NON-VIRAL AQUAPORIN1 GENE THERAPY TO RESTORE SALIVARY FLOW

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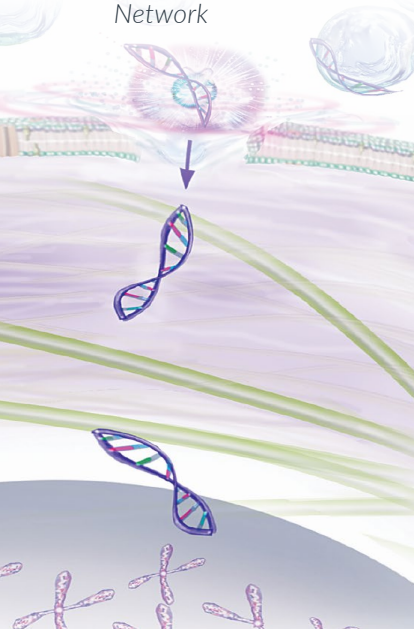

Clinical Need – In the treatment of head and neck cancers, radiotherapy is commonly executed in conjunction with other modalities, such as surgery and/or chemotherapy. Because of the anatomical proximity, salivary glands receive secondary radiation damage, which results in xerostomia. While intensity-modulated radiotherapy significantly reduces the incidence of radiation-induced xerostomia, a need still exists for patients suffering from xerostomia, especially those in whom amifostine leads to significant side effects.

Solution – The method of ultrasound-assisted gene transfer (UAGT) was developed to deliver the AQP1 gene in irradiated salivary gland for the amelioration of radiation-induced xerostomia. This non-viral gene delivery is based on sonoporation generated by the ultrasound, enabling gene transfer into radiation-surviving salivary gland cells. The delivery of the water channel AQP1 to the parotid glands in a mini-swine model restored salivary flow post-radiation to pre-treatment levels, demonstrating the efficacy of our non-viral AQP1 gene transfer approach.

Competitive Advantage – While a recent clinical trial using a viral-based AQP1 gene delivery demonstrated an increase in saliva production, this approach has not advanced beyond Phase I/II trial due to side-effects generated by the adenovirus vector. With our non-viral based approach, it is anticipated that enhanced safety is provided and that serial dosing is feasible to provide patients with AQP1 gene therapy throughout their lifetime.

ITP Support – Through the ITP support, the team has demonstrated safety of UAGT-plasmid delivery and has collected data on the vector dosing range. With support from the Cores, suppliers were qualified, and documents are in preparation for the IND package. In addition, a detailed commercialization plan was established. Future work is focused on obtaining GLP toxicology data.

FOUNDATIONAL PUBLICATION

Wang et al. Ultrasound-assisted nonviral gene transfer of AQP1 to the irradiated minipig parotid gland restores fluid secretion. Gene Ther 2015

INTELLECTUAL PROPERTY

In development

ANTICIPATED REGULATORY PATHWAY

Biologic; IND to enable Biologics License Application

ANTICIPATED COMMERCIALIZATION STRATEGY

New company formation/ license to industry partners

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