Researchers advance understanding in immune response to infections

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University of Leicester researchers have released evidence substantiating an unexpected dual role of an important component of the immune system.

Findings by researchers at the University's Department of Infection, Immunity and Inflammation – including three PhD graduates – are published in a paper for the journal 'Medical Microbiology and Immunology'.

The paper presents significant new findings about the protein properdin – an important part of the immune system. It is a positive regulator in the alternative pathway of complement activation – which means it plays a key part in one of the body's main techniques for tackling infections and foreign bodies known as antigens.

The new findings show that in some situations a lack of properdin can actually have major benefits – while in others it can be a big disadvantage.

Using mouse models, the researchers investigated the differences in immune responses between individuals deficient in properdin and those with normal amounts of the protein.

When individuals were infected with Streptococcus pneumoniae - bacteria which can cause sepsis and pneumonia in humans – those deficient in properdin had higher survival rates than those with normal

levels.

But when individuals were infected with Listeria monocytogenes – which cause an infection called listeriosis in humans – those deficient in properdin had lower levels of survival.

Cellular analysis by the researchers suggests that properdin-deficiency is likely to cause the body to use more of a type of white blood cell known as M2 macrophages – involved in tissue repair – rather than M1 macrophages, whose main role is to kill pathogens.

This allowed the researchers to conclude that properdin controls the strength of the body's immune response by affecting the role of macrophages during infection and inflammation.

Principal investigator and corresponding author, Dr Cordula Stover, Senior Lecturer in Immunology at the University's Department of Infection, Immunity and Inflammation, said: "The PhD graduates' projects together elucidate a critically instructive role of an innate immune protein, complement properdin, in shaping the inflammatory response.

"The work is the first to show that complement properdin controls the strength of immune responses by affecting humoral as well as cellular phenotypes during acute bacterial infection and ensuing inflammation."

Dr Stover also stresses that using mouse models can be very useful for understanding disease mechanisms – but there are limitations with the value of mouse models.

She said: "We are asking mice to react to human pathogens or diseases of significance for man, not mouse. Mice are genetically homogenous, unlike man, and have comparable, not identical, scope of cells and

antibodies.

"To be meaningful, disease concepts need to be tested in patient samples, in order to have direct application of the research."

More information: The complete paper is available online: link.springer.com/article/10.1 … leAuthor/onlineFirst

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