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The role of pituitary gland hormones in electrolyte imbalance in model of isolated porcine kidneys perfused with modified preservation solution

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Background Organs obtained for transplantation are stored in cold preservation solution before they are implanted into the recipient's body. Currently, many scientific centres in the world are conducting research on the development of the fluid composition that will enable long-term storage of organs for several days outside the human body. In addition, it will allow the transport of organs over long distances, and even their treatment and regeneration in vitro. As a result, poor quality organs that are currently being rejected will be able to be included in the transplant procedure.

Aim The aim of our study was to analyse the effect of prolactin and lutropin as a component of the preservation solution on the maintenance of electrolyte homeostasis in a model of isolated porcine kidneys.

Methods Kidneys from Polish “Large White” breed adult pigs were used for the study. The study was conducted with the consent of the II Local Ethics Commission for Animal Experiments in Cracow, Poland (No. 1046/2013). The reference solution Biolasol and modified solutions for preservation were used: Biolasol+p-LH (0.01µg/l), Biolasol+p-PRL (0.1mg/l). In the collected samples of perfusates, the concentrations of Na⁺ and K⁺ were determined using spectrophotometric methods.

Results LH and PRL as components of the preservation solution affect the degree of ischemia-reperfusion damage in isolated pig kidneys. Hormones ensure the optimal ratio of sodium and potassium concentration in the perfundate after 24/48 h storage of the grafts. Biolasol with 0.01 µg/l p-LH: K⁺ 12 ± 1 mEq/l vs Na⁺: 162 ± 11 mEq/l. Biolasol with 0.1 mg/l p-PRL: K⁺: 14 ± 3 mEq/l vs Na⁺: 118 ± 11 mEq/l.

Conclusion The addition of lutropin (0.01 µg/l) and prolactin (0.1 mg/l) to the composition of the Biolasol solution play a vital role in maintaining electrolyte homeostasis.