# Gallocatechin-silver nanoparticle impregnated cotton gauze patches enhance wound healing in diabetic rats by suppressing oxidative stress and inflammation *via* modulating the Nrf2/HO-1 and TLR4/NF-κB pathways


## ABSTRACT

This study is designed to investigate the combination of gallocatechin (GC) and silver nanoparticles (AgNPs) for its wound healing ability in diabetic rats. Thirty male Sprague Dawley rats were randomly divided into 5 groups: 1. Normal control rats dressed with blank CGP1; 2. Diabetic rats dressed with blank CGP1; 3. Diabetic rats dressed with 13.06μM of GC; 4. Diabetic rats dressed with 26.12 μM of GC; 5. Diabetic rats dressed with 0.1% silver sulfadiazine patches. GC-AgNPs-CGP dressed diabetic rats showed significant FBG reduction, prevented the body weight losses and reduced the oxidative stress by lowering MDA content and elevated antioxidant enzymes such as SOD, CAT and GPx in wound healing skin of diabetic rats when compared to normal CGP. Besides, mRNA expression of Nrf2, Nqo-1, and Ho-1 was upregulated with downregulated expression of Keap-1 mRNA, which is supported by immunohistochemistry. Furthermore, GC-AgNPs-CGP dressing increased growth factors such as VEGF, EGF, TGF-β, and FGF-2 while decreasing MMP-2 in the skin of diabetic wound rats. In vitro permeation study demonstrated rapid GC release and permeation with a flux of 0.061 and 0.143 mg/sq.cm/h. In conclusion, the results indicated that GC-AgNPs-CGP dressing on diabetic wound rats modulated oxidative stress and inflammation with elevated growth factors; increased collagen synthesis thereby significantly improved the wound healing and could be beneficial for the management of diabetic wounds.