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NEWSRELEASE

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Chen et al. (Nature Immunology)

Macrophage sentinels eradicate parasites with help from an unlikely partner, according to a study led by William Gause at Rutgers New Jersey Medical School. The work was published in Nature Immunology on August 31, 2014.

Intestinal parasitic worms often pass through the lungs en route to the gut, leaving tissue damage in their wake. Defense against these intestinal worms requires a specific type of immune response called type 2 immunity, which is orchestrated by a variety of immune cell types and is required both to fight off the infection and repair the collateral lung damage. Gause's group had previously found that macrophages—cells that can inflict damage or promote repair depending on the circumstance—become healers when exposed to a type 2 immune environment. These reparative cells, dubbed "M2" cells, help patch up the wounded lungs after the worms pass through. These studies have suggested this response may be useful in developing new therapies for accelerated wound healing.

Once an intestinal worm infection is neutralized, the immune system is poised to fend off subsequent encounters in the lung, preventing the worms from reaching their destination in the gut. But exactly which cells are responsible for cutting off secondary infections in the lungs has been a matter of debate. Immune 'memory' is most often attributed to so-called adaptive immune cells like T and B cells, which genetically fine-tune pathogen-specific surface receptors to ensure a better, faster and more effective response to secondary challenge.

Gause and colleagues now reveal that M2 cells are both healers and fighters during parasitic infection. These cells hung around in the lungs long after the first wave of parasites had departed and directly grabbed onto and damaged repeat invaders. Thus the M2 cells were capable of mediating acquired resistance, the basis for vaccine development. But the M2 cells didn't act alone, they had help from neutrophils. Neutrophils are best known as 'first responder' cells that race to sites of infection, inflict damage on invading microbes, and then die. Until now, they hadn't been widely thought to influence the activity of their immune cell brethren. Although neutrophils came and went quickly from the lungs during the initial infection, their transient presence was essential for macrophages to become M2 cells and to acquire their parasite-damaging prowess.

These data suggest macrophages as a new target for vaccine development and raise the possibility that this novel vaccine strategy may be useful against pathogens where more conventional approaches have been ineffective.

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Celebrating its 60th anniversary, **Rutgers New Jersey Medical School** was founded in 1954 and 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