

Cloning and expression of apical membrane water channel of rat kidney collecting tubule

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Summary

Concentrating urine is mandatory for most mammals to prevent water loss from the body. Concentrated urine is produced in response to vasopressin by the transepithelial recovery of the water from the lumen of the kidney collecting tubule through highly water-permeable membranes. In this nephron segment, vasopressin regulates water permeability by endo- and exocytosis of water channels from or to the apical membranes. CHIP28 is a water channel in red blood cells and the kidney proximal tubules. We have performed PCR cloning strategy to obtain a cDNA of the kidney collecting tubule. The obtained cDNA clone (WCH-CD) is 42% identical in amino acid sequence to CHIP28. WCH-CD transcripts are detected only in the collecting tubule of the kidney. Immunohistochemically, WCH-CD is localized to the apical region of the kidney collecting tubule cells. Expression of WCH-CD in *Xenopus* oocytes markedly increases osmotic water permeability. The functional expression and the limited localization of WCH-CD to the apical region of the kidney collecting tubule suggest that WCH-CD is the vasopressin-regulated water channel.