

Poly- γ -glutamic Acid (γ -PGA); Biological Characterizations

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Poly- γ -glutamic acid (γ -PGA) has gained attention because of the properties as polymers include a safe and edible biomaterial. In the present studies, we analyzed biological characterization of γ -PGA as a biosafe adjuvant, immune response stimulatory factor, delivery system and anti-tumor effects. First, we checked that γ -PGA could be used as an adjuvant for soluble antigen by investigating whether the antigenicity of TGE viral antigen (Nucleocapsid) or hepatitis B viral antigen (L protein) could be significantly enhanced by the coadministration with γ -PGA in mouse and rabbit model. And we also demonstrated the effect of γ -PGA as an adjuvant or delivery agent for oral vaccine by significantly enhancement of the antigenicity against CPV antigen when γ -PGA was used in combination with lactobacillus expressing the CPV antigen on the surface in mouse model. Second, we analyzed the effects of γ -PGA as immune response stimulatory factor and antitumor agent *in vitro* and *in vivo*. *In vitro* stimulation of macrophage cell line RAW 264.7 from isolated mice with γ -PGA results in enhanced production of TNF- α and IL-1 β . And *in vivo* stimulation of lymphocytes isolated from thymus of γ -PGA-treated mice results in enhanced production of IFN- γ . Also, *in vitro* treatment of tumor cell line (B16, Caco-2) with γ -PGA results in enhanced cytotoxic effect for the tumor cell and oral administration of γ -PGA to mice also enhanced the activities of natural killer (NK) cells in spleen. These results suggest that γ -PGA could be used as a biosafe adjuvant or delivery system and maybe a stimulatory factor and anti-tumor agent by modulating cytokine production and immune cell activity.

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