

# Trauma drama: researches investigate 'drama queen' of immune system

August 8 2011

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Kansas State University's Sherry Fleming is investigating the factor that initiates the immune system's "drama queen": the one responsible for intestinal cell damage after hemorrhage.

Fleming, an associate professor in the Division of Biology, is using a \$140,000 grant from the [American Heart Association](#) to identify the molecule responsible for the [overreaction](#) that can cause cell death in the intestines after trauma.

"What's starting this drama queen situation? A 13-year-old girl doesn't usually become a drama queen without a reason. There's something that initiated the drama -- clothes, shoes, make-up, movies, etc.," Fleming said. "With hemorrhage, we're looking for the initiating factor in the drama which occurs after trauma."

After a traumatic event, such as the loss of a limb or severe bleeding, the body cuts off blood flow to the intestines, sending more blood to the [vital organs](#) like the heart, lungs and brain, Fleming said. During that time, cells in the gut release molecular markers to let the body know that they are not getting oxygen.

After the trauma is resolved, blood flow is returned to the gut and a protein in the blood -- known as beta2 [glycoprotein](#) 1 in mice and apolipoprotein H in humans -- binds to the [molecular marker](#) on the cell to notify antibodies that there is a problem. The antibodies then activate a cascade of proteins, known as complement, that normally help the

immune system by killing bacteria and helping rid tissues of [dying cells](#). However, after a trauma this system can overreact and unnecessarily kill healthy cells.

"If you've been in a car accident and sever an arm or start hemorrhaging, you want complement there to protect you from bacteria. So we don't want to stop all complement action entirely," Fleming said.

But Fleming is looking for a way to interrupt the chain of events leading to the over activation of complement following a traumatic event, because [trauma patients](#) often develop further complications throughout their body due to the activation of complement, she said.

"Many times trauma patients who have lost a lot of blood will end up with acute respiratory distress syndrome or multiple organ dysfunction syndrome, due to the complement system overreacting," Fleming said. "So they not only have to deal with the trauma, but also with their immune system attacking things that it shouldn't."

As a possible solution, Fleming and her lab group have developed a peptide that takes the place of the beta2 protein in binding to the molecular marker on the cell's surface, thus preventing the activation of complement.

"This treatment is a promising solution," Fleming said. "The funding from the American Heart Association will give us the opportunity to make major progress in this research."

Provided by Kansas State University

Citation: Trauma drama: researches investigate 'drama queen' of immune system (2011, August 8) retrieved 12 May 2024 from <https://medicalxpress.com/news/2011-08-trauma-drama-queen->

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