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Expression of Prox1 is Regulated by the Osmolarity in Mouse Kidney

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Purpose: Prox1, prospero-related homeobox1 transcription factor, is known to be expressed in various internal organs and is related to those differentiations. We previously reported that Prox1 expressed in the development regions of the ascending thin limb (ATL) of Henle's loop. We present hypothesis that the Prox1 is related to urinary concentrating ability. The purpose of this study was to examine whether the expression and distribution of the Prox1 change with the capacity to concentrate urine in the developmental kidney and in the potassium depleted mice by immunohistochemistry and western blot analysis.
Methods: For developmental study, kidneys from 18-day-old fetuses, 1-, 4-, -7, -14, and 21-day-old pups, and adult C57BL/6 mice were used and for potassium-depleted model, adult male C57BL/6 mice were fed a low-potassium diet for 2 weeks, and control animals received normal diet.
Results: In developmental kidney, Prox1 was expressed in transformation region from thick ascending limb (TAL) to ATL. After 2 wk on a low-potassium diet, urinary volume increased and urinary osmolality decreased. In the normal adult kidney, the immunoreactivity for Prox1 in ATL was week in initial part, but not in terminal part of renal papilla. However, Prox1 was expressed not only in initial part of renal papilla but also in terminal part of renal papilla in the potassium depleted mice. And the intensity of prox1 immunoreactivity was increased in the potassium depleted mice compared to normal mice.
Conclusion: Prox1 is involved in transformation of TAL into ATL in the renal development and regulated by the osmolarity in the renal medulla.

Key Words: Prox1, Urinary concentrating capacity