NIH partnership results in key FDA Orphan Drug Designation for rare respiratory disease therapy

National Cancer Institute

A partnership between the National Institutes of Health (NIH) and Precigen Inc., a biopharmaceutical company, has led to a milestone regulatory designation that could significantly decrease treatment costs and improve quality of life for patients living with an incurable respiratory disease.

In March 2021, the Food and Drug Administration (FDA) granted an Orphan Drug Designation for PRGN-2012, an investigational therapeutic vaccine being developed to treat recurrent respiratory papillomatosis (RRP). It is the first human regulatory designation for this investigational agent, which was developed by the National Cancer Institute (NCI) in collaboration with the National Institute on Deafness and Other Communication Disorders (NIDCD) and Precigen.

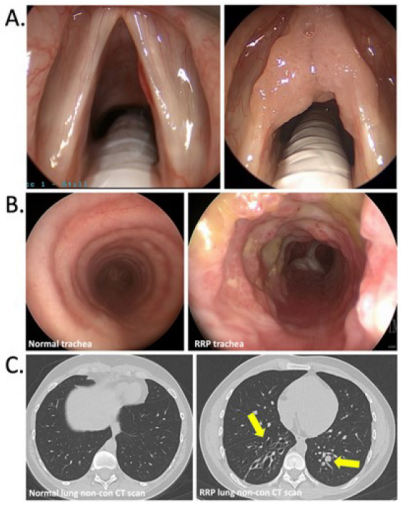
The partnership brings together Precigen's PRGN-2012 vaccine and platform technologies and NCI's expertise in research, design, and execution of preclinical and clinical studies to develop a treatment for RRP.

RRP is a rare, difficult-to-treat, and sometimes fatal disease caused by human papillomavirus (HPV) infection. Approximately 1,500 new cases of RRP are diagnosed each year in the United States.

The disease causes benign tumors (papillomas) to grow in the air passages leading from the nose and mouth to the lungs (respiratory tract), which can affect a patient's ability to talk and breathe easily. In rare cases (1% to 3%), RRP can transform into invasive cancer (invasive squamous cell carcinoma).

There is no cure for RRP, and the current standard of care is repeated surgeries to remove the papillomas. Unfortunately, papillomas often recur after surgical removal, which necessitates repeated surgeries that expose patients to clinical risks and emotional distress.

In October 2017, NCI executed a confidential disclosure agreement (CDA) with Intrexon Corporation (which subsequently became Precigen) to discuss a possible collaboration to study Precigen's investigational therapies. PRGN-2012 uses Precigen's "gorilla adenovector technology," a proprietary gene therapy delivery technology that is part of the company's AdenoVerse™ platform.



Left: *A: normal (left) and diseased (right) true vocal folds. B: normal (left) and diseased (right) trachea. C: axial cuts of computed tomography scan showing normal (left) and diseased (right) lungs, yellow arrows point to mixed cystic and solid papillomatous lesions.*

In February 2018, the NCI Technology Transfer Center executed a cooperative research and development agreement (CRADA), which allowed NCI to evaluate Precigen's proprietary vaccine platform for the treatment of cancer. In December 2020, the CRADA was amended to expand the scope of the research.

Preclinical studies, conducted by researchers from NCI and NIDCD, showed robust immune responses to the vaccine in human patient samples and animal models. The Orphan Drug Designation was based on these data; a clinical trial in patients with RRP began in March 2021 and is ongoing.

The Orphan Drug Designation is given to drugs and biologics intended for the safe and effective treatment, diagnosis or prevention of diseases/disorders that affect fewer than 200,000 people in the U.S. at the time of the designation. Although the designation does not necessarily mean the treatment will be approved by the FDA or reach patients faster, it provides important incentives that help to expedite and reduce the cost of drug development, approval, and commercialization.