Ukrainian medical stomatological academy

USAGE OF MEXIDOL AS A NEPHROPROTECTOR IN ACUTE STRESS REACTION

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The existence of a modern man is constantly accompanied by stress reactions. Adaptation reactions that occur in the body against the background of excessive stress can contribute to the emergence and development of a number of pathological processes. The main component of the stress triad of Selye is adrenal hypertrophy with increased synthesis of glucocorticoids and catecholamines. The changes that occur in the adrenal glands on the background of stress are devoted a considerable amount of work, whereas the effects of stress reactions on the kidneys and morphological changes in them have been studied much less.

The aim of the research:

- To establish at the morphological level the efficacy of using Mexidol to correct changes that occur in the white kidney of rats on the background of acute immobilization stress

Materials and methods of the research

The material used for the study was the kidneys of 15 adult white male rats.

The first control group is consisted of 5 intact rats.

The second control group is consisted of 5 animals that were exposed to acute immobilization stress without correction.

The third group is consisted of 5 animals for reproduction of an experimental model of acute immobilization stress with Mexidol correction.

Materials and methods of the research

- The experimental part of the work was performed in accordance with international standards for biological research.
- Conducted scientific research is according to the requirements of the international principles of the "European Convention for the Protection of Vertebrate Animals Used in Experiment and Other Scientific Purposes" (Strasbourg, 1985), the relevant law of Ukraine "On the Protection of Animals against Cruelty" (No. 3 446-IV of 02/21/2006, Kyiv), the codex of ethics of the doctor of Ukraine and the ethical code of the scientist

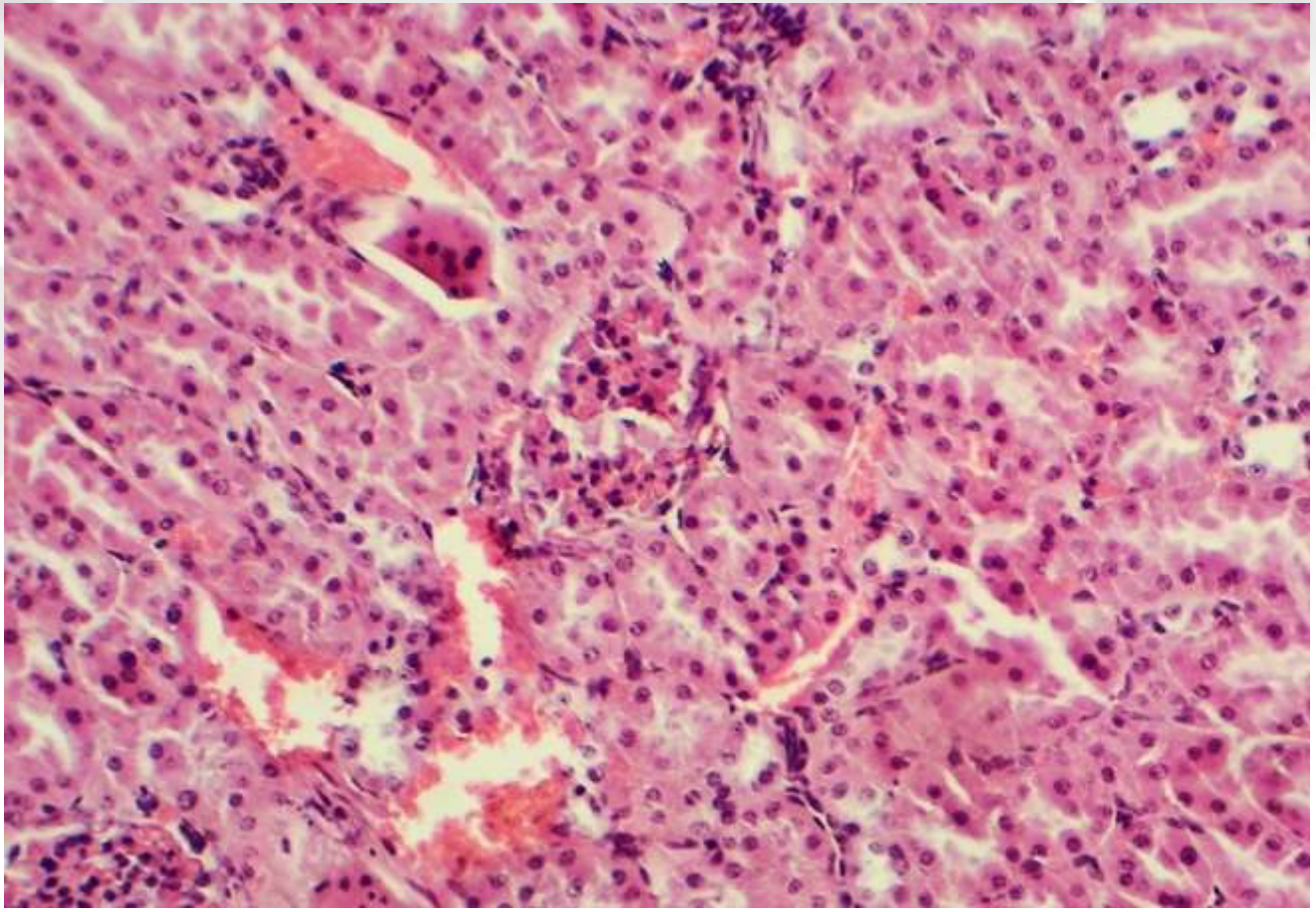
Model of stress

- Acute immobilization stress was reproduced by immobilizing of non-narcotic rats in a horizontal position on their back for 6 hours. Fixation was performed at the extremities, without damaging the skin and disrupting hemocirculation.
- For the purpose of correction, Mexidol was administered once intraperitoneally at a rate of 100 mg / kg body weight 20 minutes before the fixation period.

Materials and methods of the research

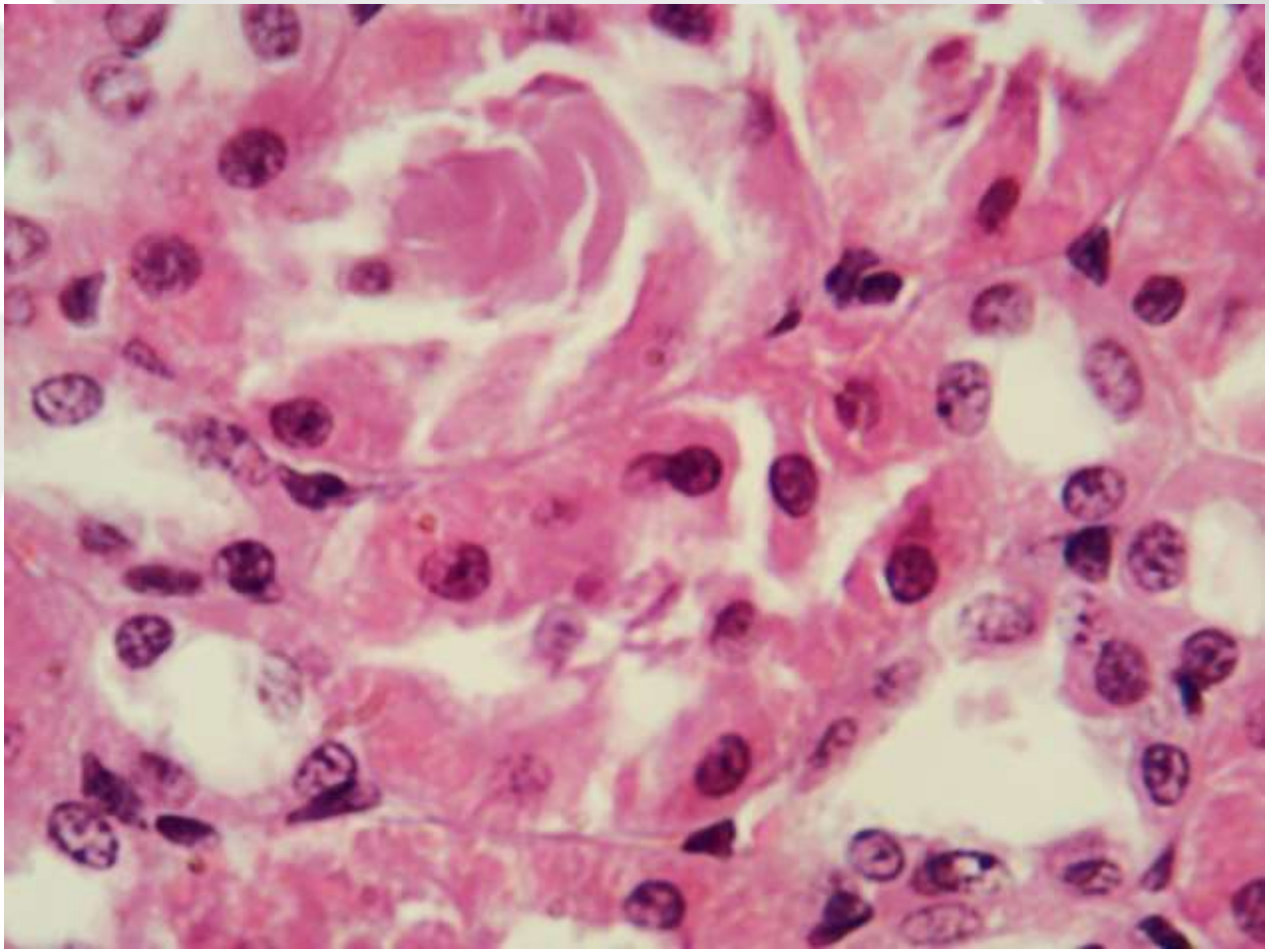
- Euthanasia of animals was performed
- Macroscopic examination of the kidney and material sampling for further microscopic examination were performed
- Kidney micropreparations are stained with hematoxylin and eosin according to the standard procedure

A kidney of a rat exposed to experimental acute immobilization stress



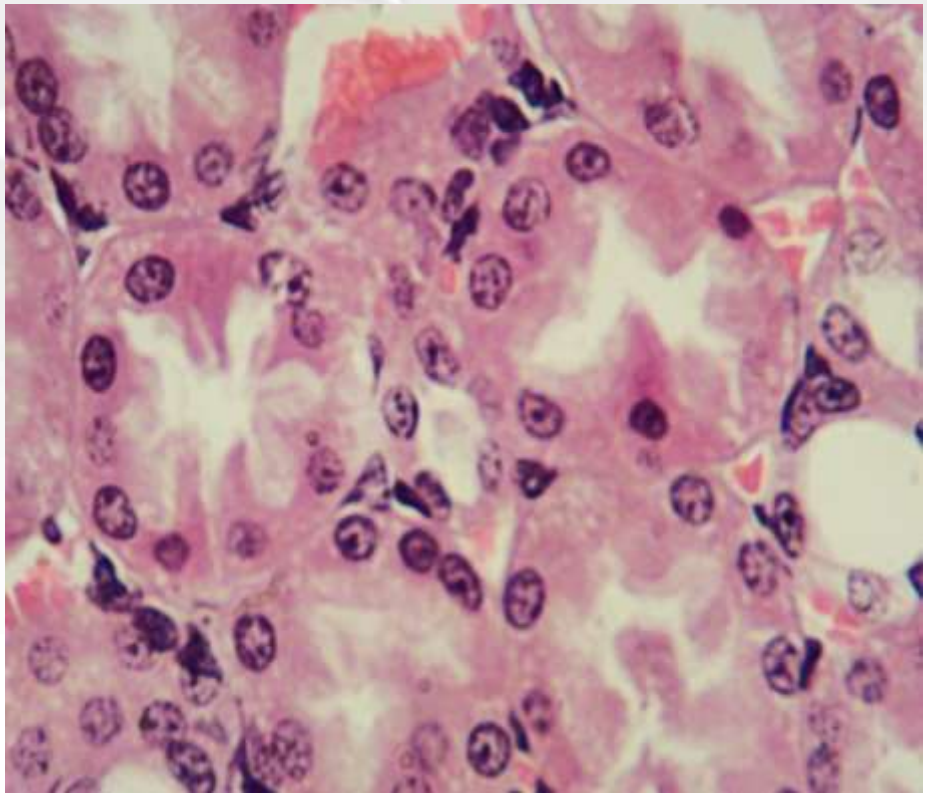
Focal hemorrhages of the peritubular vascular system of the rat kidney on the background of the stress response. Micro photo. Hematoxylin and eosin staining: 10×10 magnification

