عنوان مقاله:

Effects of insulin-loaded chitosan-alginate nanoparticle on RAGE expression and oxidative stress status in the kidney tissue of rats with type ۱ diabetes

محل انتشار:

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نویسندگان:

Shirin Heidarisasan - *Department of Biochemistry, School of Medicine, Hamadan University of Medical Sciences, Hamadan, Iran*

Nasrin Ziamajidi - *Department of Biochemistry, School of Medicine, Hamadan University of Medical Sciences, Hamadan, Iran*

Jamshid Karimi - *Department of Biochemistry, School of Medicine, Hamadan University of Medical Sciences, Hamadan, Iran*

Roghayeh Abbasalipourkabir - *Department of Biochemistry, School of Medicine, Hamadan University of Medical Sciences, Hamadan, Iran*

خلاصه مقاله:

Objective(s): Chronic hyperglycemia leads to activation of the advanced glycation end products (AGE)-receptor (RAGE) for AGE axis and oxidative stress, which promote diabetic renal damage. This study examines the effect of insulin-loaded trimethyl chitosan nanoparticles on the kidney tissue of diabetic rats. Materials and Methods: Twenty-five male Wistar rats were randomly divided into ۵ groups: normal control (C), diabetic group without treatment (DM), diabetic group treated with chitosan-based nanoparticle (DM+NP, ۱ ml by gavage), diabetic group treated with ۸ IU/kg insulin-loaded trimethyl chitosan nanoparticles (DM+N.in, ۱ ml by gavage), and diabetic group treated with ۸ IU/kg trade insulin (DM+SC.in, ۰.۲ ml by subcutaneous injection). The animals were treated from weeks ۸ to ۱۰. At the end of the study, serum urea, creatinine, and uric acid were measured. Also, the level of AGE and RAGE mRNA expression, and oxidative stress markers were studied in the kidney tissue.Results: Insulin-loaded nanoparticles similar to trade insulin could significantly reduce urea, creatinine, and uric acid parameters, while the elevated total antioxidant capacity (TAC), thiol groups, and catalase activity also reduced total oxidant status (TOS) and malondialdehyde (MDA) levels ($P<۰.۰۵$). However, the reduction in AGE and RAGE mRNA expression is not statistically significant in both treatments. Of course, the influence of insulin-loaded trimethyl chitosan nanoparticles on the amelioration of all these parameters is higher compared to that of the injected form. No markedly significant differences were observed between these two kinds of treatments. Conclusion: This data reveals that insulin-loaded trimethyl chitosan nanoparticle is a better therapeutic approach than injected insulin.

کلمات کلیدی:

AGE, Antioxidant, Diabetes Mellitus, Insulin, Nanoparticles, Oxidant

لینک ثابت مقاله در پایگاه سیویلیکا: