核农学报 2012, (3) 523-526,534 DOI: ISSN: 1000-8551 CN: 11-2265/S

农产品辐照研究·食品科学

姜辣素对^{60}Co γ射线照射小鼠造血和抗氧化损伤的治疗作用研究

耿艳艳, 谢振飞, 周羽, 曾宪垠

四川农业大学生命理学院原子能农业应用研究室, 四川 雅安 625014

摘要:

研究了姜辣素对^{60}Co γ射线损伤小鼠造血和抗氧化功能的治疗作用。18只雌性健康昆明小鼠被随机分为3组,每组6只,分别为对照组、照射组、照射给药组。对照组不照射,连续灌胃5d蒸馏水;照射组和照射给药组分别用3Gy ^{60}Co γ射线进行照射,并分别在照射后30min内灌胃蒸馏水和姜辣素,连续5d。末次灌胃后48h内测定所有小鼠血液中白细胞(WBC)和红细胞(RBC)数量、脏器指数、肝脏超氧化物歧化酶(SOD)活性、总抗氧化能力(T-AOC)、丙二醛(MDA)含量及骨髓嗜多染红细胞微核(MN)数目。与对照组相比,照射组脾脏指数、WBC极显著降低(P <0.01),肝脏MDA含量、骨髓MN数目极显著升高(P <0.01);与照射组相比,照射给药组脾脏指数、T-AOC、SOD活性极显著升高(P <0.01),肝脏指数、WBC、RBC含量也有所升高,MDA含量、MN数目极显著降低(P <0.01)。结果表明,姜辣素对^{60}Co γ射线照射造成的小鼠造血、抗氧化功能损伤具有治疗作用。

关键词: 姜辣素 辐照损伤 治疗作用 抗氧化 造血系统

THERAPEUTIC EFFECTS OF GINGEROL ON HEMATOPOIETIC AND ANTIOXIDATIVE DAMAGE OF ^{60}Co γ-RAYS IRRADIATED MICE

GENG Yan-yan, XIE Zhen-fei, ZHOU Yu, ZENG Xian-yin

Isotope research Lab, College of Life science, Sichuan Agricultural University, Ya'an, Sichuan 625014

Abstract:

18 female Kunming mice were chosen and randomly divided into three groups, and the therapeutic effects of gingerol on hemopoietic and antioxidative system in liver of ^{60}Co γ-rays irradiated mice were developed in this study. Control group was given distilled water intragastrically once a day for five days. Mice in the irradiated group and irradiated+gingerol group were both irradiated at 3Gy of ^{60}Co γ-rays and were given distilled water and gingerol intragastrically within 30min after irradiation respectively, once a day for five days. The mice were sacrificed and sampled in 48 hours after intragastric administration. Compared with control group, the relative spleen index and WBC numbers significantly decreased(P <0.01), and MDA content and MN numbers in bone marrow increased(P <0.01)in irradiated group. The irradiated + gingerol group showed significantly higher spleen index, T-AOC and SOD activities(P <0.01), lower MDA contents and MN numbers(P <0.01)compared with irradiated group. WBC and RBC numbers in irradiated + gingerol group were also higher than those in irradiated group. The results indicated that the gingerol has the therapeutic effects on hematopoietic and antioxidative damage of ^{60}Co γ-rays irradiated mice.

Keywords: gingerol irradiation damage therapeutic effect antioxidation hematopoietic system

收稿日期 2011-06-09 修回日期 2011-12-02 网络版发布日期

DOI:

基金项目:

教育部"长江学者和创新团队发展计划"创新团队项目(IRT0848)

通讯作者: 曾宪垠(1966-),男,江西瑞金人,博士生导师,主要研究方向为核技术在畜牧兽医上的应用。Tel: 0835-2886138;E-mail: xyzeng@sicau.edu.cn

作者简介:

作者Email: xyzeng@sicau.edu.cn

参考文献:

[1] Ito H, Meistrch ml, Barkley H T, Thames H D, Milas L. Protection of acute and late radiation damage of the gastrointestinal tract by WR-2721[J]. Int J Radiation Oncol Bio Phys, 1986, 12(2): 211-219

[2] Andreopopolos D, Schleicher U N, Cotarelo C L, Hand S, Ammon J. Radioprotection of human endothelial cells with amifostine[J]. Strahlenrher Oncol, 1999, 175(4): 34-36
[3] 李素民, 杨秀岭, 赵 智, 樊德厚. 干姜和生姜药理研究进展[J]. 中草药, 1999, 30(6): 471-473
[4] 黄寨康. 常用中药成分与药理手册[M]. 北京: 中国医药科技出版社, 1994: 17
[5] Platel K, Srinivasan K. Influence of dietary spices on their active principles on digestive enzymes of small intestinal mucosa in rats [J]. Int J Food Sci Nutr, 1996, 47(1): 55-59
[6] Bhandari U, Sharma J N, Zafar R. The protective action of ethanolic ginger(*Zingiber officinale*) extract in cholesterol fed rabbits [J]. J. Ethnopharmacol, 1998, 61(2): 167-171
[7] Xiong Pingyuan. The Research of Ginger’s Effect on the Immunological Function [J]. Journal of Mathematical Medicine, 2006, 3: 68-71
[8] 曹兆丰,陈忠岗,郭 平. 生姜对超氧阴离子及羟自由基的清除作用[J].中国中药杂志, 1993,18(12):750-750
[9] Jagetia G, Baliga M, Venkatesh P. Ginger (*Zingiber officinale* Rosc.), a dietary supplement, protects mice against radiation-induced lethality: mechanism of action [J]. Cancer Biotherapy &Radiopharmaceuticals, 2004, 19(4):547-561
[10] Liu H, Zhou Y. Effect of alcohol extract of Zingiber officinale rose on immunological function of mice with tumor [J]. Wei Sheng Yan Jiu, 2002, 31: 208-209
[11] 哈 楠. 生姜提取物对造血系统辐射损伤的保护作用研究[D].吉林:吉林大学,2006
[12] Sharma A, Haksar A, Chawla R, Kumar R, Arora R, Singh S, Prasad J, Islam F, Arora M P, Sharma R K. *Zingiber officinale Rosc.* modulates gamma radiation-induced conditioned taste aversion [J]. Pharmacology, Biochemistry and Behavior, 2005, 81: 864-870
[13] Du Xiaogang, Pan Huaizhu, Zhang Chengyun, Zhang Huaiyu, Liu Hanmei, Chen Zhiyu, Zeng Xianyin. Zingiber officinale extract modulates γ-rays-induced immunosuppression in mice [J]. Journal of Medicinal Plants Research, 2010, 4(16): 1647-1655
[14] 谢振飞,周 羽,耿艳艳,曾宪垠. 姜辣素对^{60}Co γ辐照小鼠白系细胞和骨髓细胞DNA的保护作用[J]. 核农学报,2012,(2):306-310
[15] Ledebur M V, Schmid W. The micronucleus test methodology aspects [J]. Mut Res,1973, 19:109
[16] 王东晓, 陈孟莉, 殷建芬, 刘 屏. 鸡血藤活性成分SS8对骨髓抑制小鼠造血祖细胞增殖的作用[J]. 中国中药杂志, 2003, 28 (2): 152-155
[17] 肖元梅, 曾令福, 王 舟. 锌对小鼠骨髓造血细胞辐射损伤影响的研究[J]. 中国公共卫生, 2003, 19(9): 1081-1083
[18] 邓乾春, 陈春艳, 段会珂, 汪 兰, 谢笔钧. 白果清蛋白提取物对γ射线辐射损伤小鼠的保护作用研究[J]. 辐射研究与辐射工艺学报, 2005, 23(6): 359-365
[19] Salassidis K, Georgiadou-Schumacher V, Braselmann H, Müller P, Peter R U, Bauchinger M. Chromosome painting in highly irradiated chernobyl victims: a follow-up study to evaluate the stability of symmetrical translocations and the influence of clonal aberrations for retrospective dose estimation [J]. International Journal of Radiation Biology, 1995, 36(8):257-262
[20] Nirmala K, Krishna P, Polasa K. Alterations in antioxidant status of rats following intake of ginger through diet [J]. Food Chemistry, 2008, 106: 991-996
[21] 杨湘山,李景舜,吕 焱, 赵淑华, 杨晓光, 刘洪阳. 生姜提取物对X射线损伤小鼠肝脏脂质过氧化的影响[J]. 现代预防医学, 2007, 34 (3): 436-437
[22] 李景舜,赵淑华,王春华, 隋春生. 生姜提取物对X射线损伤免疫功能拮抗作用[J]. 中国公共卫生, 2006, 22 (2): 171-172

