Francois S et al., J Stem Cell Res Ther 2017, 7:3(Suppl)
http://dx.doi.org/10.4172/2157-7633.C1.024

6th International Conference and Exhibition on

Cell and Gene Therapy

March 27-28, 2017 Madrid, Spain

Mesenchymal stem cells transplants after pelvic radiotherapy limits the development of radiation-induced fibrosis, in the prostate, without promoting the residual tumor growth

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Radiation therapy is a key component of the management of various pelvic tumors. Unfortunately, normal tissues located in the vicinity of target organs are radiosensitive, and long-term cancer survivors may develop late treatment-related injury, most notably radiation-induced fibrosis (RIF). This process is considered irreversible, and there is currently no effective treatment for preventing or reducing the development of RIF. The objective of this study is to investigate the anti-fibrotic effect of Mesenchymal Stem Cells (MSC) on prostatic fibrosis. For this study, we have developed a model of fractionated irradiation in the pelvic area in Sprague-Dawley rats after chemical induced colonic tumours. The anti-fibrotic effect of MSC in prostate was evaluated by histology study. Expression of fibrosis biomarkers was studied after radiotherapy alone and radiotherapy associated with MSC therapy. Our study was conducted from 24 hours to one year after the last radiation exposure. Over a period of 12 months the variation of fibrosis biomarkers expression has highlighted that the process of prostatic fibrosis evolves step by step with reaction peak at 2 months after radiotherapy. These preliminary results suggest that MSC must be performed during the first months after radiotherapy for an optimal efficiency of MSC. In the prostates of rats treated with radiotherapy + MSC transplants, the stoichiometric ratio of MMP/TIMP seems to be respected suggesting tissue homeostasis and lack of progression of a RIF. In this study, we found that the lifetime of the animals receiving MSC grafts was significantly greater. Pelvic radiotherapy combined with MSCs has reduced the number and size of colonic tumors as well as protection of the prostate tissue in long term against the RIF.

Biography

During her various scientific experiments, she specialized in the optimization of the use of cell therapy in regenerative medicine and more particularly in the case of lesions Induced by ionizing radiation. During her doctorate (IRSN), she studied the plastic capacity of Mesenchymal Stem Cells (MSCs), as part of an innovative therapeutic approach to radiation-induced multi-organ damage. Her work has made it possible to demonstrate for the first time that the MSCs favor the healing of cutaneous radiation syndrome in a xenogeneic transplantation model. As part of her specialization in the field of regenerative medicine through the use of MSC in radiation-induced lesions, she completed a post-doctoral internship (Hôpital Saint Antoine) Have evaluated the safety of MSC transplants after radiotherapy in the context of pelvic cancer. At the same time, she studied the MSCs action in a tumoral environment: early and late stage colonic carcinogenesis. During her last Post-doctoral work, she participated in a clinical study evaluating a compassionate treatment based on the use of MSCs. Finally, taking advantage of her previous scientific achievements, she joined the Radiation Biological Effects Department (RBED) of the French Armed Forces Biomedical Research Institute (IRBA), in which she is currently project leader on the Development of new therapeutic approaches to acute radiation syndrome. Her ten years of research experience have been valued by 22 publications in international journals, 2 national publications and 2 academic books.

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