F-E14

K+ 처리에 따른 흰쥐 집합관에서 세포 분열과 세포사멸

가톨릭대학교 의과대학 해부학교실 세포사멸질환연구센터

박은영 · 김완영 · 이현욱 · 송현국 · 황진선 · 김 진

Cell Proliferation and Apoptosis with Potassium Treatment in Rat Kidney Collecting Ducts

Eun-Young Park, Wan-Young Kim, Hyun-Wook Lee, Hyun-Kuk Song, Jin-Sun Hwang, Jin Kim

Department of Anatomy and MRC for Cell Death Disease Research Center
College of Medicine The Catholic University of Korea

Purpose : Potassium depletion induces the structural alterations that included hypertrophy and hyperplasia of intercalated cells (IC) and principal cells (PC) in collecting ducts, in particularly change of cellular composition of IC. In contrast, potassium repletion induces regression of structural changes. The purpose of this study was to examine the possible mechanism behind the changes.

Methods : Sprague-Dawley rats received a K+-depleted diet for 1, 7 and 14 days. After 2 weeks of K+-depletion, some rats were repleted with K+ for 1, 3, 5 and 7 days. H+-ATPase and AQP2 were used to identify IC and PC, respectively. Proliferating cells were identified with an antibody against 5-bromo-2'-doxyuridine (BrdU), and apoptosis were identified by using the ApopTag kit.

Results : In K+-depletion, BrdU-positive nuclei appeared mainly in AOP2-positive/H+-ATPase-negative PC, however the fraction of the cell density of PC was decreased compare to the control rats. While only a few AOP2-negative/ H+-ATPase-positive IC had BrdU-positive nucleus, but the fraction of the cell density of IC was markedly increased in K+-depletion. In K+-repleted groups, these changes were rapidly disappeared and became the control level on 7 days after K+-repletion. To determine the role of apoptosis in these changes, we operated double-staining by TUNEL and H+-ATPase. TUNEL-positive cells were detected mainly in AOP2-positive/H+-ATPase-negative PC after K+-repletion, but not observed in K+-depleted rats. There was no TUNEL-positive/ H+-ATPase-positive IC in both K+-depleted and -repleted groups.

Conclusion : In conclusion, the K+-induced fractional change in the density of IC is associated with high proliferative and apoptotic rate of PC than a selective proliferation and apoptosis of IC in the CD.