**Supplementary Methods**

**HLA Genotyping**

Genomic DNA was isolated from non-fixed peripheral blood cells and melanoma cell lines using the QIAamp DNA Mini Kit (Qiagen, Hilden, Germany) according to the manufacturer’s instructions. Molecular HLA class I genotyping was performed at the Institute for Immunology and Genetics Kaiserslautern (Kaiserslautern, Germany).

**Immunohistochemistry**

On serial cryostat tissue sections expression of specific marker proteins was detected with the indicated primary mAb in combination with a biotinylated goat anti-mouse antibody (Jackson ImmunoResearch). Antibody binding was visualized using the Vectastain ABC-AP kit (Vector) according to the manufacturer’s instructions.

**Western blot analysis**

Proteins from tumor cell lysates were separated by SDS-PAGE, blotted on nitrocellulose membranes and probed with the specific primary antibodies. After washing, membranes were incubated with the appropriate secondary antibodies linked to horseradish peroxidase (HRP). Antibody binding was visualized with the ECL chemiluminescence system.

**Flow cytometry**

Cells were stained for surface marker expression with either directly labelled antibodies or non-labelled antibodies in combination with a secondary PE-labelled goat anti-mouse mAb (Beckmann Coulter) or Cy5-labelled goat anti-mouse mAb (Jackson ImmunoResearch). Stained cells were analysed either in a Calibur (Becton Dickinson) or Gallios (Beckmann Coulter) flow cytometer using CellQuest(Becton Dickinson) and Kaluza (Beckman Coulter) software, respectively, for data analysis. To determine the impact of interferons on the expression of specific surface molecules, cells were treated for 48 h with 1000 U/ml IFN-α or 500 U/ml IFN-γ.

**Quantitative real-time RT-PCR**

Total mRNA was isolated from tumor cells, melanocytes and CD8-depleted PBMC using the RNeasy Mini kit (Qiagen) and was reverse transcribed with the High Capacity cDNA Reverse Transcription Kit (Applied Biosystems). Real-time PCR was performed using specific TaqMan Gene Expression assays in combination with the StepOnePlusTM Real-Time PCR system (Applied Biosystems). Relative RNA expression was calculated by the 2-∆∆CT method after normalizing expression levels of candidate genes to *GAPDH* or *beta-actin* mRNA.

**RT-PCR and cloning of mutated *B2M***

PolyA-RNA was reverse transcribed from total RNA using the first strand cDNA synthesis kit (Roche Diagnostics), according to the manufacturer’s instruction. Specific amplification of *B2M* cDNA (sense primer 5'-cgagatgtctcgctccgtgg-3', antisense primer 5' ataacctctagaacctccatgatgctgcttaca-3') was carried out in a 30-cycle PCR using the proofreading polymerase ExpandTM High Fidelity (Roche Diagnostics). PCR products were cloned into pCR2.1 (Invitrogen) and sequenced (MWG-Biotech).

**Transfection**

Lipofectamine (Life Technologies) was used for transient transfection of melanoma cells with a *B2M* expression plasmid. After 72 h, cells were analyzed for transient surface expression of HLA class I antigens by flow cytometry, as described above.

**ELISPOT**

IFN- enzyme-linked immunospot (ELISPOT) assay was performed as follows: Multiscreen-HTS plates (Millipore) were coated with anti-hIFN- mAb 1-D1K (Mabtech). T cells were seeded into plates at 5 x 103 cells/well in AIM-V complete medium and tumor cells (1x104 cells/well) were added. After incubation for 20 h, plates were washed and a biotinylated secondary anti-hIFN- antibody (clone 7-B6-1, Mabtech) was added. Captured cytokine was detected with ExtrAvidin alkaline phosphatase and BCIP®/NBT Liquid Substrate System (Sigma-Aldrich). Spots were imaged determined with the AID EliSpot reader (AID Diagnostika GmbH). All determinations were performed in triplicates. Where indicated, antibodies W6/32 (50 µg/ml) and anti-PD-L1 (10 µg/ml; Biolegend) were added to the co-culture in order to block the TCR/HLA class I and PD-1/PD-L1 interactions, respectively. Mouse IgG1 (R&D systems) was used as control in functional assays.