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CD8 T cell responses to Listeria monocytogenes infection

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Intracellular bacterial pathogens induce complex T cell responses that are essential for protective immunity. Our principal model system has been murine infection with the intracellular bacterium *Listeria monocytogenes*. Mice infected with *L. monocytogenes* develop a robust and highly protective cell mediated immune response. We have determined the antigen specificity of the CD8 T cell response to *L. monocytogenes* and, using MHC class I tetramers, have measured and characterized the in vivo expansion of distinct T cell populations during the course of active bacterial infection. These studies have shown that CD8 T cells responding to *L. monocytogenes* infection can be divided into two distinct populations that differ in their MHC restriction, peptide specificity and in vivo response kinetics. The first T cell population to respond to *L. monocytogenes* infection is restricted by H2-M3 MHC class Ib molecules, which present N-formyl methionine bacterial peptides to CD8 T cells. This T cell response is very rapid and quantitatively substantial, but it does not give rise to a large memory T cell population. The second T cell population is restricted by conventional MHC class Ia molecules. This T cell response is slower than the H2-M3 restricted T cell response but it provides a large populations of memory T cells which protect mice from secondary infection with *L. monocytogenes*. We are currently investigating the cellular and molecular mechanisms that are responsible for the rapid primary response of H2-M3 restricted T cells and the dramatic memory response of MHC class Ia restricted T cells. These studies are providing fundamental information about T cell responses to bacterial infection and the generation and maintenance of T cell memory.