Ischemia and reperfusion (I/R) injury of renal graft is one of the major problems for successful transplantation of kidney. Apoptosis plays a crucial role in the renal injury induced by I/R and the apoptosis of renal tubular epithelial cells has been predominantly investigated. However, it is not clear whether I/R provokes endothelial cell injury within glomeruli. Here, we focused on the apoptotic change of glomerular endothelial cells (GECs) during I/R injury. DNA ladder formation, morphological changes and TUNEL staining in accordance with Fas and FasL expressions in the kidney were examined. Apoptotic cell death in kidney was observed as early as 3 hours after reperfusion. Early apoptotic change was mainly occurred in vascular endothelial cells, including GECs. The double staining with TUNEL and anti-vascular endothelial cadherin (VE-cadherin) Ab demonstrated that I/R induced apoptosis in GECs. Electron microscopic examination supports the findings. In addition, laser microdissection and RT-PCR demonstrated that enhanced mRNA expression of FasL in glomeruli was observed after ischemia, suggesting involvement of Fas/FasL system in apoptotic death of GECs after I/R. Furthermore, the apoptosis of GECs was predominantly inhibited by the intravenous injection of Fas-Fc fusion protein before ischemia. These findings suggest that I/R induces apoptotic cell death not only in tubular epithelial cells but also in endothelial cells in glomeruli and the Fas/FasL system is importantly involved in I/R-induced endothelial cell apoptosis. Thus, the pretreatment with Fas-Fc fusion protein may help to reduce the injury of endothelial cells in glomeruli and effectively improve renal function after renal transplantation.


* Correspondence should be addressed to:
Noboru Suzuki, Departments of Immunology and Medicine, St. Marianna University School of Medicine, 2-16-1, Sugao, Miyamae-ku, Kawasaki, Kanagawa 216-8511, Japan. Phone: 81-44-977-8111(Ext.3547), Fax: 81-44-975-3315, e-mail: n3suzuki@marianna-u.ac.jp

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