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Effects of post-irradiation administration of IB-MECA, an adenosine A3 receptor agonist, on hematopoiesis and survival of sublethally or lethally irradiated mice

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IB-MECA, an adenosine receptor agonist selective for adenosine A3 receptors, was tested from the point of view of its abilities to influence hematopoiesis in sublethally gamma-irradiated mice and survival of lethally irradiated ones. The drug was administered in therapeutic (post-irradiation) treatment regimens. After a sublethal radiation dose of 4 Gy, IB-MECA was found to stimulate significantly important hematopoietic parameters of the bone marrow progenitor and precursor cells when given i.p. in two doses on days 1 and 2 after irradiation. These hematopoiesis-stimulating effects of IB-MECA manifested itself when the agonist was administered alone. as well as when given concommitantly with granulocyte colony-stimulating factor or an inhibitor of cyclooxygenase-2, meloxicam.

However, following an exposure to lethal doses of gamma-rays, no modulation of survival of the experimental mice by IB-MECA was recoreded, even when various treatment regimens comprising both intraperitoneal and peroral administration routes were attempted.

It follows from the findings that IB-MECA acts as a stimulator of hematopoiesis and, as such, it is maximally effective when administered after sublethal doses of radiation inducing the bone marrow radiation syndrome. After lethal radiation doses, seriously suppressing hematopoiesis and damaging significantly also other organismal systems, like the gastrointestinal one, IB-MECA is, consequently, not efficacious. Since, nevertheless, there are no signs of undesirable side effects of the treatment with IB-MECA in irradiated mice, activation of adenosine A3 receptors may be considered as a usable component in the spetrum of pharmacoloical means potentially utilizable in the treatment of the acute radiation disease.

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