Prostaglandin regulation of immune responses against coronavirus infections

Rahul Vijay
PhD Candidate

Monday, November 16, 2015
1:00 p.m.
2117 Medical Education Research Facility (MERF)
Prostaglandin regulation of immune responses against coronavirus infections

Prostaglandins (PG) are ubiquitous lipid mediators that play key roles in pathophysiological responses to infections. They are considered to have both pro and anti-inflammatory roles depending upon the time of inflammation, the receptors that they bind to and the tissue that they act upon. Hence given their pleiotropic nature, a perfect balance between the pro and anti-inflammatory functions of PGs are required to ensure that a controlled timely immune response is elicited to mediate protection and to avoid immunopathology. PGD_2 is one such PG that was reported to increase with age in the lungs of mice and to mediate anti-inflammatory effects thereby blunting the immune response following Severe acute respiratory syndrome – coronavirus (SARS-CoV). Here, I show that age-related increases in oxidative stress results in the upregulation of a single phospholipase (PLA_2) group II D (G2D) (PLA_2G2D) with anti-inflammatory roles which in turn causes upregulation of PGD_2.

Strikingly, infection of mice lacking PLA_2G2D expression (Pla2g2d^-/- mice) converted a uniformly lethal infection to a non-lethal one, subsequent to development of enhanced respiratory DC migration to the draining lymph nodes, augmented anti-virus T cell responses and diminished lung damage. Thus, our results suggest that directed inhibition of a single inducible phospholipase PLA_2G2D in the lungs of older patients with severe respiratory infections is potentially an attractive therapeutic intervention to restore immune function.

Rahul Vijay
Biographical Sketch

Rahul was born in Kerala, a state in Southern India (often called ‘God’s own country’ for its serene and picturesque landscapes) to Mr. E.B Vijayakumar (a civil engineer) and Mrs. R. Suseela Vijayakumar (a plant pathologist). Immunology became his passion while doing veterinary school in India - thanks to Dr. N Krishnan Nair for teaching a well tailored course in Immunology.

He joined the Perlman Lab in 2011 and has been involved in projects studying the role of lipids in modulating immune response against coronavirus infections.

When not in the lab Rahul likes to run and cook and eat exotic dishes. As his wife, Renjitha often says, “he likes to do experiments with food, because seems like those are mostly successful” and then she grins.

Following his PhD, he will continue in the Perlman Lab until the end of summer and then plan to do a post doc in a pulmonary immunology lab elsewhere. He will then to move to India with his wife where he hopes to find a job in a federal research institute. Iowa city however, he says would be his most preferred place in the US to live. ‘A pint of stout and a grilled pork tenderloin’ is just heavenly he says.