

Re-writing the research on the treatment of infection

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(Medical Xpress)—A major breakthrough in the search for alternatives to antibiotics and the treatment of infection could provide microbiologists with a whole new insight into the way germs co-exist with or attack humans.

The discovery led by a team in Schools of Life Sciences and Chemistry at The University of Nottingham has revealed that [bacteria](#) are 'hijacking' the [human body](#)'s own [immune defences](#) to adapt their life style inside our body and survive our [immune response](#) or build up their own attack.

The discovery could lead to the development of new drugs to prevent and treat infections such as blood poisoning and epidemic meningitis. The results of this research, have been published today, Wednesday 9 October 2013 in the Royal Society's academic journal *Open Biology*.

Professor Dlawer Ala'Aldeen, an expert in microbiology and infectious diseases, said: "This is basically germ warfare between us and bacteria. What we have discovered is that bacteria hijack our immune response, by binding and taking up the [cytokines](#), enhancing their gene expressions and changing their own virulent behaviour. As a result, they make themselves more aggressive and able to withstand our defences and go further to invade our tissues.

"When the human body is under attack from bacteria it releases proteins called cytokines, to prepare for the fight against the invaders. This pro-inflammatory response helps us fight off bacterial infections such as the meningococcus which causes meningitis and septicaemia. Until now it was thought these cytokines were there as communication messengers between our cells to help build up our defences."

Panos Soultanas, a professor of biological chemistry, said: "This is new information, something we didn't know before, and it could change drastically the way we view host pathogen interactions."

Dr Jafar Mahdavi, who led the laboratory investigations, said:

"Cytokines are major players in the co-ordination of the human [immune system](#). It was, until now, unbelievable that bacteria can use them for their own benefit. This very exciting discovery could re-write current literature. The bacteria are doing things inside our bodies which nobody believed before. We now have a much better understanding of the whole mechanism – how bacteria do this and why. We have already studied this in Neisseria meningitis and E. coli infection models and it seems that the different bacteria behave in the exactly the same way."

When harmony turns to discord

These pathogens and the human host routinely live in harmony with one another. But when infection strikes, scientists now know they are adept

at taking advantage of one another's defences. The real impact of this discovery is that science now knows enough to look at ways of manipulating bacterial genetics to help in the fight against infection and community based diseases.

Professor Ala'Aldeen said: "The discovery that the bacterial surface molecules act as gatekeepers and hijack human cytokines to improve their own effectiveness could lead to new preventative or therapeutic strategies against bacterial infections, and could be exploited as alternatives to antibiotics. This discovery will enable us to find ways of dampening down the effects of bacterial attack on our immune system by manipulating their genetics and forcing them to 'forget' about invading us, and instead co-exist with us."

Provided by University of Nottingham

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