

## Independent regulation of the basolateral K<sup>+</sup> recycling and K<sup>+</sup> secretion in the renal collecting duct

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### Summary

Coordinated expression of ROMK (luminal K<sup>+</sup> channel in the thick ascending limb and the collecting duct) and Na<sup>+</sup>,K<sup>+</sup>-ATPase has been demonstrated to be involved in the postnatal development of renal K<sup>+</sup> excretion, however, the developmental expression of the basolateral K<sup>+</sup> channel Kir7.1 is unknown. The purpose of this study was to elucidate the possible involvement of Kir7.1 in the maturation of renal K<sup>+</sup> excretion.

[Methods] Developmental changes in the renal K<sup>+</sup> excretion was investigated by collecting urine in neonatal rats infused with K<sup>+</sup> (KCl solution). RNase protection analysis was used to elucidate the expression of Kir7.1, ROMK and Na<sup>+</sup>,K<sup>+</sup>-ATPase mRNA from rat kidney at 7, 14 and 21 days.

[Results] Renal K<sup>+</sup> excretion increased between 7 and 14 days after birth and sustained between 14 and 21 days. On the other hand, half excretion time of K<sup>+</sup> load gradually increased through the experimental period of 7 and 21 days. Na<sup>+</sup>,K<sup>+</sup>-ATPase mRNA levels showed the peak of up-regulation at birth and remain elevated. ROMK1 mRNA levels significantly increased between 7 and 14 days. In contrast, Kir7.1 mRNA levels increased through the experimental period, especially between 14 and 21 days.

[Conclusion] Our results showed that Kir7.1 as well as ROMK1 were involved in the maturation of renal K<sup>+</sup> excretion and indicate that Kir7.1 expression is strongly related with development of the renal K<sup>+</sup> excretion between 14 and 21 days after birth.