Introduction:
Respiratory infections have a greater global burden of disease than any other health conditions, including HIV/AIDS and cancer. In the US, respiratory diseases, such as influenza and other viral infections, and bacterial infections caused by pathogens like the genus Streptococcus, result in $87 billion in healthcare costs and more than 36,000 deaths each year.

Definition:
Investigators at the Oklahoma Center for Respiratory and Infectious Diseases (OCRID) engage in critical research on infectious diseases of the respiratory system with a focus on influenza virus, respiratory syncytial virus and bacterial infections. The interdisciplinary projects in OCRID cover disease pathogenesis, therapeutics, molecular mechanisms, and bioengineering.

Currently at OSU:
OCRID was established in 2013 through a $11.3 million Centers of Biomedical Research Excellence (CoBRE) grant from the National Institutes of Health. OCRID is a multi-institutional, interdisciplinary research center based at Oklahoma State University, which strengthens OSU’s biomedical research infrastructure and provides training and mentoring to next-generation scientists. Several major projects comprise the foundation of OCRID. One such core project consists of a team of scientists, led by OSU pathobiologist Dr. Tom Oomens, seeking to develop a safe vaccine for the human respiratory syncytial virus (a leading cause of pediatric bronchiolitis and pneumonia) by manipulating the virus’s protein structure. A second team, led by OSU bioengineer Dr. Heather Fahlenkamp, is developing a laboratory-based model of respiratory tissue, such that infection processes (antigen introduction, immune responses, etc.) can be studied in situ but without the impact on a living organism. Yet another team of scientists at OCRID, led by OSU physiologists Dr. Telugu Narasaraju and OCRID Director Dr. Lin Liu, is developing a combination drug therapy for influenza—one that simultaneously targets the virus and the acute lung injury already caused by the infection—to dramatically reduce post-influenza pneumonia rates. These and other core projects at OCRID not only extend the science in their respective areas, but also provide the infrastructure of expertise and facilities for other researchers at OSU and its partner institutions.
In addition to the foundational projects described above, OCRID promotes collaboration with scientists throughout the region, recruiting new scientists to member institutions, and mentoring of researchers scientists who might be new to respiratory infectious disease or to NIH funding. The center funds a variety of pilot and follow-on projects to extend the impact of the initial studies. OCRID currently includes 26 investigators whose projects are funded by and an additional 25 researchers affiliated with the center.

Potential:
With the already strong representation of more than 50 investigators, the impact of OCRID research on understanding and treating respiratory infections will only grow as the threat of ever more virulent bacterial and viral diseases continue to evolve in the U.S. and worldwide. With continued support, OCRID is positioned to become a nationally and internationally influential respiratory infectious disease research center.

Conclusion:
Scientists agree that the evolution of organisms responsible for respiratory and infectious diseases, including the growing prevalence of antibiotic-resistant strains and the possible introduction of more dangerous influenza viruses from abroad, makes the need for expanding this type of research essential. Oklahoma and OSU can take a leadership role in this research growth because of OCRID.

In the US, respiratory diseases, such as influenza and other viral infections, and bacterial infections caused by pathogens like the genus Streptococcus, result in $87 billion in healthcare costs and more than 36,000 deaths each year.

For more information, contact the OSU Vice President for Research at vpr@okstate.edu or 405-744-6501.

Lin Liu, Ph.D.
Director of the Oklahoma Center for Respiratory and Infectious Diseases

An artist’s rendering of an influenza virus with a cut away.