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A Recombinant Group a Streptococcus (GAS-2W) Strain Elicits Protective Immunity in Mice through Induction of an IFN-γ Dependent Humoral Response

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Abstract : Group A streptococcus (GAS) is a prevalent human pathogen, causing a wide range of infections and diseases. One of the most well-known virulence factors in GAS is M protein, a surface protein that facilitates bacterial invasion. In this study, we used a recombinant GAS strain (GAS-2W) expressing M protein containing a hyper immunogenic peptide (2W). Mice were immunized three times with heat-killed-GAS subcutaneously at three weeks intervals. Three weeks post last immunization, mice were challenged intraperitoneally with a lethal dose of live GAS. In order to investigate the impact of IFN-γ and antibodies in protection against GAS infection, we used a mouse model knock-out for IFN-γ (IFN-γ KO). We observed immunization with GAS-2W strain can increase protection against GAS infection in mice compared with the original GAS strain. Higher levels of antibodies against M1 protein were measured in GAS-2W-immunized mice. There was also a significant increase in IgG2c response in mice immunized with GAS2W. By using IFN-γ KO mice, we showed that not a high level of total IgG, but IgG2c was correlated with protection through the i.p challenge. It also emphasizes the importance of IFN-γ cytokine to combat GAS by isotype switching to IgG2c (which is opsonic for phagocytosis). Our data indicate the crucial role of IFN-γ in the protective immune response that, together with IgG2c, can induce protection against GAS.

Keywords : Group A streptococcus, IgG2c, IFN-γ, protection
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