Stem cell reservoirs could preserve post-radiation salivary gland function

Researchers at the University of Groningen, The Netherlands, have discovered a method to potentially prevent the dry-mouth syndrome associated with head and neck cancer patients, post-radiation therapy.

Each year, half a million patients worldwide with head and neck cancer undergo radiotherapy. Approximately, 40% of this group suffer major damage to their salivary glands, resulting in xerostomia or dry-mouth syndrome.

First author, Peter van Luijk explains, “[Xerostomia] is painful, causing people to wake up and drink multiple times during the night, leading to severe fatigue. Speaking and eating is difficult without saliva, and often leads to isolation. Moreover, saliva plays a central role in preventing tooth decay and oral infections. Loss of saliva production often leads to loss of all teeth. These patients often need to use saliva-replacing liquids for the rest of their lives.”

Although, modern radiotherapy techniques use precisely targeted blasts of radiation to avoid unnecessary damage, this is evidently far from fool-proof. Prior research has allowed scientists to ascertain that stem cells inside the parotid glands could help with the glandular regeneration after radiation damaged. Until now, however, the exact location of these stem cells, and the effect of radiation on them, has eluded researchers.

This study, published in Science Translational Medicine, located reservoirs of stem cells within central ducts of the parotid glands. The researchers were able to cause xerostomia by irradiating these ducts in mice and rats, leading to long-term loss of saliva production.

Additionally, the team found the severity of xerostomia post-radiation was linked to the levels of radiation previously received to these ducts; that is, the more radiation damage sustained by these stem cells in the parotid ducts, the worse the dry-mouth symptoms.

With this in mind, the researchers went on to demonstrate that it is possible to avoid irradiation of this specific, stem cell-rich area during therapy, which may reduce the patient’s risk of developing post-radiotherapy xerostomia.

Van Luijk commented, “We now know that sparing the major salivary gland might be achieved by sparing only a small part of it.”

The team have initiated a double-blind clinical trial to test their xerostomia prevention strategy. Completion is anticipated in two to three years.

**Source:** Sparing the region of the salivary gland containing stem cells preserves saliva production after radiotherapy for head and neck cancer. (2015) van Luijk et al. Science Translational Medicine.