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Renoprotective effects of xenon on lupus nephritis by inhibiting NLRP3 inflammasome and oxidative stress

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Lupus nephritis (LN) is a major complication of systemic lupus erythematosus. Development of a novel molecular pathogenesis-oriented therapeutic remedy preventing progression is clinically warranted. The development of accelerated and severe LN (ASLN) has been attributed to a wide range of pathogenic pathways, such as overt activation of T and B cells, NLRP3 inflammasome and oxidative stress. Unfortunately, the current treatment of ASLN is insufficient. Therefore, to establish novel yet practical therapeutic agents for ASLN is clinically warranted. Xenon (Xe), a noble gas, has been used as an anesthetic, with very low toxicity. In present study, Xe was used to test its renoprotective effects in an ASLN model induced by repeated injections of lipopolysaccharide to SLE-prone NZB/Wf1 mice. The results showed that (1) Xe significantly ameliorated the proteinuria, hematuria, severe renal lesions and improved renal function; (2) Xe suppressed renal inflammation via blocking of the activation of NLRP3 inflammmasome and NF-κB; (3) Xe inhibited renal cells apoptosis via blocking Bax/Bcl-2 mediated apoptotic pathway; (4) Xe decreased mitochondrial injury in macrophage, including mitochondrial ROS generation and mitochondrial DNA release into the cytosol. Our data suggest that Xe alleviated the mouse ASLN model by inhibiting the activation of NLRP3 inflammasome and mitochondrial ROS production. Xe may be useful for the treatment of human ASLN.

Biography

Shuk-Man Ka has completed her PhD from National Defense Medical Center, Taipei, Taiwan and postdoctoral studies from the Department of Pathology, Tri-Service General Hospital, Taipei, Taiwan and the Initiative of Gene Therapy, Harvard Medical School. She is working as an associate professor at the Academy of Medicine, National Defense Medical Center, Taipei, Taiwan. She has published more than 50 papers in reputed journals.

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