吉林大学学报(医学版) 2010, 36(2) 215-219 DOI: ISSN: 1671—587X CN: 22—1342/R

基础研究

低剂量电离辐射对糖尿病小鼠肾脏ICAM-1 mRNA和蛋白表达的影响

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摘要：

目的：研究低剂量电离辐射（LDR）对链脲佐菌素（STZ）诱导的1型糖尿病（DM）小鼠肾脏细胞间黏附分子-1（ICAM-1）mRNA及蛋白表达的影响，阐明LDR抗炎作用可能是其治疗糖尿病的主要机制。 方法：选 取健康适龄C57BL/6J小鼠，分为4组（对照、DM、LDR和DM/LDR组）。其中DM与DM/LDR组经腹腔注射STZ，建立DM模型，另2组给予等量枸橼酸溶液。造模后DM/LDR与LDR组给予25 mGy隔日照射，共照射4周。在照射后2、4、8、12及16周，利用RT-PCR及Western blotting方法检测其肾脏ICAM-1 mRNA及蛋白表达。结果：小鼠造模后照射前各组肾脏总ICAM-1 mRNA及蛋白表达差异无显著性（P>0.05）。给予LDR 2周时DM组肾脏ICAM-1 mRNA及蛋白表达显著高于其他3组（P<0.05）。照射后4周时DM/LDR 组ICAM-1 mRNA表达水平明显高于非DM组（P<0.05），但仍显著低于DM组，这种差异一直保持到照后16周。而LDR组其表达水平显著高于对照组（P<0.05）。免疫组织化学检测：与非DM组比较，DM组小鼠肾小球、肾小管结构异常，且阳性细胞染色数量明显增多。但DM/LDR组肾小球肾小管损伤较DM组有所减轻，且阳性细胞数量显著少于DM组。结论：在糖尿病状态下LDR能有效降低ICAM-1 mRNA及蛋白表达水平，缓解肾脏的炎症反应；在正常机体LDR可提高免疫力，促进免疫相关因子释放，提示LDR视机体所处不同状态发挥不同的调节功能。

关键词： 低剂量辐射；细胞间黏附分子-1；糖尿病；糖尿病肾病；炎症

Effects of low dose radiation on expressions of ICAM-1 mRNA and protein in kidney of diabetic mice

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Abstract:

Abstract:Objective To study the effects of low dose radiation (LDR) on the expressions of intercellular adhesion molecule-1 (ICAM-1) mRNA and protein in kidney of diabetes mellitus (DM) mice and illuminate that anti-inflammation of LDR is a main mechanism for diabetic therapy.Methods The healthy and right age C57BL/6J mice were divided into 4 groups including control,DM,LDR and DM/LDR.The mice in DM and DM/LDR groups were injected intraperitoneally with streptozocin (STZ) to set up DM models.The mice in DM/LDR and LDR groups were irradiated with 25 mGy every other day for 4 weeks.The expressions of ICAM-1 mRNA and protein in kidney were detected with RT-PCR and Western blotting 2,4,8,12 and 16 weeks after irradiation.Results The expressions of ICAM-1 mRNA and protein in kidney had no significant difference among 4 groups before LDR (P>0.05).The expressions of ICAM-1 mRNA and protein 2 weeks after irradiation with LDR were higher than those in the other 3 groups (P<0.05).The expressions of ICAM-1 mRNA and protein in the DM/LDR group 4 weeks after irradiation were also significantly higher than those in non-DM groups (P<0.05),but still significantly lower than those in DM group (P<0.05),and the significant differences were kept to 16 weeks after irradiation.But the expressions of ICAM-1 mRNA and protein in LDR group were significantly higher than those in control group(P<0.05).IHC assay showed that the glomerular and tubular in DM and DM/LDR groups were abnormal and the quantities of the positive staining cells were significantly increased compared with non-DM groups.However the damage of glomerular and tubular in DM/LDR was significantly supressed compared with DM gorup and the positive staining cells were

also decreased.Conclusion Under the circumstance of DM,LDR can significantly decrease the expressions of ICAM-1 mRNA and protein in mouse kidney to relief the inflammation reaction in kidney;but in normal condition,LDR can improve the immunity and promote the release of immune-related factors.It means that LDR can play different roles under different circumstance.

Keywords: low dose radiation;intercellular adhesion molecule-1;diabetes mellitus;diabetic nephropathy;inflammation

收稿日期 2009-11-20 **修回日期** **网络版发布日期** 2010-03-28

DOI:

基金项目:

国家自然科学基金资助课题（30672495）

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