A kidney of a rat exposed to experimental acute immobilization stress

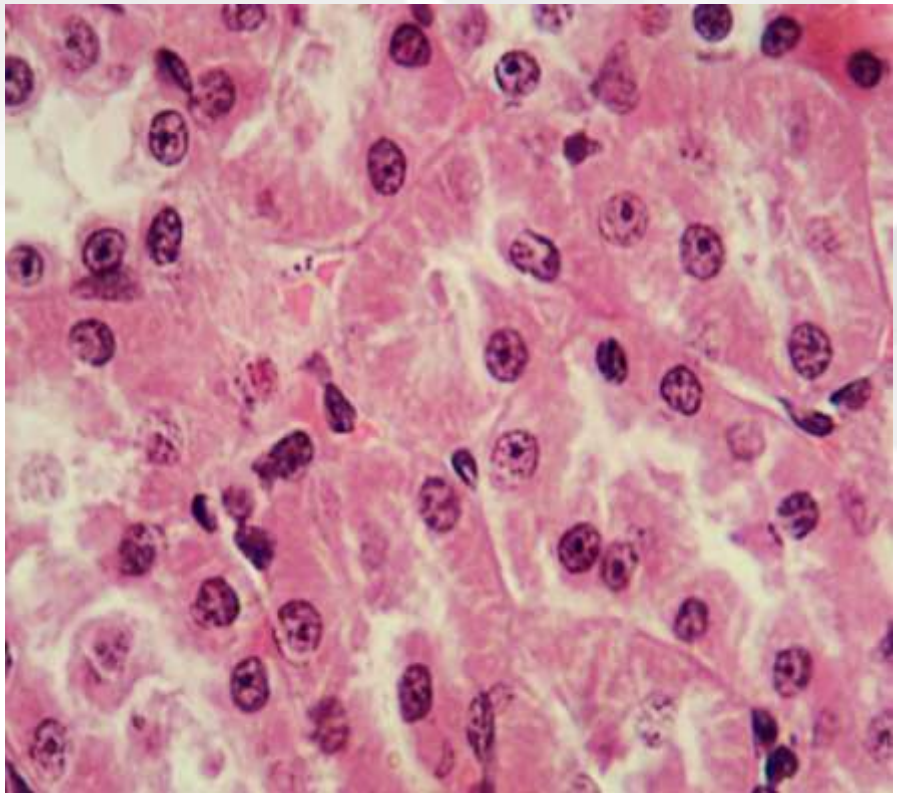


Extension of the lumen of the convoluted tubules and revealed homogeneous eosinophilic masses in the rat kidney on the background of the stress response. Micro photo. Hematoxylin and eosin staining: 40×10 magnification

