UDC 615.31+616.379-008.64 DOI: 10.25808/08697698.2018.202.6S.064

Y.M WANG, Y.J. CHEN, W.F. LIAW, S.S.F. YUAN

Activation of angiogenesis and wound healing in diabetic mice using no-releasing dinitrosyl iron complexes

Key words: diabetes mellitus, angiogenesis, wound healing, ●NO-delivery dinitrosyl iron compelxes

In diabetes mellitus, abnormal angiogenesis due to endothelial dysfunction impairs the wound healing and stimulates the attempts to develop chemotherapies for the prevention of diabetic foot ulcers and mortality. In this study, activation of angiogenesis and wound healing by direct treatment of nitric oxide using ●NO-delivery dinitrosyl iron compelxes (DNICs) and the therapeutic effect in diabetic mouse were investigated. The in vitro and in vivo study demonstrates that DNIC-1 [$Fe_2(\mu\text{-}SCH_2CH_2OH)_2(NO)_4$] features a sustainable ●NO-release reactivity (t1/2 = 27.4±0.5 h) and displays the pro-angiogenesis activity overwhelming the other ●NO donors and, in particular, vascular endothelial growth factor (VEGF). Moreover, DNIC-1 rescues the impaired angiogenesis on hind limb under ischemia and accelerates the wound closure in diabetic mouse. This study highlights the sustainable ●NO-release reactivity of the synthetic DNIC-1 for the translation into a novel chemotherapy to replace VEGF and to activate of angiogenesis and wound healing in diabetes.

* WANG Yun-Ming, CHEN Yu-Jen (Department of Biological Science and Technology, Institute of Molecular Medicine and Bioengineering, National Chiao Tung University, Taiwan), LIAW Wen-Feng (Department of Chemistry, National Tsing Hua University, Hsinchu 30013, Taiwan), YUAN Shyng-Shiou (Translational Research Center and Department of Obstetrics and Gynecology, Kaohsiung Medical University Hospital, Kaohsiung Medical University, Kaohsiung 807, Taiwan; Translational Research Center and Department of Obstetrics and Gynecology, Kaohsiung Medical University Hospital, Kaohsiung Medical University, Kaohsiung 807, Taiwan). *E-mail: ymwang@mail.nctu.edu.tw

This work was supported by grants from the Ministry of Science and Technology, Taiwan (MOST 106-2113-M-009-023)