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Effects of zinc deficiency and supplementation on functions of lymphocytic IL-2 and IL-2R systems in preschool children

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Abstract Objective: To investigate the effects of three regimens of zinc supplementation on lymphocytic function in preschool children. Methods: One hundred and forty preschool children were randomized into four groups according to the regimens of zinc supplementation: zinc group (ZG), micronutrient group (MG), zinc+ micronutrient group (ZMG) and control group (CG). On the 10th day after the supplementation, the immune functions of lymphocytic IL-2 and IL-2R systems were measured in all the children. Results: The concentration of serum zinc, production of lymphocytic IL-2, content of soluble IL-2R and expression of membrane IL-2R were all significantly increased in the three experimental groups as compared to the control. Meanwhile, the supplementation of zinc+ micronutrient was the best method among the three. Conclusion: Zinc activates lymphocytes through IL-2 and IL-2R systems. Zinc or micronutrient along can enhance immune functions in children, but zinc+ micronutrient is the best. These provide a scientific method for zinc intervention in children.

Key words zinc deficiency; lymphocyte; interleukin-2; interleukin-2 receptor; preschool child

严重烧伤大鼠肾脏热休克蛋白的表达及其细胞保护作用

Expression of heat shock protein and its cytoprotection effects in rat kidney after severe burns

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严重烧伤后缺血-再灌流损伤是烧伤后多脏器功能障碍的重要原因。如何防止烧伤后缺血再灌流损伤是目前重要的研究课题。热休克蛋白 (HSPs)是一种应激蛋白,在从原核细胞到人类都呈现出高度保守性,并在损伤性因素作用下快速合成。现在已经证明: 热休克蛋白参与许多重要的生理学过程,包括新合成多肽的移位、蛋白质的成熟、折叠和降解。由于应激反应是细胞在应激条件下的一种基本防御机制,而且热休克蛋白已经被发现对热应激和其他应激模型 (如心肌缺血再灌注损伤)有细胞保护作用。因此在肾缺血再灌注损伤中它也可能存在细胞保护作用。帮本实验旨在观察严重烧伤大鼠肾脏热休克蛋白的表达及其对细胞的保护作用。

根据实验目的,采用 RT-PCR和原位杂交观察肾脏 HSP72 mRNA变化;用免疫印迹和免疫细胞化学观察蛋白质表达的变化和分布。在热预处理与非预处理组,通过观察氧化应激、细胞凋亡、细胞骨架和阻离子位点的变化来了解热休克蛋白的细胞保护功能。

结果与总结:① 烧伤早期大鼠肾脏热休克蛋白表达是逐渐增加的,到 24 h,其 mRNA和蛋白质均处于高表达水平。② 热预处理后大鼠肾脏热休克蛋白的表达峰值是在 6~ 12 h,在 24 h其表达水平仍比正常对照高。③ HSP72在近曲小管、远曲小管、集合管和髓袢上皮细胞均有分布。主要存在于细胞浆中。④ 热预处理后大鼠肾脏 MDA含量低于烧伤组; SOD CAT Na^+-K^+ ATPase活性高于烧伤组。提示热预处理增强了细胞的抗氧化能力。⑤ 热预处理后大鼠肾脏 G-actin含量高于烧伤组;上皮细胞微绒毛脱落减少,提示热预处理对细胞骨架的保护作用。⑥ 热预处理大鼠肾小管上皮细胞阴离子位点没有明显下降,提示热预处理有抑制阴离子位点减少的作用。

关键词 烧伤;肾脏;热休克蛋白;反转录聚合酶链式反应
微丝;凋亡自由基;阴离子位点

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