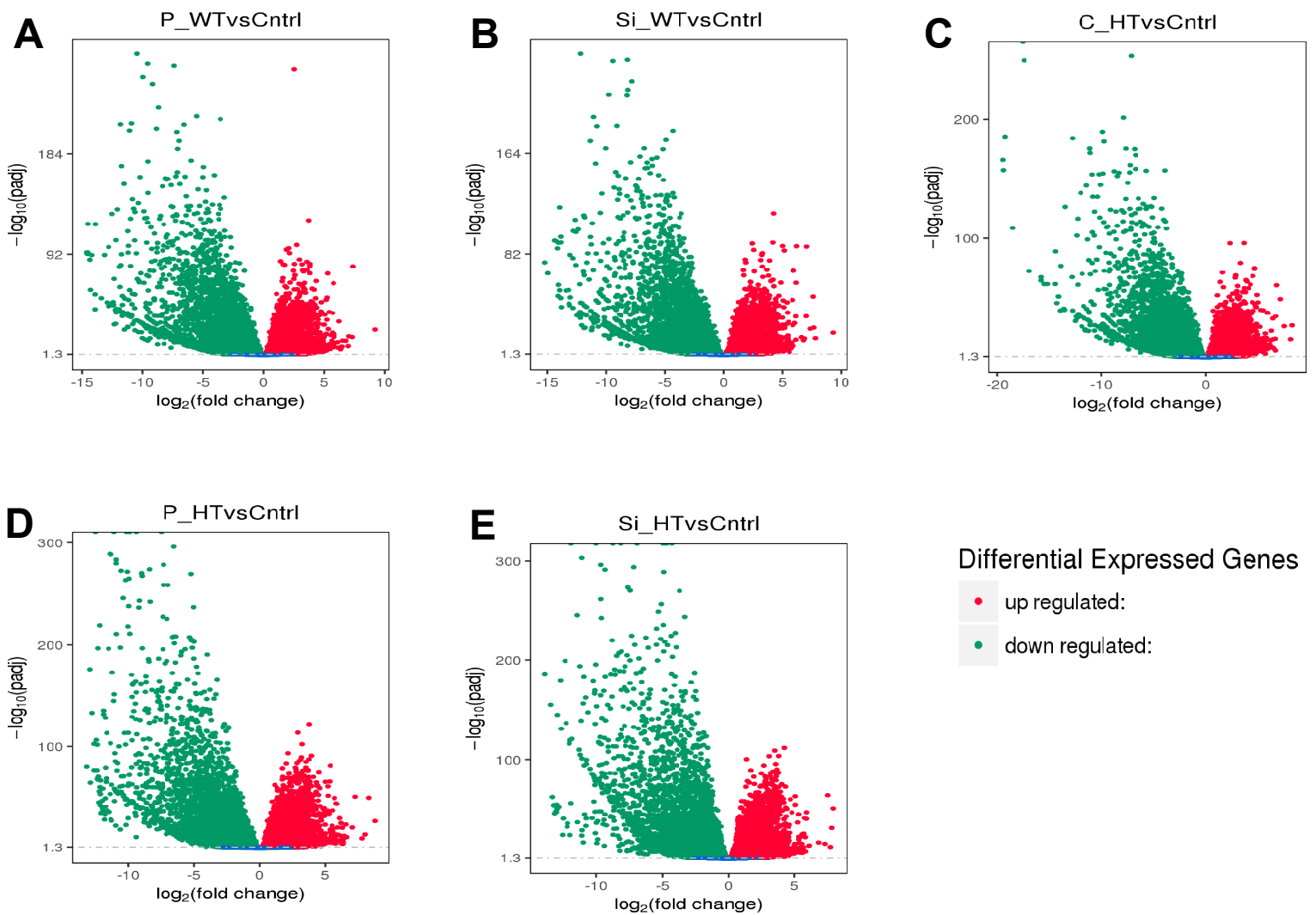
D *Mlh1*^{+/+} mice lymphoma distribution



E *Mlh1*^{+/-} mice lymphoma distribution



Supplementary figure 2: Immunohistochemistry of lymphomas arising from *Mlh1*^{+/+} and *Mlh1*^{+/-} mice. (A-C) The majority of lymphomas had an immunophenotype of T-cell rich B-cell (TRB) lymphomas, characterized by a dominant population of lymphoma cells stained positive for B-cell by B220 antibody (A), with enriched infiltrating T-cells presence found by CD3 antibody (B), and only a few resident macrophages presence found by F4/80 antibody (C) (20X). Distribution based on immunohistochemistry of lymphomas collected from (D) *Mlh1*^{+/+} mice, and (E) *Mlh1*^{+/-} mice exposed to sham, ¹H ion, or ²⁸Si ion irradiation. IHC was performed on 8-14 lymphomas of *Mlh1*^{+/+} origin and 15-33 lymphomas of *Mlh1*^{+/-} origin.



Supplementary figure 3: Volcano plots represent the whole distribution of differentially expressed genes in TRB lymphomas arising from (A) ^1H ion irradiated *Mlh1*^{+/+} mice, (B) ^{28}Si ion irradiated *Mlh1*^{+/+} mice, (C) sham irradiated *Mlh1*^{+/-} mice, (D) ^1H ion irradiated *Mlh1*^{+/-} mice, and (E) ^{28}Si ion irradiated *Mlh1*^{+/-} mice. C_HT - sham irradiated *Mlh1*^{+/-} cohort; P_HT - ^1H ion irradiated *Mlh1*^{+/-} cohort; Si_HT - ^{28}Si ion irradiated *Mlh1*^{+/-} cohort; P_WT - ^1H ion irradiated *Mlh1*^{+/+} cohort; Si_WT - ^{28}Si ion irradiated *Mlh1*^{+/+} cohort; Cntrl - control.