**Supplementary Figure 1. Quantification of CD8 T cell infiltrate in tumours.**

Analysis of CD8 T cell tumour infiltrate was performed on sections of HPV+ tumours with representative data at low and high magnification from tumours for each scoring group is shown in (A). The mean number of CD8 T cells per high magnification field from each tumour scored with tertiles indicated (B).

**Supplementary Figure 2. Stimulation of B3Z with SIINFEKL and SIINFEHL peptides**

K89 (H2-Kb expressing L-cells) were incubated with titrating amounts of synthetic SIINFEKL (SL8) or SIINFEHL (SHL8) peptides and assessed for stimulation of B3Z T cell hybridoma cells.

**Supplementary Figure 3. Generation of HPV E782-90 specific T cell hybridoma BE7A2Z.**Splenocytes from LV9 immunised HLA-A\*0201 transgenic HHD mice that were fused with BWZ.36/CD8were assessed for peptide specificity by pulsing with 10M LV9 or irrelevant peptide and determining IFN production and CD8 expression by flow cytometry (A). Peptide specificity and sensitivity of BE7A2Z clones were determined by pulsing HLA-A\*0201 expressing 293T cells with 10M peptide and screening for T cell activation (B). The sensitivity of four BE7A2Z clones was determined at reducing concentration of LV9 peptide (C). E1KO 293T cells were transfected with either pcDNA3 or \*002 ERAP1 together with LV9, D-LV9 or ED-LV9 minigenes and assessed for the generation of LV9 by BE7A2Z activation to determine requirement of ERAP1 activity.

**Supplementary Figure 4. N-terminal amino acid trimming specificity of X-LV9 by OPSCC ERAP1 allotype combinations.**  
E1KO 293T cells were transfected with ERAP1 allotype combinations found in CD8/TILhigh (A), CD8/TILmoderate (B) and CD8/TILlow (C) tumours, together with X-LV9 minigenes representing 15 amino acids and assessed for generation of LV9 by BE7A2Z activation. The relative presentation of trimmed X-LV9 was compared to that of the maximal response using LV9 which does not require ERAP1 activity. Data pooled from five experimental repeats ±SEM.