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THE KI-67 CELL PROLIFERATION MARKER IN HUMAN METANEPHROGENESIS

Milorad Antić[1], Vladimir Antić[2], Braca Kundalić[1], Miljana Pavlović[1], Vladimir Živković[1]

The kidney plays several essential roles, including the excretion of metabolic wastes, maintenance of key homeostatic parameters of the blood plasma, participation in blood pressure and hormone levels regulation. These diverse functions are enabled by the developmental process that provides the presence of specific cells for performing all diverse functions. Organogenesis of the kidney is an intricate mechanism involving cell proliferation as a fundamentally necessary process. The aim of this study was to determine proliferative activity during the metanephros stage of renal development, based on the spatial and temporal expression pattern of the cell proliferation marker Ki-67. Kidney tissue specimens of 30 human fetuses with gestational ages ranging from 11 to 36 weeks were analyzed. The specimens were divided into three groups based on gestational age, each corresponding to the earlier, mid or late gestation period. Routine histological processing yielded tissue sections. The proliferative activity of the cells (expression of the Ki-67 protein) was examined by an immunohistochemical assessment of Ki-67, according to the manufacturer's protocol. The presence of Ki-67-positive cells characterized all metanephric structures but with different intensity. The most prominent expression was revealed in the nephrogenic zone in the earlier weeks of development, indicating the role of cell proliferation in nephron formation. The intensity of Ki-67 antigen expression gradually decreased in all cortical structures until the end of the trial period. In the metanephric medulla, the proliferation was less pronounced only after week 20, and the only Ki-67 positive cells were single cells of collecting duct epithelia, narrow parts of Henle's loops and the interstitium. Cell proliferation was continuously present during metanephrogenesis. It was characterized by different intensity, more pronounced in the nephrogenic zone and renal cortex due to the dominant presence of cells in their structural components. However, the obvious developmental remodeling of the kidney tissues inevitably indicates the need to correlate proliferation with other developmental processes, apoptosis above all.

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