

Investigation of structure, function, and encapsulated microparticle in interleukin-1

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Interleukin-1 (IL-1), an important cytokine that produced by immune cells such as monocytes and macrophages. Porcine reproductive and respiratory syndrome (PRRS), the most severe viral disease in pigs, causing reproductive failure and respiratory problems. PRRS-infected pig also results in a weak antiviral immune response leading to viral persistence. This disease brings about a great number of porcine deaths, and causes great losses in the livestock industry. Our previous studies indicated that IL-1 is an effective cytokine adjuvant that enhances an individual's immune response to prevent viral infection. Therefore, we suppose that structural and functional information of porcine IL-1 may provide some positive insights in PRRS therapy. Here we characterize the 3D structure and biological activity of porcine IL-1. Structural modeling and molecular dynamics simulations of porcine IL-1 receptor and its accessory protein are performed to clarify the differences comparing with other IL-1 species.

Moreover, in order to improve the treatment and enhance the immune response, we combine electrospray ionization technology to make the IL-1/ alginate microparticle. This technology could be applied in the drug delivery for the preparation of prolonged release systems to continue stimulating the immune response. Those results may use as potential therapeutic options for PRRSV infection.

Keywords: Interleukin-1, alginate, microparticle

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