A kidney of a rat exposed to experimental acute immobilization stress

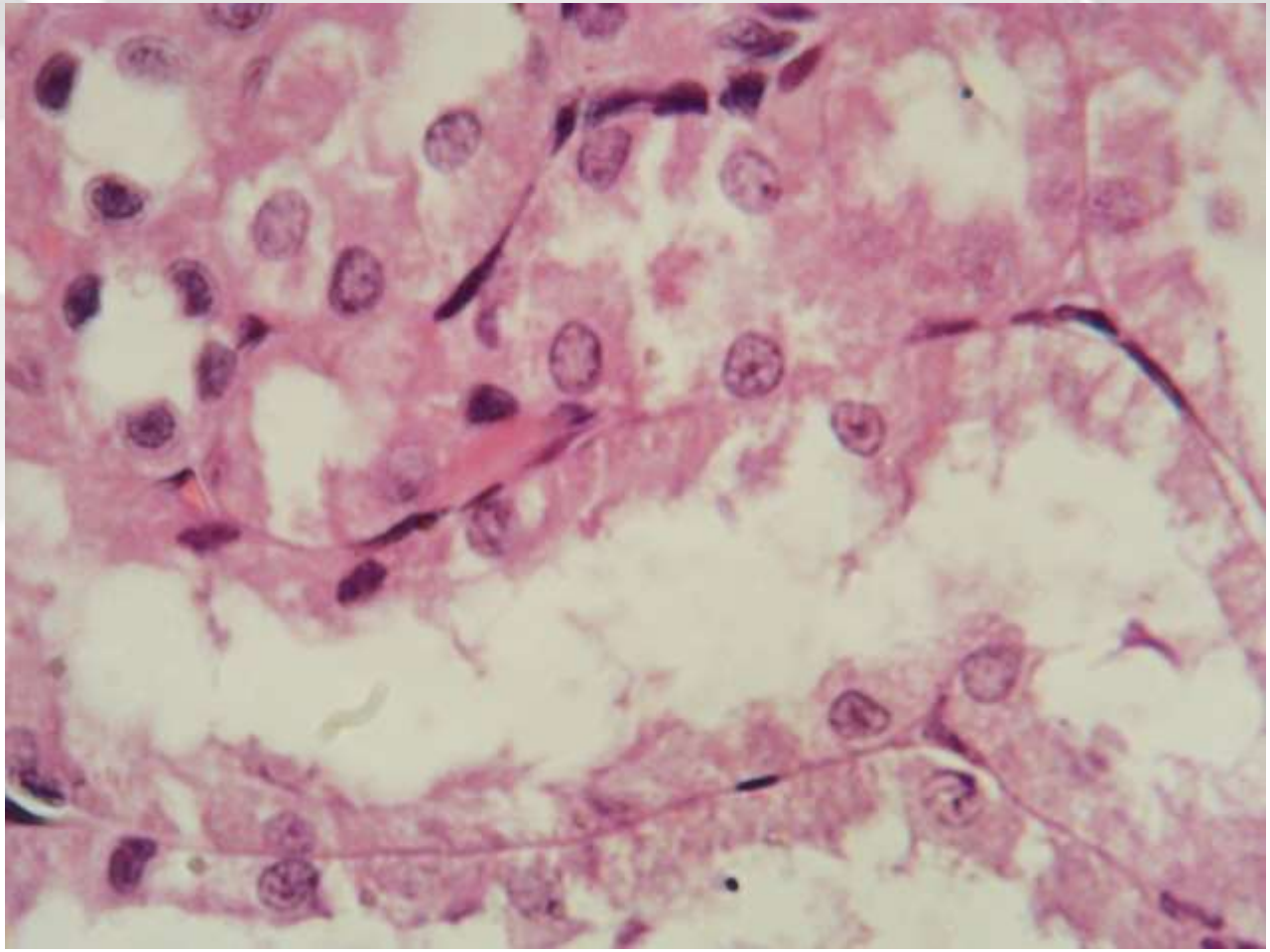


Hyaline-drip inclusions in rat kidney cells on the background of stress response. Micro photo. Hematoxylin and eosin staining: 40×10 magnification



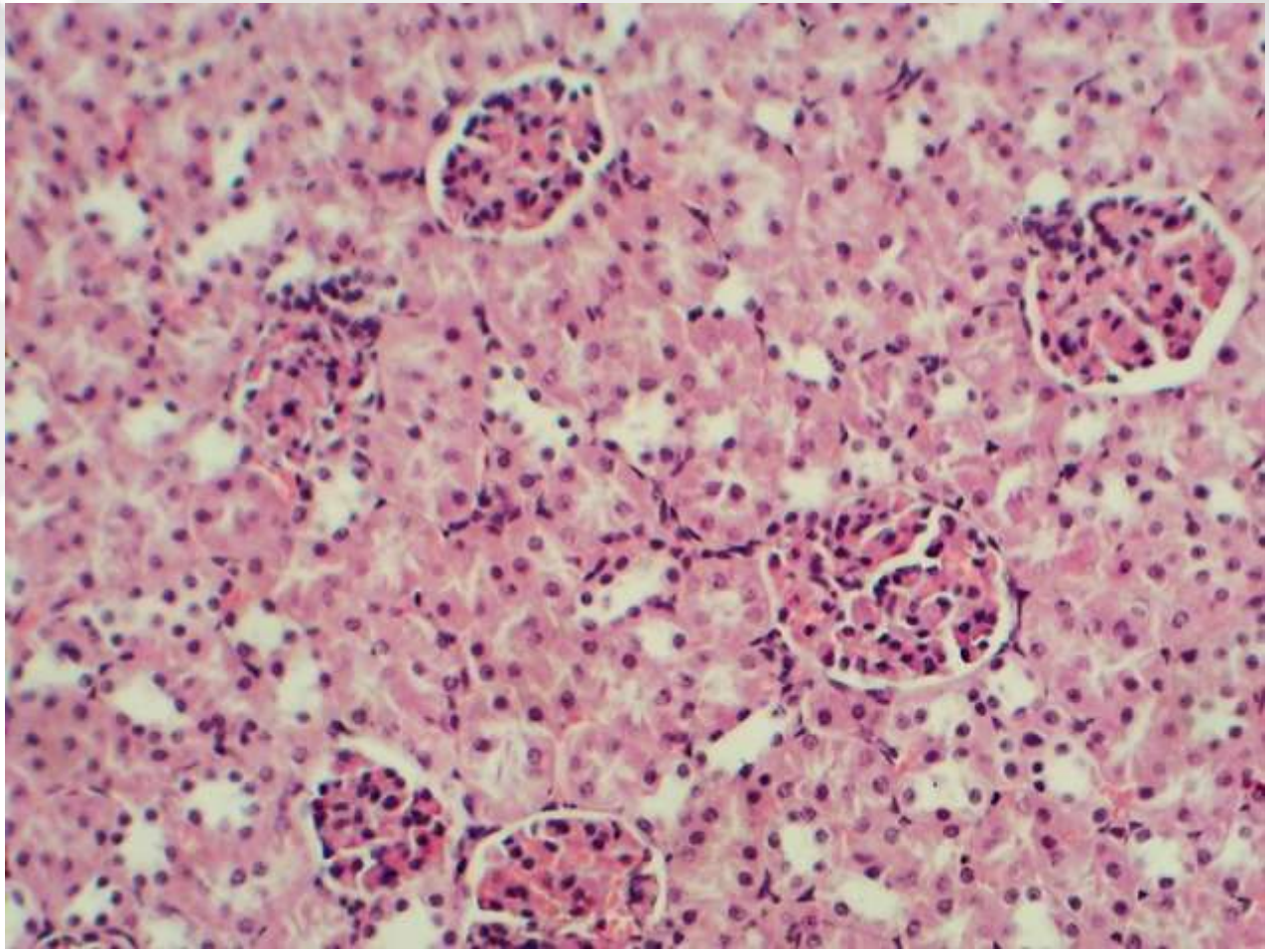
Hyaline-drip inclusions in rat kidney cells on the background of stress response. Micro photo. Hematoxylin and eosin staining: 40×10 magnification

