Distribution of nitric oxide synthases and nitrotyrosine in the kidney of spontaneously hypertensive rats.


Department of Comparative Neuroanatomy, Cajal Institute, Madrid.

OBJECTIVES: To study the cellular distribution and the expression of the major isoforms of NO synthase (NOS) and of nitrotyrosine in the kidney in spontaneous hypertension. DESIGN AND METHODS: We have studied by immunohistochemistry the location of the endothelial (eNOS), neuronal (nNOS) and inducible (iNOS) isoforms and nitrotyrosine in kidney slices from normotensive Wistar-Kyoto (WKY) rats and spontaneously hypertensive rats (SHR) using specific antibodies. In order to quantify the expression of these proteins, we have analyzed dissected renal cortical and medullary sections by means of Western blot. RESULTS: Tubular cells were immunoreactive to nNOS and more numerous in the renal medulla of the SHR compared with that of the WKY, specifically in the outer medulla and the papillary region. Western blot also showed higher expression of nNOS in the renal medulla, but not the renal cortex of the SHR. In contrast, iNOS and eNOS distribution and expression were similar in the kidneys of WKY rats and SHR. Immunohistochemistry showed immunoreactive cells to nitrotyrosine in a variety of renal cells similarly distributed in SHR and WKY kidneys. Western analysis detected three proteins of 14.5, 23.7 and 39 kDa immunoreactive to nitrotyrosine, showing a higher expression in the renal cortex compared to the renal medulla. CONCLUSIONS: The expression of nNOS is higher in the renal medulla of the SHR, and the distribution of eNOS, iNOS and nitrotyrosine is similar in SHR and WKY rats. It is proposed that the higher expression of the neuronal isoform in the medullary tubular cells is a protective mechanism aimed to improve renal function in spontaneous hypertension.

PMID: 14654759 [PubMed - indexed for MEDLINE]