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Bowel radiation injury: Complexity of the pathophysiology and promises of cell and tissue engineering**Noelle Mathieu**

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Statement of the Problem: Bowel radiation injury is an insidious disease associated with substantial morbidity and mortality. Moreover, it's an increasing problem as more patients receive radiotherapy and survive longer after their tumor treatment. Bowel radiation injury results from the treatment of several cancers by radiotherapy in which normal colorectal tissues are present in the irradiation field. The clinical expression of bowel complications associated to radiotherapy resembles chronic bowel disease of other etiologies. However, recent studies have identified differences and specialists have proposed that complications following pelvic radiotherapy should be recognized as a "new disease". The growing number of cases declared every year highlights the importance of understanding the mechanisms involved and of finding effective therapies. There is no unified approach for the assessment and treatment of this disease partly due to insufficient knowledge about the mechanism involved in the development of bowel radiation injury. However, unresolved inflammation is hypothesized to have an important role in late side effects. We used an experimental model of radiation proctitis developed in rats that reproduces severe colonic mucosal damages and fibrosis similar to those observed in patients treated by radiotherapy.

Findings: Our studies demonstrated the involvement of inflammation and immunity in colorectal damages induced after localized irradiation. We also evaluated the benefit of immunomodulatory mesenchymal stromal cells isolated from adipose tissue (Ad-MSC) to reduce late side effects. We demonstrated a therapeutic benefit on different crucial functions of the colon and determined pleiotropic action mechanisms of the cell therapy treatment.

Conclusion & Significance: Our studies provide evidence for the potential of Ad-MSC to limit radiation effects on the colon and could open new perspectives in the treatment of other inflammatory bowel diseases.

Biography

Noëlle Mathieu has a thesis in Immunology from the Marseille-Luminy Immunology Center, France. She joined the Institute of Radioprotection and Nuclear Safety near Paris. Her project consists in studying late side effects of pelvic radiotherapy and developing therapeutic strategies. She used pre-clinical animal models of localized irradiation to the colorectum and developed endoscopy technique and surgery in rats. She used this model to understand the physiopathology of radiation proctitis and used cell therapy using mesenchymal stromal cells to reduce radio-induced damages to the colon. Her studies contribute to the use of this treatment in compassionate case of patients who had a surdose of ionizing radiation during their radiotherapy protocol. She is also involved in combined therapy to improve the actual treatment.

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