A kidney of a rat exposed to experimental acute immobilization stress



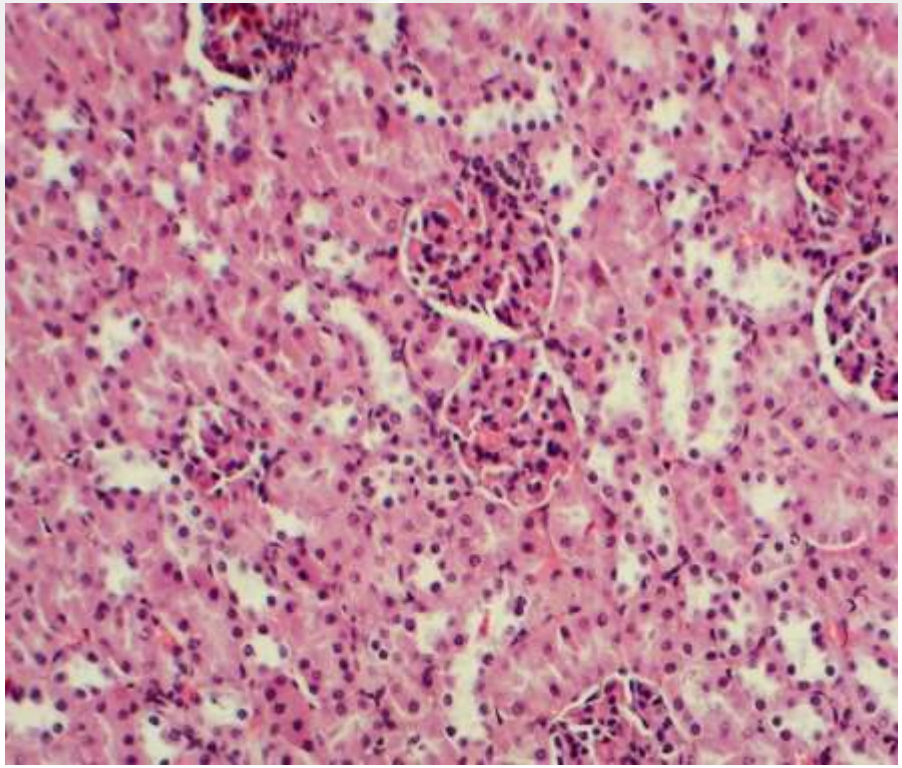
Necrosis of rat kidney epithelial cells on the background of stress response. Micro photo. Hematoxylin and eosin staining: 40×10 magnification

A kidney of a rat exposed to experimental acute immobilization stress

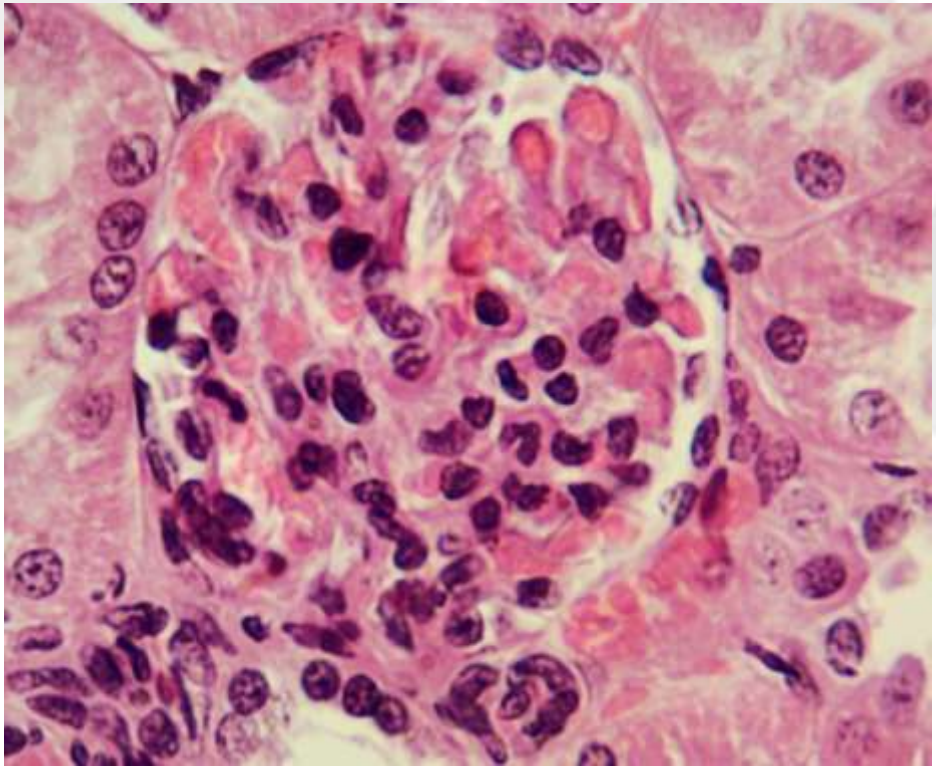


Expansion of the Bowman capsule of rat kidney on the background of stress response. Micro photo. Hematoxylin and eosin staining: 10×10 magnification

