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Mannose receptor regulates macrophage polarization and allergic inflammation through MiR-511-3p

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We proposed the existence of a protective mechanism through which mannose receptor (MRC1/CD206) limits allergic inflammation via allergen clearance and its intronic miRNA511-3p. *Mrc1*-null (*Mrc1*^{-/-}) mice showed significant reduction in cockroach allergen uptake compared with WT mice and consequently *Mrc1*^{-/-} mice had greater lung inflammation, IgE levels and cytokine production in a cockroach allergen-induced mouse model compared to WT mice. MiR-511-3p, encoded within the MRC1 gene was shown to be co-regulated with *Mrc1*. Macrophages from *Mrc1*^{-/-} mice showed significantly reduced levels of miR-511-3p and a M1 phenotype whereas over-expression of miR-511-3p rendered macrophages to exhibit a M2 phenotype. Further, delivery of miR-511-3p in mice led to a significant reduction in cockroach allergen-induced inflammation and this effect was confirmed in the bone-marrow chimeric mice receiving hematopoietic stem and progenitor cells (HS/PCs) over expressing miR-511-3p. The serum levels of miR-511-3p were significantly lower in human asthmatics compared to non-asthmatic subjects. Profiling of macrophages with or without miR-511-3p over-expression identified 729 differentially expressed genes, wherein the level of *ptgds2*, encoding PGD2 synthase and its product, PGD2 was significantly lower, which might contribute to the protective effect of *Mrc1* and miR-511-3p. Collectively, these studies suggest that *Mrc1* and its intronic miR-511-3p mediate protection against allergen-induced lung inflammation.

Biography

Peisong Gao is currently an Associate Professor of Medicine at The Johns Hopkins University School of Medicine in Baltimore, Maryland. He has received his MD degree and Pulmonary Medicine Training in The Fourth Military Medical University, China. From July 1997 to January 1999, he was a Visiting Research Fellow in Oxford University. He subsequently moved to the University of Wales Swansea for his PhD working in Molecular Genetics of Asthma. In 2002 he became a Postdoctoral Fellow in the Division of Allergy & Clinical Immunology at Johns Hopkins. In 2008 he was promoted to Assistant Professor. His research has been greatly recognized by several awards including the 2004 Research Excellence Award, the 2007 Interest Section Award and Outstanding Pediatric Allergy, Asthma and Immunology Award from AAAAI. His studies mainly focus on gene, environment and development of asthma. He has published more than 60 papers in reputed journals.

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