EFFECT OF AGE ON KIDNEY HYPERPLASIA IN THE RAT AFTER UNILATERAL NEPHRECTOMY

Milena Soukupová, Přemysl Hněvkovský and Jiří Najbrt
Department of General Biology, Medical Faculty, Charles University, and Institute of Clinical and Experimental Medicine, Prague

Adaptive growth of the mammalian kidney after nephrectomy of the contralateral organ is a firmly established phenomenon. Both increase in cell size and cell number take part in the compensatory growth and the greatest changes appear in kidney cortex. It is not clear, however, whether some ontogenetic differences in renal growth after unilateral nephrectomy exist, as there is evidence pro as well as contra the relation between the age of the individual and the degree and character of kidney growth and restoration of normal function (1-4). Therefore we studied the main characteristics of kidney growth after unilateral nephrectomy in very young, adult and ageing, but not yet senile, rats comparing kidney weight and number of cells obtained from the kidney by trypsinization.

MATERIALS AND METHODS

Inbred rats, males and females of the Lewis strain aged 3 weeks, 3 months and 12 months were used, 6 animals in each age group. The right kidney was removed aseptically under light ether anesthesia, weighed and prepared for trypsinization. After 5 days, the nephrectomized animals were killed and the remaining kidney weighed and used for trypsinization in the same way as the right, "control" kidney.

Trypsinization was done with kidneys freed from connective tissue structures, minced with fine scissors and subjected to 0.2% trypsin in PBS, pH 2.2-7.4, on an electromagnetic stirrer at 26-28°C. We used 20 ml of trypsin per 1 g kidney tissue. The first fractions containing tissue debris and red cells were discarded after 5 min of trypsinization in the 3 week old rats and 10 min in the 3 and 12 month old rats. Further fractions were collected after 20 min and the action of trypsin was stopped by an addition
of 0.5 ml calf serum to 100 ml of cell suspension. The kidneys were trypsinized till no visible tissue fragments remained, and the cell suspensions were stored during the time of trypsinization at 4°C. After filtration through a fine cloth, the cells were slowly centrifuged, the supernatant removed and the cells resuspended in Michl's medium (5) for counting in a hemocytometer. Blood cells, if present, were not counted.

The weight of the kidneys before and after nephrectomy, absolute and per 100g body weight, and the number of cells per whole kidney were calculated. Further, the percentage of weight increase of the kidney and the percentage of the increase in the cell number per kidney were calculated. The results were subjected to statistical evaluation either by Student's t test or by Wilcoxon's test (matched-pairs signed rank test).

![Graph](image.png)

Fig. 1. Kidney weight in mg before and after nephrectomy at 3 weeks, 3 months and 12 months rats.