



Treatment of diabetic mice with undenatured whey protein accelerates the wound healing process by enhancing the expression of MIP-1 α , MIP-2, KC, CX3CL1 and TGF- β in wounded tissue.

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Abstract:

BACKGROUND: Continuous diabetes-associated complications are a major source of immune system exhaustion and an increased incidence of infection. Diabetes can cause poor circulation in the feet, increasing the likelihood of ulcers forming when the skin is damaged and slowing the healing of the ulcers. Whey proteins (WPs) enhance immunity during childhood and have a protective effect on some immune disorders. Therefore, in this study, we investigated the effects of camel WP on the healing and closure of diabetic wounds in a streptozotocin (STZ)-induced type I diabetic mouse model. **RESULTS:** Diabetic mice exhibited delayed wound closure characterized by a significant decrease in an anti-inflammatory cytokine (namely, IL-10) and a prolonged elevation of the levels of inflammatory cytokines (TNF- α , IL-1 β and IL-6) in wound tissue. Moreover, aberrant expression of chemokines that regulate wound healing (MIP-1 α , MIP-2, KC and CX3CL1) and growth factors (TGF- β) were observed in the wound tissue of diabetic mice compared with control nondiabetic mice. Interestingly, compared with untreated diabetic mice, supplementation with WP significantly accelerated the closure of diabetic wounds by limiting inflammatory stimuli via the restoration of normal IL-10, TNF- α , IL-1 β and IL-6 levels. Most importantly, the supplementation of diabetic mice with WP significantly modulated the expression of MIP-1 α , MIP-2, KC, CX3CL1 and TGF- β in wound tissue compared with untreated diabetic mice. **CONCLUSION:** Our data demonstrate the benefits of WP supplementation for improving the healing and closure of diabetic wounds and restoring the immune response in diabetic mice.

Keywords:

Cytokines, Diabetes mellitus, Inflammation, Wound healing, Whey protein

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