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A dendritic cell-targetted vaccine loaded with a glyceraldehyde-3-phosphate dehydrogenase peptide confers wide protection to listeriosis in susceptible and resistant mice

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Susceptible and resistant mice to listeriosis are convenient models to examine vaccines efficiency since they mimic human diversity. Dendritic cells (DC) vaccines loaded with immunogeneic peptides are powerful tools for the vaccination against intracellular bacteria. To produce a vaccine against the human bacterial pathogen, *Listeria monocytogenes*, we assessed DC loaded with immunogenic listeriolysin O (LLO) and glyceraldehyde-3-phosphate dehydrogenase (GAPDH) peptides. Our approach consisted on examining DC-LLO or DC-GAPDH vaccines coupled with peptides with different binding capacities to MHC molecules in susceptible or resistant mice. DC-GAPDH$_{1-22}$ vaccines that contained weak binding sequences to IA^b and IA^d MHC class II molecules and medium binding sequences to H-2K^b and H-2K^d MHC class I molecules, provided the best protection to listeriosis in susceptible and resistant mice. DC-LLO$_{91-99}$ vaccines loaded with a strong peptide binder to H-2K^d but weak binder to H-2K^b MHC class I molecules, conferred better protection than DC-LLO$_{296-304}$ vaccines loaded exclusively with a strong peptide binder to H-2K^b. DC-LLO$_{190-201}$, DC-LLO$_{189-200}$ and DC-LLO$_{189-201}$ vaccines loaded exclusively with weak peptide binders to IA^b and IA^d MHC class II molecules, respectively, presented no significant protection. Enhanced protection in listeriosis correlated with increased splenic CD8$^+$ DC, enhanced IL-12 and expansion of *Listeria* antigen specific CD8$^+$ and CD4$^+$ T cells producing IFN-□. DC-GAPDH$_{1-22}$ vaccines that combine any type of CD8$^+$ epitopes and CD4$^+$ weak binder epitopes conferred higher protection to listeriosis in susceptible and resistant mice, than DC-LLO$_{91-99}$ or DC-LLO$_{296-304}$ vaccines that include exclusively CD8$^+$ epitopes. DC-GAPDH$_{1-22}$ vaccines could be an effective vaccine for prophylactic protection against human listeriosis in susceptible and resistant individuals.

Biography

Carmen Alvarez-Dominguez has completed her Ph.D at the age of 29 years from Universidad Autonoma de Madrid and postdoctoral studies from Washington University School of Medicine on Small GTPases role in Listeria monocytogenes phagocytosis. She is the director of the Group on Genomics, Proteomics and Vaccines at the Research Institute Marqués de Valdecilla (IDIVAL) in Santander, Spain. She has published more than 26 papers in reputed journals and serving as an editorial board member of Microbes and Infection and OMICS. She also is coauthor of the patent: Immunogenic peptides against Listeria and Mycobacterium, antibodies and their uses with reference PCT/ES2007/070144.

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