

Full text open access online (Since 2001)

©  Kamla-Raj IJHG 2024

PRINT: ISSN 0972-3757 ONLINE: ISSN 2456-6330

Int J Hum Genet, 24(2): 226-235 (2024)

DOI: 10.31901/24566322.2024/24.02.890

Sirtuin 1 Prevents Arterial Endothelial Cell Injury Triggered by Oxidized Low-density Lipoprotein via Modulating the TXNIP/NLRP3 Signaling Pathway

Qin Zhu¹, Bin Sun², Huicheng Hao³, Yang Zhao⁴ and Chaojie He^{5,*}

¹Department of Cardiology, People's Hospital of Ningxia, Yinchuan 750002, Ningxia Hui Autonomous Region, China

²Department of Cardiology, Nanchong Central Hospital, Nanchong 637000, Sichuan Province, China

³Third Clinical Medical College, Ningxia Medical University, Yinchuan 750004, Ningxia Hui Autonomous Region, China

⁴Department of General Medicine, Affiliated Hospital of North Sichuan Medical University, Nanchong 637000, Sichuan Province, China

⁵Department of Cardiology, The Affiliated Hospital of Jiaying University, Jiaying 314000, Zhejiang Province, China

KEYWORDS Artery. Damage. Endothelial Cells. Expression. Low-Density Lipoprotein. Signaling Pathway

ABSTRACT The researchers aimed to explore the protective mechanism of sirtuin 1 (Sirt1) against arterial endothelial cell injury triggered by oxidized low-density lipoprotein (Ox-LDL) via modulating the TXNIP/NLRP3 signaling pathway. Lentiviral infection or siRNA transfection was employed to establish human umbilical vein endothelial cells (HUVECs) presenting stably overexpressed Sirt1 or with interfered Sirt1 expression. Compared with control cells, Ox-LDL-treated HUVECs with overexpressed Sirt1 had significantly enhanced proliferative activity and decreased apoptosis rate, while HUVECs with interfered Sirt1 expression had significantly weakened proliferative activity and increased apoptosis rate. In comparison with control cells, HUVECs with overexpressed Sirt1 had significantly decreased TXNIP and NLRP3 protein expressions ($P < 0.05$), whereas HUVECs with interfered Sirt1 expression had significantly increased expressions ($P < 0.05$). Adding SRI-37330 significantly elevated the expression level of Sirt1 in cells. In the case of Ox-LDL-induced damage to HUVECs, Sirt1 is capable of safeguarding vascular endothelial cell functions by suppressing the activity of the TXNIP/NLRP3 signaling pathway.