Pathogenesis of chronic renal failure (CRF) involves endothelial dysfunction, morphological characteristics of which correlate with progressive reduction in renal functions.

The aim of the research was to investigate the effect of the rat placental cryoextract (RPC), a RAAS medicated blockade and their combined action on the morphological state of the aortal endothelium in rats with experimental CRF.

CRF was modeled by a single injection of 50% aqueous glycerol (10 ml/kg). All the animals were sacrificed in 16 weeks. The norm group made 6 animals. Control group comprised the animals with CRF (I). The rats with CRF were divided into groups (n = 6). The course of treatment on the second week of the disease involved: injections of RPC (2); a RAAS medicated blockade (3); combined application of RPC and a RAAS medicated blockade (4). Two courses of treatment (on the 2nd and 9th weeks) involved: injection of RPC (5); a RAAS medicated blockade (6); combined application of RPC and a RAAS medicated blockade (7). To prepare the RPC placental tissue was washed with saline, homogenized, frozen to −20°C and stored for 24 hours. After thawing, the homogenate was mixed with saline (1:1), centrifuged at 4000 rpm. The supernatant was stored in liquid nitrogen. RPC was intramuscularly injected by 0.5 ml thrice a week. A RAAS medicated blockade was done with enalapril and spironolactone, which were injected daily per os at a dose of 0.5 ml suspension. Thoracic aorta endothelium was evaluated with a microscope using silver-impregnated drugs. The adjacency and surface area of the endothelial cells were calculated per 100 cells using the Biovision 4.0 morphometric program.

Simulating of CRF in the animals of all groups resulted in the interruption of the endothelial cell orderliness and an increase in the number of microendotheliocytes (Me). Following RPC injections (groups 2 and 5) the number of cells with the surface area of 200–500 μm² comprised 81 and 95%, while the amounts of Me were lower (29 and 48%, respectively). In group 1, the amount of Me (area up to 300 μm²) increased to 69% (7% in the norm), and 23% of cells showed adherence to 3–4 (13% in the norm), indicating high proliferative activity. Group 2 had high proliferative activity (contacts 3–4) — 20%. Two-course combined treatment increased both proliferative potential (26% of cells with adjacency of 7–9) and endothelium proliferative activity (17% of cells with adjacency of 3–4).

Combined application of a RAAS medicated blockade with injection of RPC stimulated the proliferation and reparation in the aortal endothelial lining, which was manifested by recovery of the cell ratios of adjacency and surface area.