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Granulocyte colony stimulating factor (G-CSF) protects intestinal injury and increases survival rate in irradiated mice

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Granulocyte colony stimulating factor (G-CSF) has been reported to protect from radiation-induced myelosuppression, however little is known about the influence on intestinal injury. We evaluated G-CSF for its capacity to decrease the severity of radiation induced mucositis *in vitro* and *in vivo*. For *in vitro* test, G-CSF was administered to IEC-6 intestinal epithelial cells prior to damage induced by radiation. G-CSF prevented the decrease in IEC-6 cell viability and cytotoxicity induced by radiation. Treatment with G-CSF after irradiation also decreased the increase of the cleaved caspase-3, p53 and p21 by irradiation. For *in vivo* test, this study examined the radioprotective effects of G-CSF in intestinal damage, and survival in subtotal gamma-irradiated BALB/c mice. G-CSF (100 μg/kg per body weight) was subcutaneously injected once daily for three days before radiation. Examination 12 h after radiation (5 Gy) revealed that the G-CSF treated mice were significantly protected from apoptosis of jejunal crypt, compared with radiation controls. Compared with radiation controls 3.5 days after radiation (10 Gy), G-CSF treatment attenuated intestinal morphological changes. Further, G-CSF markedly improved attenuation of mortality in lethally-irradiated (10 Gy) mice. The present study suggests that G-CSF as a potential drug for protection from radiation-induced intestinal damage.

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