deoxyribonucleic acid (cDNA) to a salivary gland prior to treatment with IR prevents the subsequent IR-induced loss in function. The administration of AQP1 (e.g., human AQP1; hAQP1) prior to IR treatment (e.g., in patients with head and neck cancer) can reduce or prevent IR-induced salivary hypofunction, resulting in an elevated salivary output.

[0006] In one aspect, the present disclosure provides a use of an adeno-associated viral (AAV) vector encoding an aquaporin 1 (AQP1) protein in the manufacture of a medicament for preventing or reducing radiation-induced salivary dysfunction in a subject, wherein the medicament is to be administered to the subject prior to ionizing radiation, thereby preventing or reducing radiation-induced salivary dysfunction in the subject. Accordingly, in accordance with an example, the disclosure provides a vector (e.g., AAV vector) and a virion comprising such a vector (e.g., AAV virion) that encodes an AQP1 protein for the prevention or reduction of radiation-induced salivary dysfunction (e.g., hypofunction) in a subject. The use of the vector or virion for the preparation of a medicament to prevent or reduce radiation-induced salivary dysfunction in a subject also is provided. In one example, such a vector or virion is useful for protecting a subject from radiation-induced salivary dysfunction.

[0007] In accordance with an example, the disclosure provides a method of preventing or reducing radiation-induced salivary dysfunction in a subject. The method comprises (a) administering a vector encoding an aquaporin (AQP) protein to the subject, and (b) administering ionizing radiation to the subject following (a), thereby preventing or reducing radiation-induced salivary dysfunction in the subject. In one example, salivary gland function can be maintained at a level equivalent to, or at least equivalent to, salivary gland function prior to administration of the ionizing radiation.

[0008] The AQP protein can be any suitable AQP protein including but not limited to an AQP1 protein. For example, in one example, the AQP1 protein is or comprises human AQP1 (hAQP1) protein.

[0009] The vector encoding the AQP (e.g., hAPQP1) can be or comprise any suitable vector including but not limited to a viral vector. For example, in one example, the viral vector is or comprises an adenoviral vector (e.g., serotype 2 or serotype 5 adenoviral vector). In another example, the viral vector is or comprises an adeno-associated viral (AAV) vector (e.g., AAV2, AAV5, AAV6, AAV44.9, or BAAV).

CLAIMS:

1. Use of an adeno-associated viral (AAV) vector encoding an aquaporin 1 (AQP1) protein in the manufacture of a medicament for preventing or reducing radiation-induced salivary dysfunction in a subject, wherein the medicament is to be administered to the subject prior to ionizing radiation, thereby preventing or reducing radiation-induced salivary dysfunction in the subject.

2. The use of claim 1, wherein the medicament is to be administered to a salivary gland of the subject.

3. The use of claim 1, wherein the AQP1 protein comprises human AQP1 protein.

4. The use of claim 1, wherein the AAV vector comprises an AAV2, AAV5, AAV6, or BAAV vector.

5. The use of claim 4, wherein the AAV vector comprises an AAV2 vector.

6. The use of claim 4, wherein the AAV vector is to be administered as an AAV virion comprising the AAV vector.

7. The use of claim 6, wherein the AAV virion comprises an AAV2 vector packaged in an AAV2 capsid.

8. The use of any one of claims 1-7, wherein salivary gland function is maintained at a level equivalent or at least equivalent to salivary gland function prior to administration of the ionizing radiation.

9. The use of any one of claims 1-8, wherein the subject is a human patient.

10. The use of claim 9, wherein the patient has head and neck cancer.