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Nitrated T helper cell epitopes enhance the immunogenicity of HER2 vaccine and induce anti-tumor immunity

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ABSTRACT: Human epidermal growth factor receptor 2 (HER2) is an attractive target for cancer vaccine. However, autoimmune tolerance prevents vaccines based on HER2 protein from inducing long-lasting, highly effective anti-tumor immunity. In this study, we proved that the introduction of *p*-nitrophenylalanine in the universal T cell epitope (named NitraTh) enhances humoral immunity induced by B cell epitope and cellular immunity induced by CTL epitope. Moreover, this NitraTh epitope can work in both mouse and human immune system. When fused with extracellular domain 23-83 of HER2, NitraTh epitope help to break the self-tolerance of HER2 and induced strong HER2 specific humoral immunity and cellular immunity. Vaccination with HER2-NitraTh can significantly inhibit the growth of HER2+B16F10 tumor cells. These findings have important implications for developing therapeutic cancer vaccines.

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