A kidney of a rat exposed to experimental acute immobilization stress

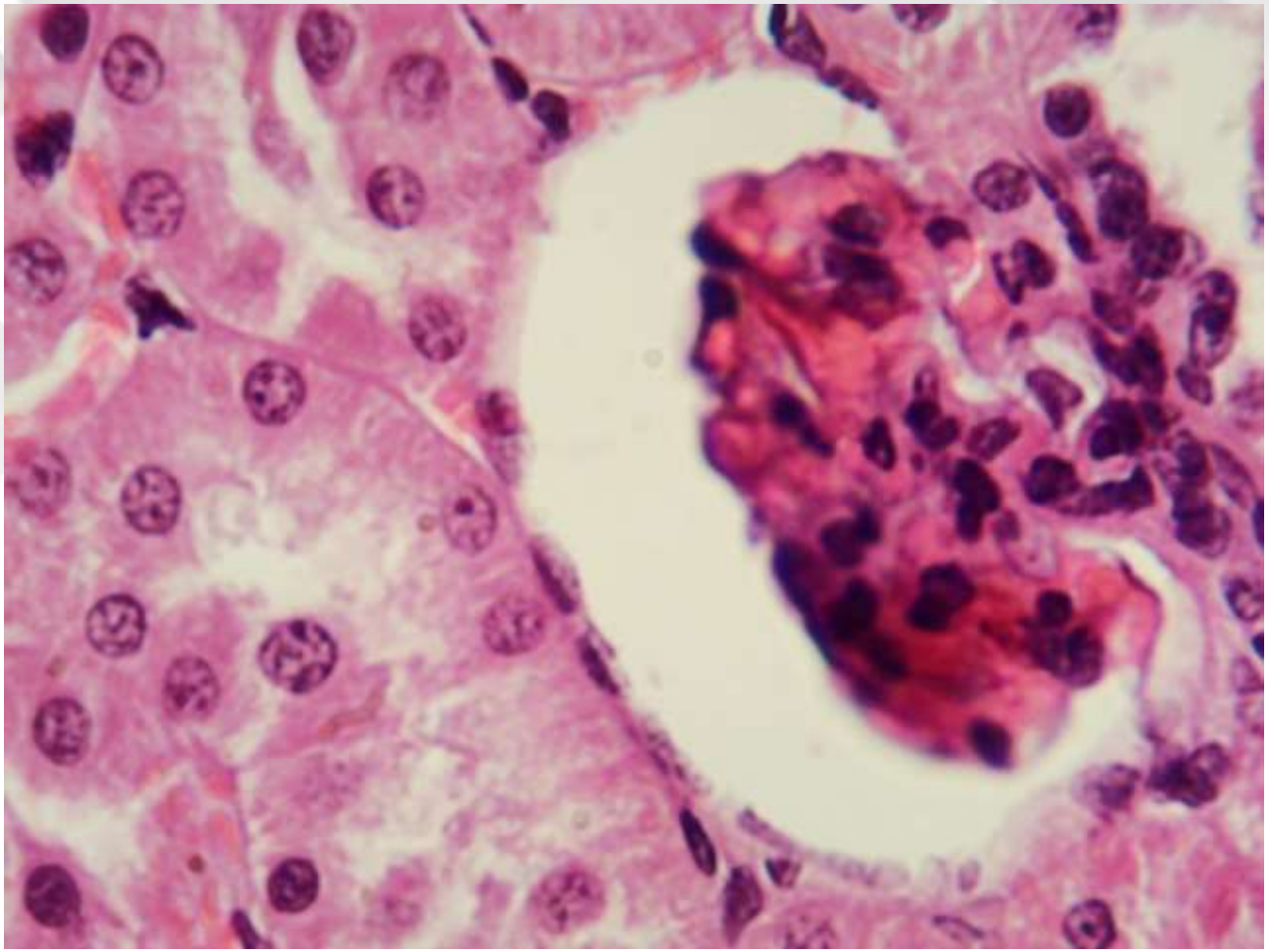


Acute plethora of capillaries, swelling of the mesangial matrix of the kidney of the rat kidney on the background of the stress response. Micro photo. Hematoxylin and eosin staining: 10×10 magnification



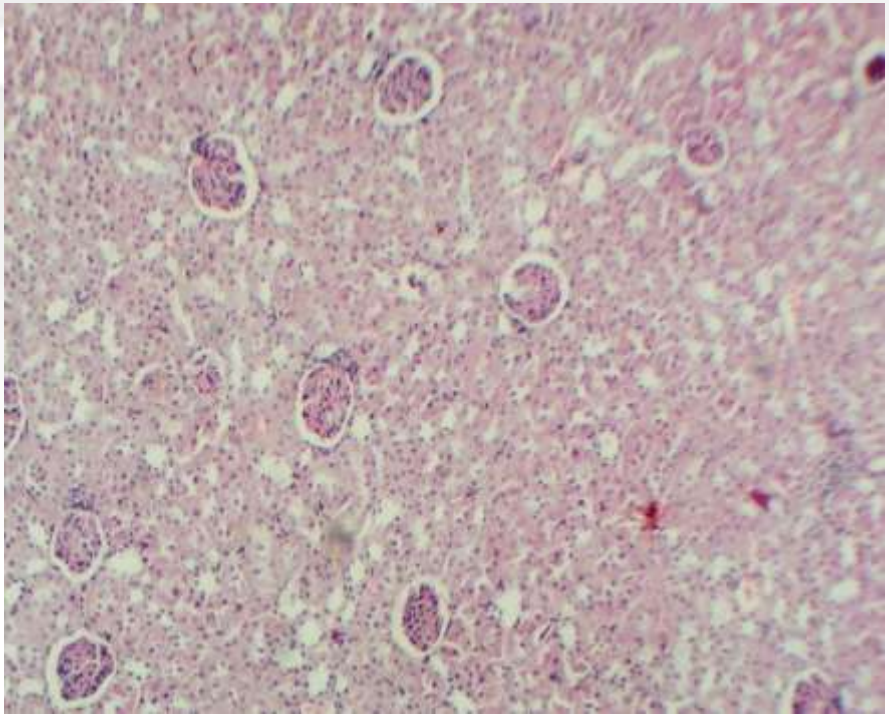
A sharp plethora of capillaries, swelling of the mesangial matrix of the kidney of the rat kidney on the background of the stress response. Micro photo. Hematoxylin and eosin staining: 40×10 magnification

