**Supplementary Figure Legends**

**Supplementary Figure S1.** Immunological analysis of the systemic effects of treatment with DRibbles, anti-OX40 antibody and ATP. A) Detailed information of flow cytometry for the percentages of IFN-γ-producing CD4+ T cells, CD8+ T cells, and FoxP3+ T cells on day 15 in spleen (left panel) and peripheral blood (right panel) samples from mice with B16F10 tumors treated with PBS, OX40, DR, DO, and DOA. B) Flow cytometry analysis of the percentages of IFN-γ-producing CD4+ T cells, CD8+ T cells, and FoxP3+ T cells on day 20 in spleen (left panel) and peripheral blood (right panel) samples from mice with 4T1 tumors treated with PBS, OX40, DR, DO, and DOA. DR, DRibbles; DO, DR+OX40; DOA, DR+OX40+ATP.

**Supplementary Figure S2.** Induction of tumor-reactive T cells by DRibbles treatment. A, B) Detailed information of flow cytometry for intracellular cytokine (IFN-γ and TNF-α) secretion. Through CD4/CD8 surface and intracellular cytokine (IFN-γ and TNF-α) staining, flow cytometry was performed to analyze the activation of splenic T cells incubated with B16F10 tumor cells in different groups (PBS, OX40, DR, DO, and DOA). C, D) Detailed information of flow cytometry for intracellular cytokine (IFN-γ and TNF-α) secretion. Through CD4/CD8 surface and intracellular cytokine (IFN-γ and TNF-α) staining, flow cytometry was performed to analyze the activation of splenic T cells incubated with 4T1 tumor cells in different groups (PBS, OX40, DR, DO, and DOA).

**Supplementary Figure S3.** Detailed information about the B16F10/4T1-associated neoantigen peptides and related bioinformatic analysis in BRCA and SKCM patients. A, B) Tables showed the details of the synthesis of the optimal B16F10-associated (A) and 4T1-associated (B) neoantigen peptides. C, D) Correlations between the expression levels of ATG8 (GABAPARAPL1) (C) and ATG12 (D) and the abundances of CD8 + T cells, CD4 + T cells, and DCs in BRCA (upper panel) and SKCM (lower panel) tissues. BRCA, breast invasive carcinoma; SKCM, skin cutaneous melanoma.

**Supplementary Figure S4.** Detailed information of B16F10/4T1-associated neoantigen peptides related immunogenicity testing. A, B) Flow cytometry for Intracellular cytokine (IFN-γ and TNF-α) secretion in neoantigen specific T cell immune responses of B16F10 model. Through CD4/CD8 surface and intracellular cytokine IFN-γ/TNF-α staining, flow cytometry was performed to analyze the activation of splenic T cells incubated with neoantigen peptides (M30 and M27). C, D) Flow cytometry for Intracellular cytokine (IFN-γ and TNF-α) secretion in neoantigen specific T cell immune responses of 4T1 model. Through CD4/CD8 surface and intracellular cytokine IFN-γ/TNF-α staining, flow cytometry was performed to analyze the activation of splenic T cells incubated with neoantigen peptides (M8 and M17).