

Cell Transplants for Lung Disease Studied

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Denver, CO — National Jewish Health biologists Susan D. Reynolds, PhD, and Carl W. White, MD, have been awarded \$1 million from the National Heart Lung and Blood Institute (NHLBI) to evaluate cell transplantation as a novel therapy for acute lung injury caused by chemical exposures, infections and severe exacerbations of chronic lung diseases such as asthma. The two-year grant, funded through American Recovery and Reinvestment Act, is one of the highly competitive National Institutes of Health (NIH) Challenge Grants, which focus on high-priority areas of investigation.

"We believe that cell transplants offer a promising new approach to repair of epithelial damage caused by acute lung injury," said Dr. Reynolds.

"If successful, our experiments could lead to therapies to help some of the 200,000 Americans who suffer acute lung injury, 75,000 of whom die, every year," added Dr. White.

Acute lung injury takes many forms, one of which results in loss of the epithelial cells lining the airways. Modeling of this injury in mice indicates that the airway damage leads to destruction of the alveoli, the small air sacs where gas exchange occurs in the lungs. Once the alveolar architecture is destroyed, it cannot be replaced and emphysema ensues.

Treatments using cell transplantation use regenerative cells from the lung that can reproduce and differentiate to replace the damaged tissue. In mouse experiments, the researchers will determine the best cells to use for transplantation. Both upper and lower airway regenerative cells, the basal and alveolar type 2 cells, will be tested. The cells will come from donor human lungs that are not suitable for transplantation to other humans. The studies will evaluate parameters that are critical for phase one clinical trials: cell dosage, timing of treatment, and method of administration. The unique characteristics of the mouse model will also allow identification of most promising patient groups.

"This research project is an excellent example of a situation in which the whole is greater than the sum of the parts," said Dr. Reynolds. Prior to funding of this project, Dr. White and Shama Ahmad, PhD, had developed a method for identifying and isolating basal cells, the regenerative cell for the upper airway. Dr. Reynolds and her colleague Moumita Ghosh, PhD, had developed a mouse model of acute lung injury.

"By combining our interests in regenerative cells, knowledge of cell separation techniques, and expertise in analysis of lung injury and repair in animal models, the investigative team was able to identify gaps in the field of cell therapy for lung disease and to propose effective solutions," said Dr. White.

"Successful completion of this study will propel the field of cell replacement therapy for lung disease beyond the planning stage and into a position appropriate for initiation of clinical trials," wrote Drs. Reynolds and White in their grant application. NHLBI officials have specifically advised the investigators to collect data that could be used in applications for clinical trials.

As part of the American Recovery and Reinvestment Act, the grant will also help stimulate the economy through employment of additional lab technicians and through support for studies that will help young researchers launch their own independent laboratories, said Dr. Reynolds. This grant award is being used to support the research initiated by Drs. Ahmad and Ghosh, and has employed two full-time and one part-time research technician.

"The Cell-Based Therapy for Lung Disease research group at National Jewish Health is grateful to be given the opportunity to evaluate a novel therapeutic approach and to further the careers of new investigators," said Dr. White.

National Jewish Health is known worldwide for treatment of patients with respiratory, cardiac, immune and related

disorders, and for groundbreaking medical research. Founded in 1899 as a nonprofit hospital, National Jewish remains the only facility in the world dedicated exclusively to these disorders. For 12 consecutive years, *U.S. News & World Report* has ranked National Jewish the #1 respiratory hospital in the nation.

National Jewish Health is the leading respiratory hospital in the nation. Founded 122 years ago as a nonprofit hospital, National Jewish Health today is the only facility in the world dedicated exclusively to groundbreaking medical research and treatment of patients with respiratory, cardiac, immune and related disorders. Patients and families come to National Jewish Health from around the world to receive cutting-edge, comprehensive, coordinated care. To learn more, visit the [media resources page](#).

Media Contacts

Our team is available to arrange interviews, discuss events and story ideas.

Jessica Berry

303.398.1082

berryl@njhealth.org

Sean Andersen-Vie

303.398.1002

andersenvie@njhealth.org