A kidney of a rat exposed to experimental acute immobilization stress

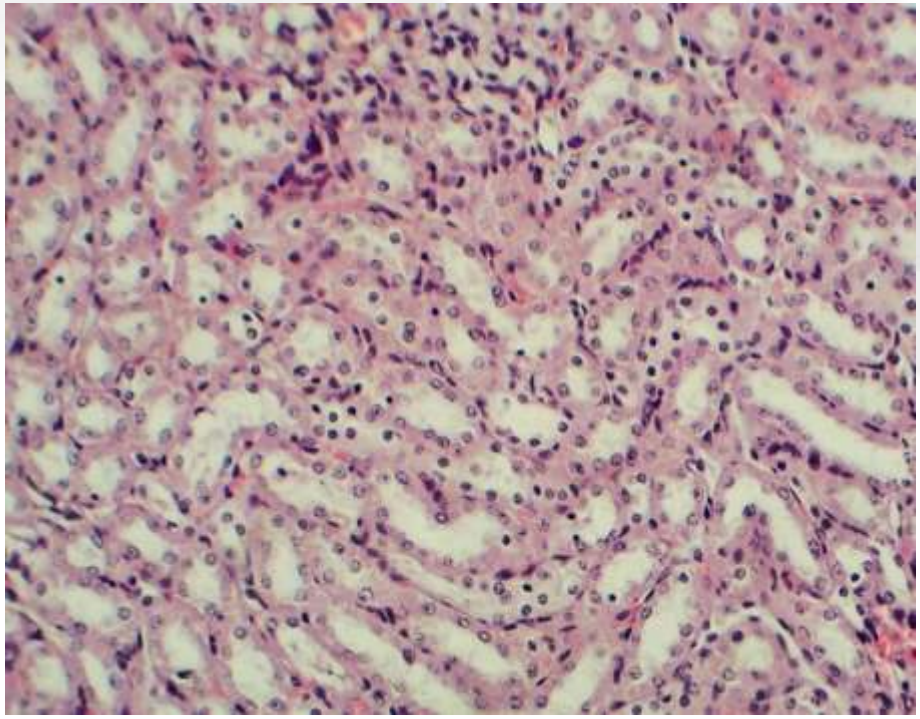


The sticking together of the inner layer cells of the kidney glomerular capsule of the rat kidney on the background of the stress response. Micro photo. Hematoxylin and eosin staining: 40×10 magnification

The kidney of a rat exposed to experimental acute immobilization stress with Mexidol correction

