

NEWS RELEASE

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Researchers Discover Key Player in Immune Response to Fungal Pathogen

Newark, NJ – Scientists from Rutgers Biomedical and Health Sciences (RBHS) New Jersey Medical School (NJMS) uncovered a novel factor involved in the regulation of immune defense against fungal infection. The exciting new findings were published in the October 6, 2017 issue of the journal *Science Immunology*. The article, entitled *Type III interferon is a critical regulator of innate fungal immunity*, details their findings on the importance of type III interferons (IFN-Lambdas) in the body's response to fungal pathogens.

Past research has demonstrated an important immune function for types I and III interferons in the body's fight against viruses. Whether these cytokines could mediate essential roles in defense against other pathogens is less clear. In this study, the investigators looked at the host response of mice whose receptors for type I or type III interferons had been deleted before being infected with the fungal pathogen *Aspergillus fumigatus*. The researchers identified IFN-Lambdas (type III) as key players in the immune response to the fungus, activating neutrophils--the most abundant type of white blood cell and among the first cells to migrate to the site of an infection. Recent studies had suggested that IFN-Lambdas play a distinct role in antiviral immunity at mucosal sites but was unclear whether they could mediate essential roles in defense against other pathogens. These new findings highlight an important role of type III interferons in the regulation of neutrophils in antifungal defense and potentially other inflammatory responses where neutrophils are involved.

Fungal infections have increased in incidence over the past decades and are associated with high mortality rates. Antifungal medications are often ineffective and fungi have also evolved resistance to current drugs. Thus, there is a critical need to develop new therapies to treat these deadly infections. The identification of host factors, such as interferons, as critical activators of host immune cells could pave the way for the development of novel therapies aimed at boosting host immunity. *Aspergillus fumigatus* is one of the significant causes of invasive fungal infections in susceptible patient populations. This fungus can also cause allergies, respiratory diseases, and bloodstream infections. The current study could provide the basis for developing future immune boosting interventions based on interferons to treat aspergillosis and potentially other fungal infections.

The primary research for this project was completed in the laboratory of Amariliz Rivera, PhD, an assistant professor in the NJMS Department of Pediatrics and a member of the Center for Immunity and Inflammation (CII), a division of the Institute for Infectious and Inflammatory Diseases (i3D) at NJMS. The studies were done in collaboration with Sergei Kotenko, PhD, a professor in the NJMS Department of Microbiology, Biochemistry and Molecular Genetics, a member of CII, and co-discoverer of type III interferons.

Rivera earned her PhD at UMDNJ (now Rutgers) Graduate School of Biomedical Sciences, and did post doctoral training at Memorial Sloan Kettering Cancer Center. Studies in the Rivera lab are supported by a five-year \$1.25 million RO1 award from the NIH as well as generously underwritten by the Feldstein Medical Foundation and the Burroughs Wellcome Fund Investigators in the Pathogenesis of Infectious Disease Award.

Vanessa Espinosa, PhD, first author on this article, is a member of the Rivera lab and the Center for Immunity and Inflammation at NJMS.

About New Jersey Medical School

Founded in 1954, **Rutgers New Jersey Medical School** is the oldest school of medicine in the state. Today it is part of Rutgers, The State University of New Jersey and graduates approximately 170 physicians a year. In addition to providing the MD degree, the school offers MD/PhD, MD/MPH and MD/MBA degrees through collaborations with other institutions of higher education. Dedicated to excellence in education, research, clinical care and community outreach, the medical school comprises 22 academic departments and works with several healthcare partners, including its principal teaching hospital, The University Hospital. Its faculty consists of numerous world-renowned scientists and many of the region's "top doctors." Home to the nation's oldest student-run clinic, New Jersey Medical School hosts more than 50 centers and institutes, including the Public Health Research Institute Center, the Global Tuberculosis Institute and the Neurological Institute of New Jersey. For more information please visit: njms.rutgers.edu.