

The diabetic miniature pig as a model for human chronic wound healing

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Ting-Yung Kuo^{1,2}, Jhih-Ying Lin², Chin-Wen Liang², Jen-Yu Fan², Hsin-Hung Lin³, Wun-Wei Cheng²,
Ming-Che Wu¹, Lynn L.H. Huang²

¹Breeding and Genetic Division, Livestock Research Institute, C.O.A.

²Department of Biotechnology and Bioindustry Sciences, College of Bioscience and Biotechnology,
National Cheng Kung University.

³Kaohsiung Animal Propagation Station, Livestock Research Institute, C.O.A.

According to the International Diabetes Federation (IDF), there were 537 million people in the world suffering diabetes in 2021. The most common complications of this disease are proteinuria, vision loss, hand, and foot paralysis. Eventually, long-term of diabetes caused disabling or even life-threatening like amputation. Therefore, it is necessary to establish an animal model of diabetes to study the chronic wound healing of it. In this study, we used Lanyu pigs as an animal model for diabetic wound healing. First, we verify the dosage of Alloxan with 100, 125, and 150 (mg/kg) to induce diabetes in Lanyu pigs. Next, we created and compared 3 × 3, 6 × 6, 12 × 12 (cm) size of the wound in diabetes and healthy Lauyu pigs to evaluate parameters associated with wound healing process. Experiment results showed that the level of blood glucose was consistently higher than 400 mg/dl after 24 hours of induction by 125 mg/kg Alloxan. Time for completing wound re-epithelialization was significantly much longer in diabetic pig than healthy pig. In diabetic pig the 3 × 3 small wound was re-epithelialized at day 42 about 14 days delayed than healthy pig. In larger wound of 6 × 6 and 12 × 12 (cm) were remaining about 6.0% and 26.5% wound un-epithelialization at the end of observation (day 77) compared to non-diabetic wound which complete re-epithelialization at day 42 and day 70. Considering the limitation of dorsal-lateral space and more number of wounds demand in one pig, the diabetic wound size of 6 × 6 cm was suggested for chronic wound study. These results establish a preclinical platform enabling better optimization of diabetic chronic wound therapies increasing bench-to-bedside translational achievement.

Key words: Lanyu pig, Alloxan, Diabetic, Chronic Wound