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Abstract

Radiotherapy remains the major course of treatment for Head and Neck cancer patients. A common consequence of radiation treatment is dysfunction of the salivary glands, which leads to a number of oral complications including xerostomia and dysphagia, for which there is no existent cure. Here, we briefly describe the current palliative treatments available for patients undergoing these conditions, such as oral lubricants, saliva substitutes, and saliva stimulants. None of these options achieves restoration of normal quality of life due to their limited effectiveness, and in some cases, adverse side effects of their own. Other therapies under development, such as acupuncture and electrostimulation have also yielded mixed results in clinical trials. Due to the ineffectiveness of palliative care to restore quality of life, it is reasonable to aim for the development of regenerative therapies that allow restoration of function of the salivary epithelium following radiation treatment. Adult stem cells are a necessary component of wound healing, and play important roles in preserving normal function of adult tissues. Thus, the present review mainly focuses on the effects of radiation on adult stem cells in a variety of tissues, which may be at play in the response of salivary glands to radiation treatment. This is of clinical importance because progenitor cells of the salivary glands have shown partial regenerative potential in mouse transplantation assays. Therefore, understanding how these progenitor cells are affected by radiation offers potential for development of new therapies for patients with xerostomia.

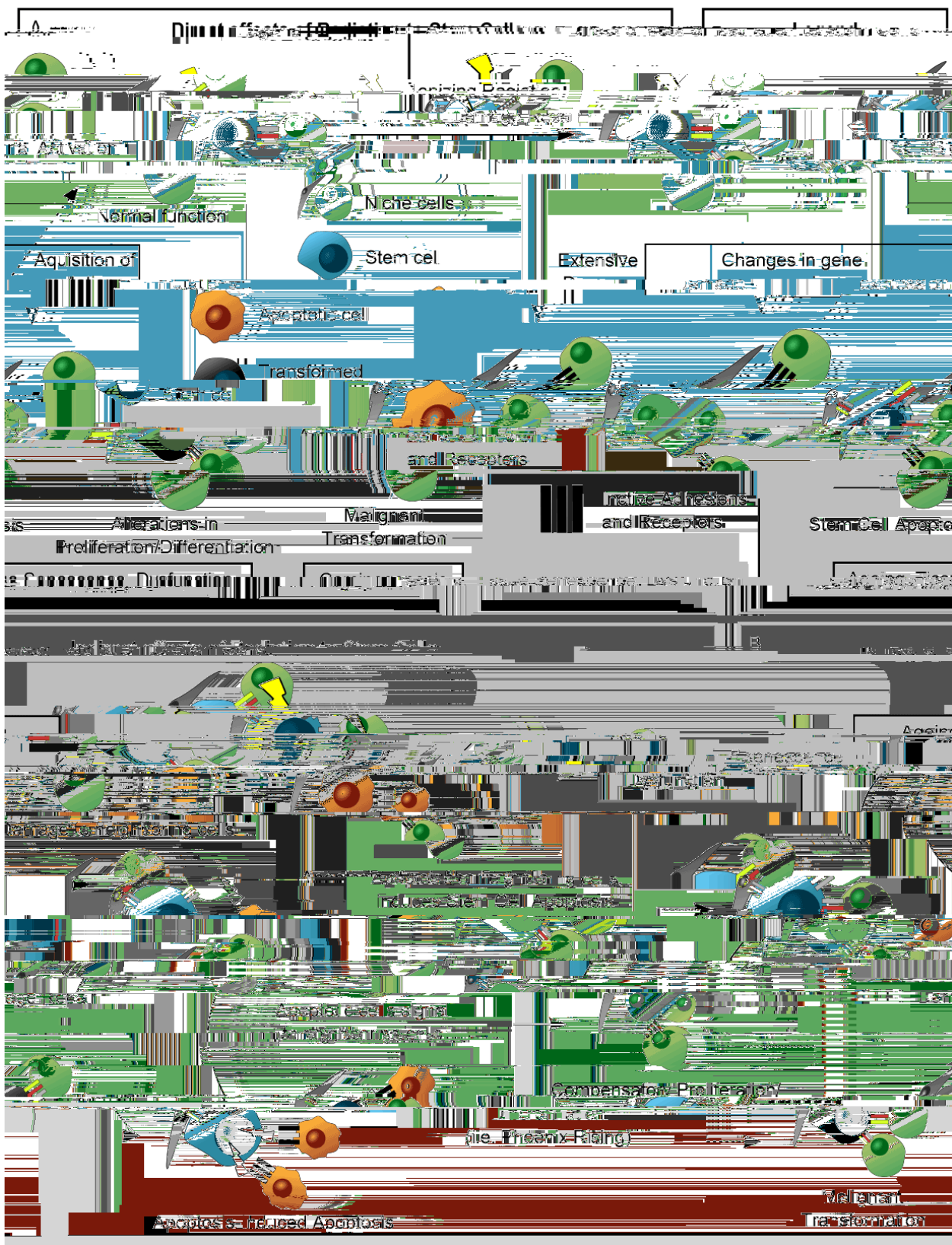
Keywords: Xerostomia, Radiation, Salivary Glands, Dysphagia, Head and Neck Cancer, Regenerative Therapies

Introduction

Radiotherapy remains the major course of treatment for Head and Neck cancer patients. A common consequence of radiation treatment is dysfunction of the salivary glands, which leads to a number of oral complications including xerostomia and dysphagia, for which there is no existent cure. Here, we briefly describe the current palliative treatments available for patients undergoing these conditions, such as oral lubricants, saliva substitutes, and saliva stimulants. None of these options achieves restoration of normal quality of life due to their limited effectiveness, and in some cases, adverse side effects of their own. Other therapies under development, such as acupuncture and electrostimulation have also yielded mixed results in clinical trials. Due to the ineffectiveness of palliative care to restore quality of life, it is reasonable to aim for the development of regenerative therapies that allow restoration of function of the salivary epithelium following radiation treatment. Adult stem cells are a necessary component of wound healing, and play important roles in preserving normal function of adult tissues. Thus, the present review mainly focuses on the effects of radiation on adult stem cells in a variety of tissues, which may be at play in the response of salivary glands to radiation treatment. This is of clinical importance because progenitor cells of the salivary glands have shown partial regenerative potential in mouse transplantation assays. Therefore, understanding how these progenitor cells are affected by radiation offers potential for development of new therapies for patients with xerostomia.

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