COMPARATIVE EXPRESSION OF PAX2 AND OCT-4 IN FETAL, NORMAL ADULT AND GLOMERULONEPHRITIC KIDNEYS

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Background

During organogenesis, the number and capacity of pluripotent stem cells capable of generating all types of kidney cells is progressively decreasing, and the normal adult kidneys host a few immature and multipotent cells with capacity of self-regenerating and producing more than one terminally differentiated cell type.

Aims

We aimed to compare the expression of Pax2 and Oct-4, two genes responsible for the development and the differentiation of the embryonic stem cells in fetal, normal adult and glomerulonephritic kidneys.

Methods

We performed immunohistochemical analysis with commercial antibodies against Pax 2 and Oct-4 on formalin-fixed, paraffin embedded tissue samples from 20 fetal kidneys with different gestational age, 40 normal adult and 40 glomerulonephritic kidneys.

Results

In <u>fetal kidney structures</u> both markers showed nuclear presence in immature blastemic mesenchyme and both early glomerular and tubular precursors, with decreasing to absent signal in immature glomeruli, except for their parietal cells, where the signal persisted.

In <u>adult normal kidneys</u> weak Pax2 signal was present in the parietal cells and in some distal tubules, unlike Oct-4, which was absent in all adult normal kidney structures.

Increased signal of both markers was observed in <u>glomerulonephritic kidneys</u>: parietal glomerular cells, as well as cellular crescents in cases of extracapillary glomerulonephritis were strikingly positive, and the number of positive atrophic tubules was higher ($p<0,05$) than the number of positive cortical tubules in normal adult kidneys. The interstitial cells in the three groups were negative.

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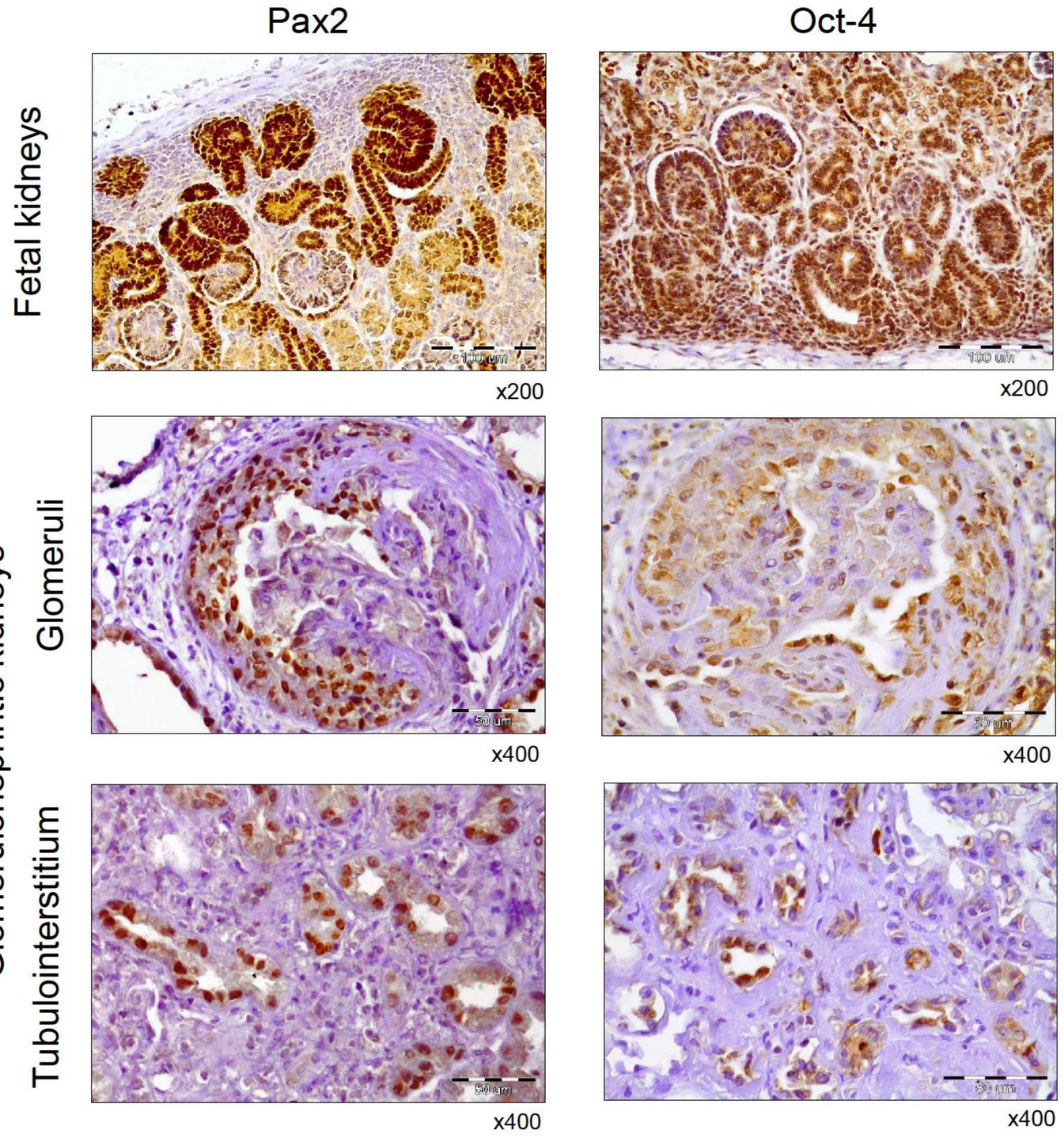

Conclusions

The presence of both markers in the immature fetal kidney structures indicates the pluripotency of the mesenchymal blastemic cells that precede the mature cells of all types, some of which undergo the process of mesenchymal-epithelial transition mediated by Pax2. Their decreased expression in adult kidney tissue indicates the differentiation and maturity of the cells that have lost their pluripotency. Since the hyperplastic crescent lesions are result of proliferation of parietal epithelial cells, the presence of Pax2 and Oct-4 in cellular crescents indicates that they are composed of immature and undifferentiated cells that proliferate as a result of impaired regeneration and differentiation of the damaged parietal epithelial cells. The positivity of the atrophic tubules can also be attributable to activating of the kidney`s own resources, potential resident stem cells in the process of defense and protection of its tissue components.

References

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