INFLUENCE OF QUERCETIN AND IT'S DERIVATIVES ON RENAL EXCRETORY FUNCTION IN NORMAL AND IN MODELING RENAL FAILURE

САМАРСКИЙ ГОСУДАРСТВЕННЫЙ МЕДИЦИНСКИЙ УНИВЕРСИТЕТ
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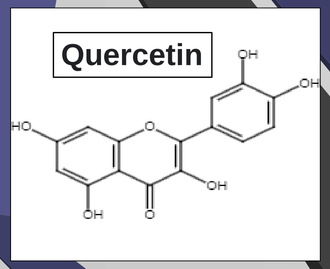
Purpose of the study

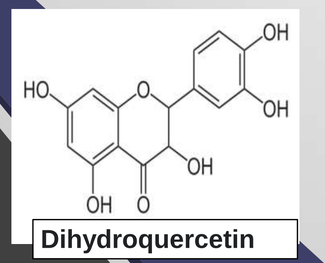
Analysis of the effect of quercetin and it's derivatives (dihydroquercetin, rutin and hyperoside) on the excretion of water, electrolytes, creatinine under physiological conditions and acute renal failure

Research objectives

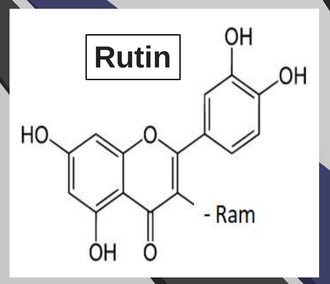
- ☑ Investigate the effect of quercetin and it's derivatives on the renal excretion of water, electrolytes, and creatinine.
- ☑ To study the mechanism of action of quercetin and it's derivatives on the excretory function of the kidneys, glomerular filtration, tubular transport of water, sodium and creatinine.
- ☑ To study the possibility of using the diuretic, saluretic and creatininuretic effects of quercetin and it's derivatives for the treatment of acute renal failure, normalization of renal excretory function and biochemical parameters of urine in a model of experimental ischemic acute renal failure.
- ☑ Conduct a comparative analysis of the effectiveness of quercetin and it's derivatives in the treatment of acute renal failure, normalization of the functional and morphological parameters of the glomerular-tubular apparatus on a model of experimental ischemic acute renal failure

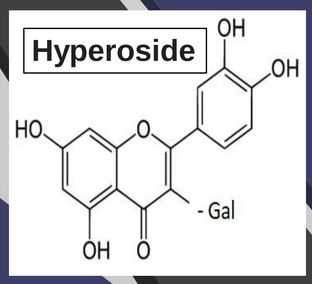
Objects of study





Dihydroquercetin

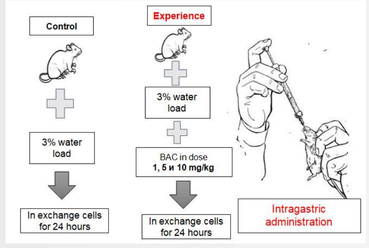




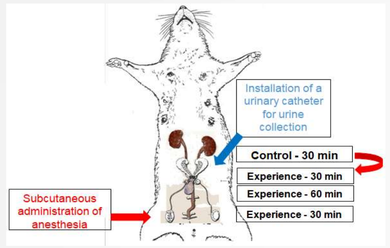
Materials and methods

The studies were carried out on outbred white rats of both sexes weighing 200-220 g. The animals were kept in a vivarium on a normal diet with free access to water. Each group consisted of ten animals.

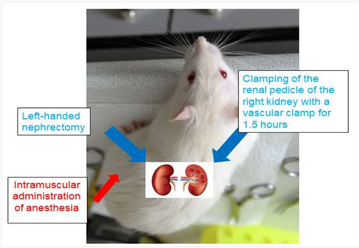
Chronic experiences



Acute experiences



Model experiences

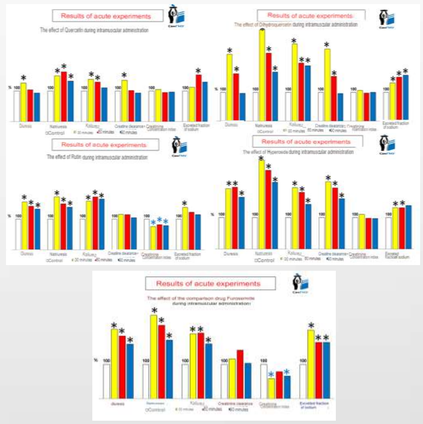


Results and discussion

Chronic experiences

In chronic experiments, quercetin and rutin at a dose of 5 mg/kg, as well as dihydroquercetin and hyperoside at a dose of 1 mg/kg, increased diuresis, saluresis and creatininuresis

Acute experiences



Quercetin increased diuresis, saluresis and creatinine clearance 30 minutes after administration, saluresis and creatinine clearance after 60 minutes, and natriuresis after 90 minutes. Dihydroquercetin after 30 and 60 minutes significantly increased diuresis, saluresis, creatinine clearance and excreted sodium fraction, and after 90 minutes it moderately increased saluresis and excreted sodium fraction. Rutin after 30, 60 and 90 minutes increased diuresis, saluresis and decreased the creatinine concentration index, after 30 minutes it further increased the excreted sodium fraction. Hyperoside increased diuresis, saluresis, creatinine clearance and excreted sodium fraction after 30, 60 and 90 minutes.

Model experiences

On the 1st, 2nd and 3rd days of the postoperative period, all studied BAC increased diuresis and saluresis. On the 4th day of the experiment, all studied BAC increased all analyzed EFK parameters (only quercetin did not change diuresis). On the 5th day, all BAC increased saluresis, dihydroquercetin additionally increased creatinineresis. On the 6th day of the experiment, it was found that quercetin and it's derivatives did not cause significant changes

Conclusions

1. Quercetin and it's derivatives have a dose-dependent stimulating effect on the excretory function of the kidneys. Optimal diuretic doses for the enteral route of administration have been established: for quercetin and rutin – 5 mg/kg, for dihydroquercetin and hyperoside – 1 mg/kg.
2. When administered intramuscularly: quercetin and rutin at a dose of 5 mg/kg moderately stimulate diuresis solely by reducing tubular reabsorption of sodium; Dihydroquercetin and hyperoside at a dose of 1 mg/kg significantly increases diuresis both by increasing glomerular filtration and by reducing tubular reabsorption of sodium.
3. Quercetin and it's derivatives exert a nephroprotective effect due to the accelerated restoration of renal excretory function (diuresis, saluresis, creatininuresis) and biochemical parameters of urine (glomerular filtration rate, proteinuria, lactatedehydrogenase and gamma-glutamyltransphrase) in a model of ischemic acute renal failure. The effectiveness of pharmacotherapeutic effects increases in the series: quercetin - rutin - dihydroquercetin - hyperoside.