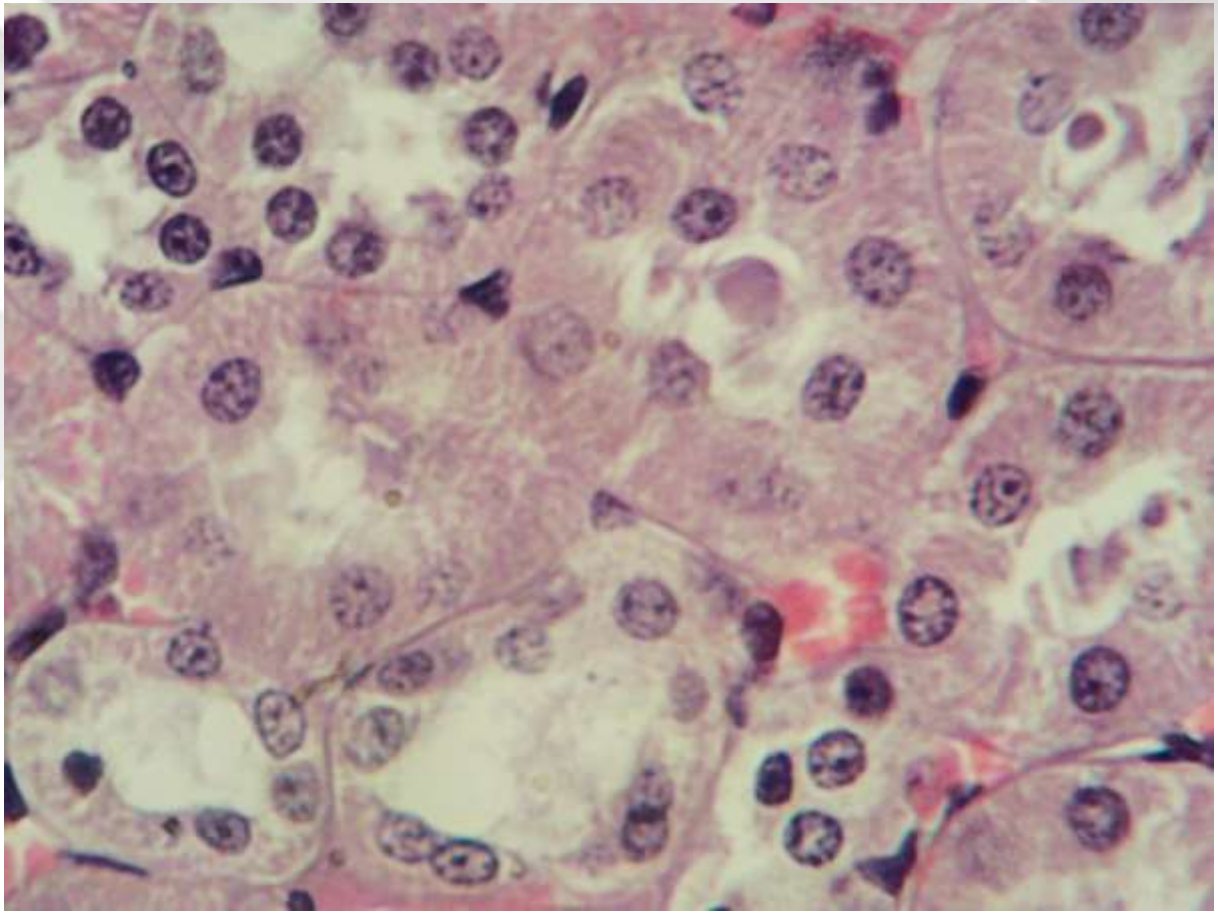


Kidney rat on the background of stress response with Mexidol correction. Micro photo. Hematoxylin and eosin staining: 4×10 magnification



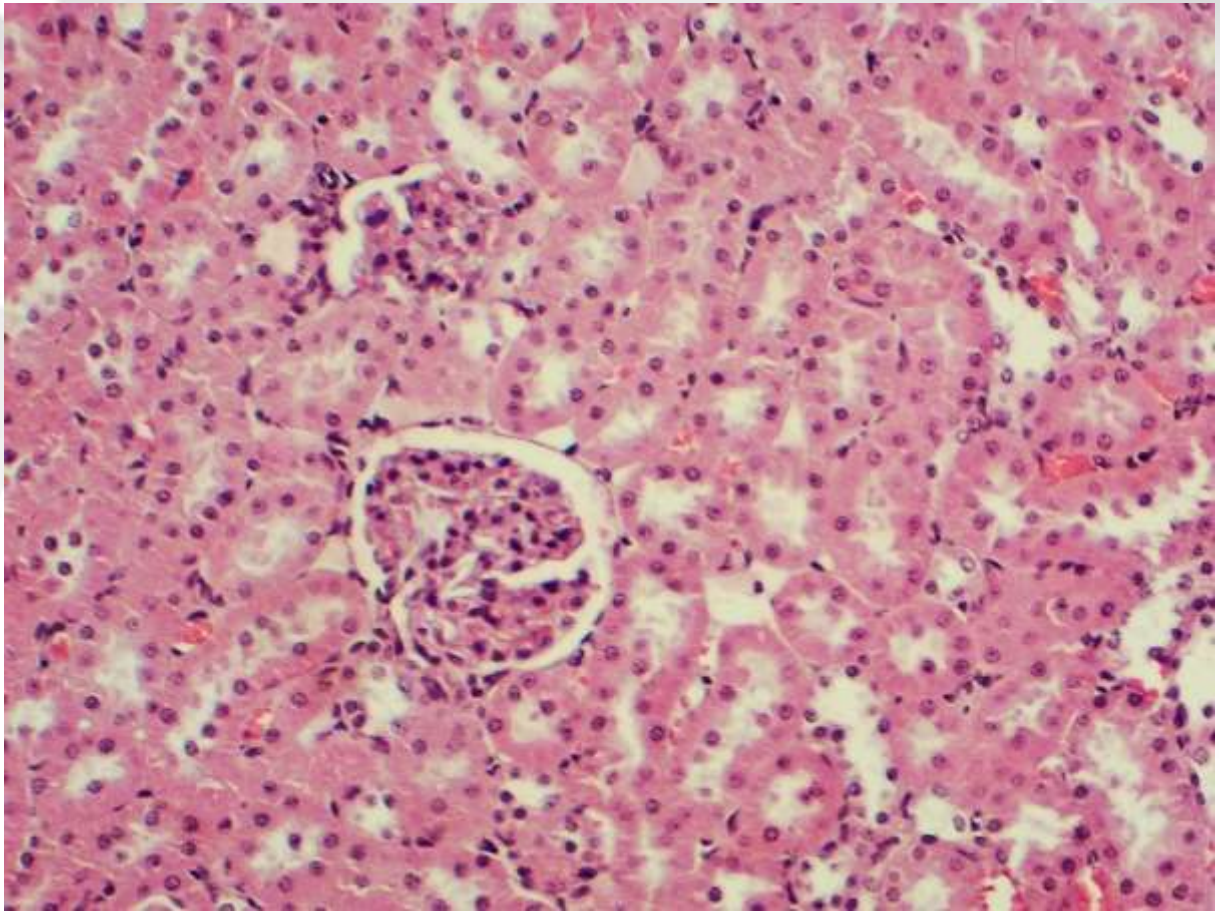
Kidney rat on the background of stress response with Mexidol correction. Micro photo. Hematoxylin and eosin staining: 4×10 magnification

The kidney of a rat exposed to experimental acute immobilization stress with Mexidol correction



Homogeneous masses in the lumen of individual tubules of the rat kidney on the background of the stress response with Mexidol correction. Micro photo. Hematoxylin and eosin staining: 40×10 magnification

The kidney of a rat exposed to experimental acute immobilization stress with Mexidol correction



Insignificant plethora of capillaries and edematous changes of the mesangium of the rat kidney on the background of the stress response with Mexidol correction. Micro photo. Hematoxylin and eosin staining: 10×10 magnification

CONCLUSIONS

- Acute immobilization stress exerts a pronounced adverse effect on the structure of the rat kidney, namely hemodynamic disorders, desquamation of the tubular epithelium, dystrophic and necrotic changes of the epitheliocytes of the renal tubules, swelling of the mesangium, plethora of capillaries and enlargement of the glomerular capsule.
- The nephroprotective effect of Mexidol was to prevent dystrophic and necrotic changes in the renal tubule epitheliocytes, to reduce the swelling of the mesangymal matrix of glomerulus and the severity of hemodynamic changes.

THANK YOU FOR LISTENING!