Official Journal of TESMA
Regenerative Research
www.regres.tesma.org.my
E-ISSN 2232-0822
Tissue Engineering and Regenerative Medicine Society of Malaysia

Regenerative Research 7(1) 2018 70

STEM-CELL THERAPEUTICS FOR RADIATION-INDUCED TISSUE DAMAGE

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ARTICLE INFO

Published: 26th August 2018
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Keywords

Stem-cell therapeutics;
Radiation-induced tissue damage;
Coordinated research project

SUMMARY

Introduction During radiotherapy, the most important dose-limiting factor is sensitivity of the normal tissue lying in the radiation field. This can result in organ damage or severe normal tissue reactions. Radiation-induced organ damage is mainly caused by stem cell sterilisation and leading to a reduced reconstitution of functional cells in the irradiated organ. Replenishment of the depleted stem cell compartment should allow regeneration of irradiated tissues/organs. **Materials and methods** During 2008-2012 International Atomic Energy Agency was running a Collaborative Research Project (CRP) E33032 "Improving Outcomes in Radiotherapy Using Novel Biotechnologies: Modification of Tissue Reactions and the Use of Stem Cell Therapeutics". 13 institution from 10 Member States participated in the project **Results** Results of this project include but not limited to: (i) provision of new data regarding the efficacy of different stem cell techniques to repair radiation damage in a variety of normal tissue/organ systems (oral mucosa, skin, gut, salivary gland, spinal cord, bone, muscle and heart); (ii) development of standard methodology for different stem cell methods and the different experimental normal tissue/organ models; (iii) dissemination of results via presentations, papers, reports and proceedings; (iv) collaboration was established between laboratories, exchange programs were implemented and joint applications for additional funding were prepared. **Discussion** Currently, a wide variety of stem cell therapies is being investigated to treatment of radiation-induced normal tissue damage. Stem cell therapy may include: local induction of stem cell proliferation in irradiated/damaged tissues i.e. local administration of growth factors such as keratinocyte growth factor, local delivery of molecular/viral vectors to express stem cell growth factors in situ, and/or transplantation of stem cells in the damaged area. **Conclusion** Member States were provided with new and relevant knowledge on stem cell therapeutics (i.e. optimization of techniques) to prevent radiation-induced damage to normal organs/normal tissues.

Acknowledgement: The CRP E33032 (2008-2012) was supported by the IAEA.