本刊中的类似文章

1． 郭锋, 樊文华.不同浓度Hg^{2+} 、Cr^{3+} 和Pb^{2+}单一胁迫对绿豆膜脂过氧化物含量及抗氧化酶活性的影响[J]. 核农学报, 2009,23(6): 1060-1064
2．金阳,葛才林,杨小勇,王译港,罗时石.氯苯对小麦抗氧化酶活性的影响[J]. 核农学报, 2003,17(04): 296-300
3． 安冰, 唐运来, 陈梅, 敖嘉, 王丹.小麦抗氧化能力对Cs+富集响应的研究[J]. 核农学报, 2011,25(2): 348-352
4．张捷, 丁韩英, 戚向阳, 袁勇军.枯草芽孢杆菌Y-6产抗菌肽的体外抗氧化效果研究[J]. 核农学报, 2011,25(3): 518-522,558
5．李兴林,卫增泉,王晓娟,李文建.50MeV/u碳离子辐照休眠和萌发春麦种子的M_1代比较[J]. 核农学报, 2001,15(03): 129-133
6．乔琳, 傅兆麟, 乔传英.X射线能谱和FTIR分析铜胁迫对玉米幼苗的影响[J]. 核农学报, 2011,25(4): 807-811
7． 敖嘉, 唐运来, 陈梅, 安冰, 王丹, 陶扬.Sr胁迫对油菜幼苗抗氧化指标影响的研究[J]. 核农学报, 2010,24(1): 166-170
8．杜成凤, 刘天学, 蒋寒涛, 李潮海.弱光胁迫及光恢复对玉米幼苗活性氧代谢的影响[J]. 核农学报, 2011,25(3): 570-575
9．王应军, 邓仕槐, 姜静, 尚鹤, 林波, 孙亚琴, 胡晓梅.酸雨对木芙蓉幼苗光合作用及抗氧化酶活性的影响[J]. 核农学报, 2011,25(3): 588-593,581
10．关正君, 郭斌, 尉亚辉.樱桃番茄叶体细胞胚发生过程中抗氧化酶活性和生理参数的变化[J]. 核农学报, 2011,25(3): 594-601
11． 邹朝晖, 王强, 王志东, 邓钢桥, 李淑荣, 高美须, 陈永浩, 范蓓, 李庆鹏, 赵宏伟.辐照对透明质酸抗氧化性及结构特性的影响[J]. 核农学报, 2011,25(1): 83-87
12．刘伟, 黄建中, 郭得平, 陈子元.茭白肉质茎膨大期间的氧化胁迫[J]. 核农学报, 2011,25(4): 824-827,831

13. 孙胜, 张智, 卢敏敏, 邢国明.Cd2+胁迫对西瓜幼苗光合生理及活性氧代谢的影响[J]. 核农学报, 2010,24(2): 389-393
14. 崔莉, 刘春泉, 李大婧, 宋江峰, 江宁, 刘春菊, 吴海虹, 朱丹宇.辐照对发酵甘薯保鲜效果和功能活性的影响[J]. 核农学报, 2011,25(6): 1184-1190
15. 潘剑用, 汪志平, 党江波, 谢彦广, 董丹丹, 邵斌, 王景梅, 蓝瑾瑾, 陈子元.夏桑叶的体外抗氧化活性及其主要功能成分研究[J]. 核农学报, 2011,25(4): 754-759,778