Modulation of Ca^{2+}-ATPase Activity on LLC-PK1 Cells: Angiotensin II Effect Via Luminal Membrane on SERCA and PMCA

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Ang II is involved in mantaining the extracellular volume and blood pressure. A recent view is that Ang II is formed in the renal interstitial fluid and in proximal tubules at much higher concentrations than those existing in the vascular compartment. In these renal compartments, Ang II elicits Ca^{2+}-dependent intracellular signalling that stimulates solute and fluid reabsorption. The aim of this work was to study the effect of Ang II on Ca^{2+}-ATPase activity from a proximal tubule cell culture. The influence of luminal membrane on the two Ca^{2+} pumps, PMCA and SERCA, and the angiotensin receptors involved was also investigated. Ang II modulates the total Ca^{2+}-ATPase in a biphasic manner when applied in the luminal side of LLC-PK1 cells for 30 min. This effect is mediated by the stimulation of SERCA activity but not of PMCA. Losartan and PD123319, AT_1 and AT_2 angiotensin receptors antagonists, revert the stimulation of SERCA activity. The time-course of Ang II effects indicate that there is a rapid (1 min) and persistent (up to 30 min) stimulus of SERCA. Alltoghether, the present data indicates that low concentrations of Ang II on luminal side of LLC-PK1 promotes the removal of intracellular Ca^{+2} by a sustained increase in SERCA activity, mediated by AT_1 and AT_2 receptors.

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