

Hydration status affects osteopontin expression in rat kidney: an ultrastructural immunocytochemistry

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Abstract. Osteopontin (OPN) is a secreted phosphoprotein that is expressed in the normal kidney. Although OPN has been reported to be induced in various conditions, little is known about the regulatory factor and the role of OPN in the kidney. The purpose of this study was to establish that hydration status would be a possible factor of OPN expression in the kidney. Three groups of rats were studied: 1) control (C: free access to water); 2) dehydrated (D: deprived of water for 3 days); 3) hydrated (H: free access to 3% sucrose water for 3 days). Kidney tissues were processed for immunohistochemistry, *in situ* hybridization, and Western blot analysis using an OPN antibody (MPIII10) or digoxigenin-labeled riboprobe to OPN. Mean urine osmolality was 1,536 mosm/L in C, 3,546 mosm/L in D, and 534 mosm/L in H.

In C, OPN mRNA and protein were expressed restrictively in the cells of descending thin limb (DTL) and papillary surface epithelium (PSE). However, in D, OPN was expressed in the cells of thick ascending limb (TAL) as well as DTL and PSE. The OPN expressed in TAL was localized predominantly in the luminal surface of the cells. In H, OPN mRNA and protein expression were expressed in DTL and PSE. However, the staining intensity seemed to be weaker than that of C. Western blot analysis showed increased OPN expression in D, and decreased OPN expression in H compared to C.

These results indicate that expression of OPN is increased with dehydration while decreased with hydration, and suggest that hydration status is involved in the regulation of OPN expression in rat kidney.