Research sheds new light on inflammatory disease

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Scientists at the University of Liverpool have found that understanding the precise timing of communication between cells that coordinate the body's response to disease could be key to new drug developments.

Researchers, in collaboration with AstraZeneca and the Universities of Manchester and Warwick, are investigating the NF-kappa-B signalling system, which governs the responses within cells to stimuli such as stress and infection. It plays a central role in conditions such as cancer, inflammatory bowel disease, rheumatoid arthritis and asthma.

It was thought that blocking NF-kappa-B signals with drugs might alleviate these conditions, but scientists have now found that the timing of these signals can change cell behaviour and cause disease. The research suggests that drugs would need to change the timings in order to treat disease more effectively.

Professor Mike White, from the University's School of Biological Sciences, explains: "We know that the NF-kappa-B signalling system is a vital component of all cells and acts to control cell death and growth. When this system goes wrong, however, it can cause diseases such as cancer and inflammatory bowel disease. Currently, drugs target signal pathways and block them in order to treat diseases, but the NF-kappa-B system is so complex that the outcome of treatment is unpredictable.

"Our new research shows that the amount of NF-kappa-B in the nucleus of a cell varies in a wave-like pattern over time. It is the timing of these

waves that can change the cell's behaviour and affect the development of disease. This means that instead of blocking the signal pathway, drugs need to change the timing of the waves to treat disease successfully."

Professor Douglas Kell, Chief Executive of the Biotechnology and Biological Sciences Research Council (BBSRC) and co-author of the research, added: "The results both aid and challenge drug designers. It will not simply be a matter of using a drug to knock down one key biological player in inflammatory disease. A systems biology approach to this work will enable us to get a complete picture of the biology underpinning inflammation and thus pinpoint the potential axes of control that might be targeted with drugs."

The work is published in *Science*.

Source: University of Liverpool (news : web)