Cryopreservation of MHC multimers: Recommendations for quality assurance in detection of antigen specific T cells.

Fluorescence-labeled peptide-MHC class I multimers serve as ideal tools for the detection of antigen-specific T cells by flow cytometry, enabling functional and phenotypical characterization of specific T cells at the single cell level. While this technique offers a number of unique advantages, MHC multimer reagents can be difficult to handle in terms of stability and quality assurance. The stability of a given fluorescence-labeled MHC multimer complex depends on both the stability of the peptide-MHC complex itself and the stability of the fluorochrome. Consequently, stability is difficult to predict and long-term storage is generally not recommended. We investigated here the possibility of cryopreserving MHC multimers, both in-house produced and commercially available, using a wide range of peptide-MHC class I multimers comprising virus and cancer-associated epitopes of different affinities presented by various HLA-class I molecules. Cryopreservation of MHC multimers was feasible for at least 6 months, when they were dissolved in buffer containing 5–16% glycerol (v/v) and 0.5% serum albumin (w/v). The addition of cryoprotectants was tolerated across three different T-cell staining protocols for all fluorescence labels tested (PE, APC, PE-Cy7 and Quantum dots). We propose cryopreservation as an easily implementable method for stable storage of MHC multimers and recommend the use of cryopreservation in long-term immunomonitoring projects, thereby eliminating the variability introduced by different batches and inconsistent stability.