AUXIN INDUCES CELL PROLIFERATION IN AN EXPERIMENTAL MODEL OF MAMMALIAN RENAL TUBULAR EPITHELIAL CELLS

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OBJECTIVES

Indole-3-acetic acid is the main auxin produced by plants and plays a key role in plant growth and development[1]. In mammals, it is able to influence cell plasticity under experimental conditions. This hormone has been found also in humans where it is considered as an uremic toxin deriving from tryptophan metabolism and its serum levels increase as kidney function declines[2]; furthermore, some authors observed that probably auxin (henceforth this term will be used to indicate indole-3-acetic acid) is not only a biomarker of renal function but also a factor that, together with other uremic solutes, contributes to thrombotic risk in patients with severe chronic kidney disease[3]. However, beyond this peculiar aspect, the involvement of auxin in human pathophysiology has not been further investigated and currently, we do not know yet where and why it is produced and what is its function under normal conditions[4]. Since it is a plant growth hormone but it is found even in humans for unknown reasons, we evaluated its proliferative properties in an in vitro model of mammalian renal tubular epithelial cells.

METHODS

We used an experimental model of renal tubular epithelial cells belonging to the LLC-PK1 cell line, that is derived from the kidney of healthy male pig. Growth effects of auxin against LLC-PK1 cell lines were determined by a rapid colorimetric assay. Increasing concentrations of auxin (to give a final concentration from 1 to 1000 ng/ml) were added and microplates were incubated for 72 hours. Each auxin concentration was assayed in 4 wells and repeated 4 times. Results were expressed as mean ± SEM of 4 biological replicates. One-way analysis of variance (ANOVA), followed by Dunnet comparison post test, was used to analyze the differences in cell growth assays.

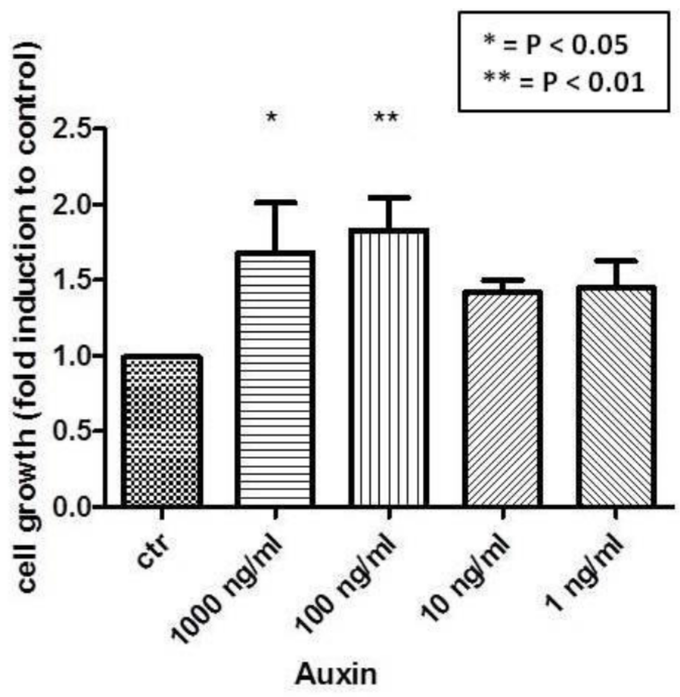

Figure 1. **Cell growth expressed as fold induction with respect to control cells after addition of different amounts of auxin to cultured LLC-PK1 cells. *p < 0.05; **p < 0.01.**

RESULTS

Cell proliferation significantly increased, compared to control cells, 72 hours after addition of auxin to cultured LLC-PK1 cells. Statistically significant values were observed when 100 ng/ml (P < 0.01) and 1000 ng/ml (P < 0.05) were used (*Figure 1*).

CONCLUSIONS

Auxin influences cell growth not only in plants, where its role is well documented, but also in mammalian cell lines. This observation opens new scenarios in the field of tissue regeneration and may stimulate a novel line of research aiming at investigating whether this hormone really influences human physiology and pathophysiology and in particular, kidney regeneration.

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