EFFECT OF PRESERVATIVE SOLUTION MODIFIED BY THE ADDITION OF MAGNESIUM AND MANGANESE ON THE NEPHRON FUNCTIONS OF ISOLATED PERFUSED PORCINE KIDNEYS

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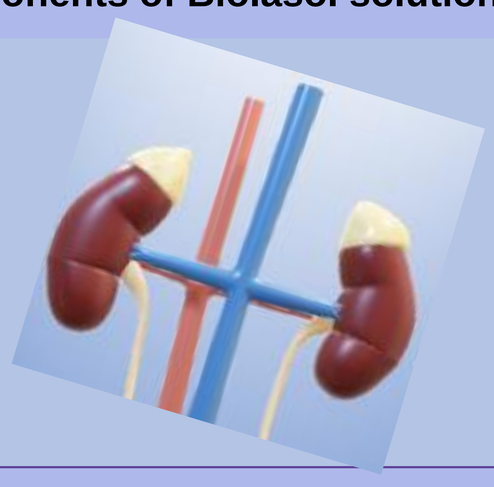
[†]In the memory of Professor Florian Ryszka

1.Introduction

We present another paper in a series of studies on the effectiveness of preservation solutions modified with bio-elements in protecting ischemic organs for transplantation. Bio-elements as components of organ perfusion and preservation solutions can potentially increase the efficiency of graft preservation. Macro- and micronutrients are involved in biochemical reactions and metabolic processes of the cell. Many of them exhibit antioxidant properties, protecting against oxidative damage. The aim of this study was to evaluate the effectiveness of manganese (Mn^{2+}) and magnesium (Mg^{2+}) as components of Biolasol solution.



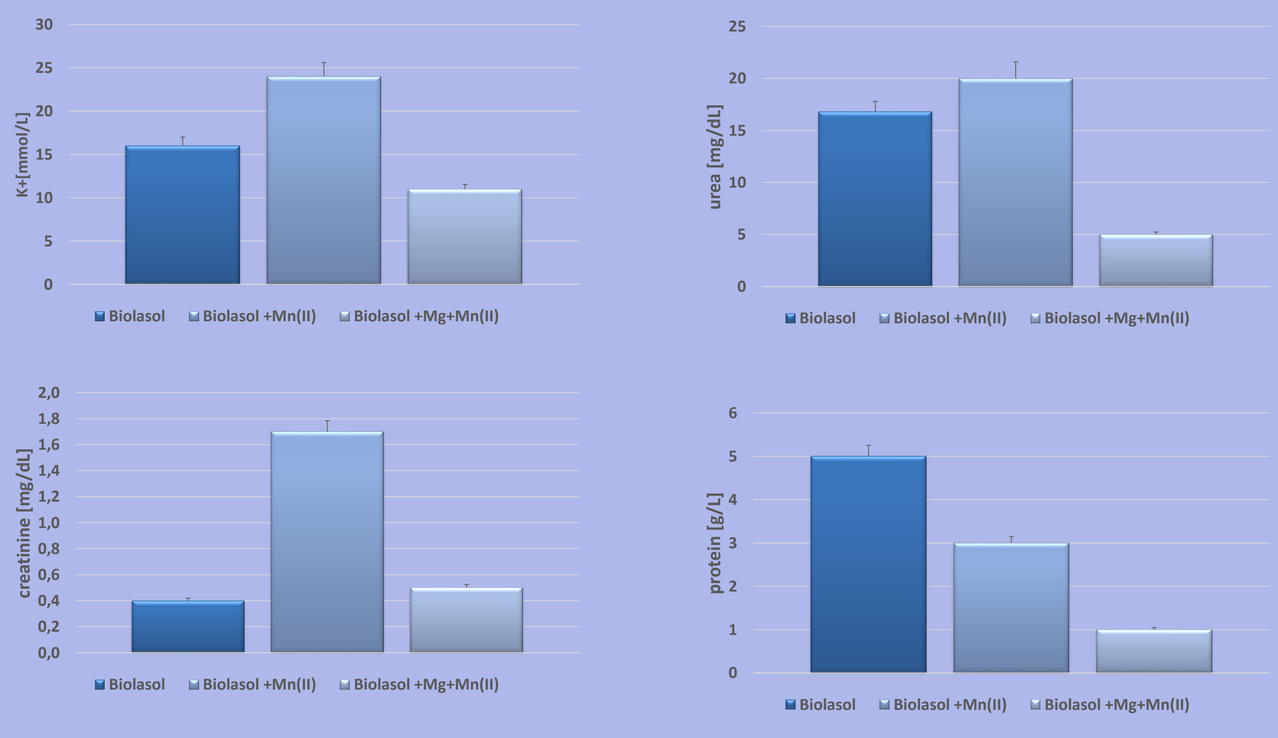
2. Materials and Methods

The study was conducted in a model of isolated porcine kidneys collected from Polish Large White pigs. Approval was obtained from II Local Ethics Committee Krakow; number 1046/2013. Kidneys were preserved through static cold storage (SCS) using Biolasol (control) and modified Biolasol (A: Mn^{2+}/ 1 µg/l; B: Mg^{2+}/ 1 µg/l and Mn^{2+}/ 1 µg/l). Kidneys were flushed with solutions after 48 hours of storage.

3. Results

Potassium, urea, and creatinine concentrations were highest in the Biolasol + Mn^{2+} group after 48h storage ([K^+]: up by 50% vs Biolasol and 119% vs Biolasol + Mn^{2+} + Mg^{2+}; urea: up by 18% vs Biolasol and 300% vs Biolasol + Mn^{2+} + Mg^{2+}; creatinine: up by 250% vs Biolasol and 240% vs Biolasol + Mn^{2+} + Mg^{2+}; $p<0.05$). Protein concentration was lowest in the Biolasol + Mn^{2+} + Mg^{2+} group (by 81% vs Biolasol and 67% vs Biolasol + Mn^{2+}; $p<0.05$).

4. Figures. Biochemical indicators of the function of isolated pig kidneys.



5. Conclusion

The simultaneous introduction of Mn^{2+} + Mg^{2+} ions into the Biolasol composition improved renal function indices. The bio-elements showed a protective effect.

6. Acknowledgements

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7. References

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2. Ostróżka-Cieślik, A. *The Effect of Antioxidant Added to Preservation Solution on the Protection of Kidneys before Transplantation.* Int. J. Mol. Sci. 2022, 23, 3141. doi.org/10.3390/ijms23063141