Researchers make blood poisoning breakthrough

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(PhysOrg.com) -- The lives of millions of people struck down by blood poisoning - or sepsis - could be saved after a team of researchers, including an expert from the University of Glasgow, made a medical breakthrough in how the condition is treated.

Blood poisoning often develops into septic shock which is an acute and systemic inflammatory condition. It leads to multi-organ damage, cardiovascular dysfunction and often death. Sepsis has a worldwide incidence of more than 20 million cases a year, with mortality due to septic shock reaching up to 50 per cent even in industrialised countries.

The treatment options available for blood poisoning are limited. However, Alirio J Melendez, Professor of Immunopharmacology at the University of Glasgow, and a team of researchers have discovered what could be a powerful weapon in the battle against the condition.

Prof Melendez's and his team found a new molecular pathway stimulated by a lipid enzyme known as sphingosine kinase1 (SphK1) which is activated during the inflammation. When this molecular pathway is blocked, however, it significantly reduces the risk of death from blood poisoning.

The results of the study, which are reported in the latest edition of the scientific journal *Science*, showed that SphK1 is highly elevated in inflammatory cells from patients with sepsis and inhibition of the molecular pathway reduced the proinflammatory response triggered by bacterial products in the human cells.

Moreover, the study also showed the mortality rate of mice with experimental sepsis was reduced when treated with a SphK1 blocker. The SphK1-inhibitor treated mice developed lower systemic inflammation, were protected from multi-organ failure, and had a much more efficient bacterial clearance than untreated mice.

Professor Melendez said: "Inhibitors of SphK1 may become therapeutic agents against this major class of disease which claims the lives of millions of people across the world each year.

"The incidence of sepsis is on the increase and clinical treatments are still inadequate so a medical breakthrough of this kind is timely and will hopefully lead to a way to treat this killer condition."

The team of researchers made the pioneering discovery of the inflammatory mechanism controlled by SphK1 in an earlier study which found the expression and activity of SphK1 is grossly elevated in several immune cells following inflammatory stimulation.

Molecules were then designed to counteract the elevation and it was discovered they restore the cells to a more normal and less pro-inflammatory state. The finding suggested there could be a new treatment for sepsis and possibly other inflammatory diseases.

In the latest study, cutting-edge research technologies were employed by a multinational team of experts in immune cell biology from the UK, Europe and Singapore, who were brought in to share their clinical and scientific experience.

The purpose of the study was to provide sound evidence to better understand how SphK1 may control systemic inflammation and to test whether drugs that target the molecule can successfully treat experimental sepsis.

Provided by University of Glasgow