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## **The Effect of Insect Chitosan for Transforming Growth Factor- $\beta$ 1**

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Transforming growth factor- $\beta$ 1 (TGF- $\beta$ 1), a multifunctional cytokine, regulates biological process such as cell proliferation, differentiation is very important immunological reaction area. However, over expression of TGF- $\beta$ 1 has been related to the pathogenesis of fibrotic diseases such as glomerular diseases. TGF- $\beta$ 1 plays a crucial role in the accumulation of extra cellular matrix (ECM) in human and experimental glomerular diseases. Therefore, we are examined to inhibit the overexpression of TGF- $\beta$ 1 in macrophages using various insect chitosan. The chitin was isolated from various kinds of insects, silkworm pupa (*Bombyx mori*), *Apis mellifera*, *Bombus ardens*, *Teleogryllus emma*, and exuvia of *Cryptotympana dubia* by treatment with critical acid and alkaline conditions. The chitosan is obtained from the acetylation reactions of in those obtained various insect chitin. In those chitosans are showed that a significantly inhibitory effect on TGF- $\beta$ 1 expression by the activated macrophages. These results suggest that promotive effect of insect chitosan could suppress TGF- $\beta$ 1 over expression.