Researchers find new way of reducing the symptoms of anaphylactic shock

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(PhysOrg.com) -- A method of reducing the impact or symptoms of anaphylactic shock has been identified by university researchers.

The team from Glasgow are the first in the world to pinpoint a molecule which amplifies the allergic reaction and have successfully developed a biological agent to reduce the symptoms.

The breakthrough could lead to a huge reduction in the number of fatal cases of anaphylactic shock across the world.

Anaphylaxis is a severe allergic reaction - the extreme end of the allergic spectrum. Symptoms may include generalised flushing, difficulty in breathing and can result in cardiac arrest and death.

Common causes of anaphylaxis include foods such as peanuts, tree nuts, sesame, fish, shellfish, dairy products and eggs. Non-food causes include wasp or bee stings, natural latex (rubber), penicillin or any other drug or injection.

Led by Dr Alirio Melendez and Prof Eddy Liew, both of the University of Glasgow, the team found that the novel cytokine (immune hormone) - IL-33 - plays a key role in the development of anaphylaxis.

Dr Melendez said: “We looked at a number of patients who had experienced anaphylaxis during surgery and found that they had very high levels of the molecule IL-33.

“IL-33 is a relatively new discovery and its part in anaphylaxis (or any pathology) has not been greatly understood.

“Our study showed that IL-33 plays a pivotal role in hugely increasing the inflammation experienced during a period of anaphylactic shock and led us to understand how to intervene to reduce its impact.

“An anaphylactic shock prompts a massive inflammatory reaction which often is so severe that it constricts breathing. In our study we found that the severity of the shock is linked to the IL-33 molecule, which acts as an amplifier to the inflammatory reaction. This can lead to a fatal constriction of the airway and, ultimately, death.

“Our study suggests that patients with the most severe anaphylactic reactions have very high levels of IL33 in their system.

“In basic terms, without the IL33 molecule, the allergic reaction experienced would be far less severe, greatly reducing the risk of death.”

The findings have been published in the highly respected international journal, Proceedings of the National Association of Sciences of the USA (PNAS).

The team successfully used a mouse model to show that blocking the IL-33 molecule reduces the severity of the attack.

Dr Melendez continued: “We used what is called a soluble receptor to block the influence of the IL-33. Introducing the soluble receptor - ST2 - blocked the inflammatory response normally prompted by IL-33.

“This approach does not stop the allergic reaction altogether. It blocks the amplification of the reaction triggered by IL-33, not the allergic response itself.

“We are now further studying the role of IL-33 in anaphylaxis and similar disorders, and our plans are to further these studies on food, venoms and drugs-mediated anaphylaxis.

“Our current strategy is to utilise the soluble receptor for IL-33 (sST2) to validate as a potential biological agent that can potentially be used to target IL-33 during an anaphylactic shock.

“It takes time to go complete all the regulations to validate and start a clinical trial for such biological.

“At the same time, we are looking at the intracellular signalling mechanisms by which IL-33 stimulates cellular responses in order to identify potential novel target.

“However, this is an important finding on the path to developing better treatments for this serious condition and we are committed to generating a suitable therapeutic to treat anaphylaxis.

The research team are based at the University of Glasgow’s Biomedical Research Centre, within the Division of Infection and Immunology of the Faculty of Medicine.

Lynne Regent, Chief Executive of The Anaphylaxis Campaign, said: "The results of the study, led by Dr Melendez and Prof. Liew at The University of Glasgow, are encouraging. We would hope to see this work developed further to a point where it could be of real benefit to people living with Anaphylaxis or at risk of severe allergic reaction.

“The Anaphylaxis Campaign is fully supportive of this type of reputable research and it will be particularly interesting to see how the findings can be delivered to the allergic population through the provision of adequate allergy services”.

More information: The Anaphylaxis Campaign website provides information for those at risk of anaphylaxis via their Helpline (UK) 01252 542029 or visit www.anaphylaxis.org.uk .

Provided by University of Glasgow