

Structure formed by strep protein can trigger toxic shock

April 6 2011



M1 joints (red) and fibrinogen struts (green) form a scaffold. Dense assemblies trigger a pathological response that can lead to toxic shock. Higher resolution image and an additional version with white background available here: <u>http://physicalsciences.ucsd.edu/press/</u>. Credit: Partho Ghosh lab/UC San Diego

Infection with some strains of strep turn deadly when a protein found on their surface triggers a widespread inflammatory reaction.

In a report published April 7 in the journal *Nature*, researchers describe the precise architecture of a superstructure formed when the bacterial protein called M1 links with a host protein, fibrinogen, that is normally involved in clotting blood.

The proteins form scaffolds with M1 joints and fibrinogen struts that



assemble into dense superstructures. Frontline <u>immune cells</u> called neutrophils mistake these thick networks for <u>blood clots</u> and overreact, releasing a chemical signal that can dilate vessels to the point where they leak, the team reports.

"We knew that M1 plus fibrinogen was inflammatory, but how was unknown. By determining the structure of this complex, we were able to identify the characteristics that lead to a sepsis response," said Partho Ghosh, Ph.D., professor of chemistry and biochemistry at the University of California, San Diego who studies the structure of virulence factors and led this project.

Ghosh and colleagues found that the density of the M1-fibrinogen structure was a critical characteristic. Looser structures or separate fibers formed by altered versions of M1 failed to trigger a pathological response.

"This research provides the first snapshot of the interaction between this key bacterial virulence factor and its human target at the <u>atomic level</u>," said Victor Nizet, M.D., professor of pediatrics and pharmacy and a co-author of the report.

Difficult to treat once they set in, the leaking blood vessels and <u>organ</u> <u>failure</u> of strep-induced toxic shock prove fatal for 30 percent of patients. Ghosh and Nizet have a long-standing collaboration aimed at designing treatments to counteract the toxic effects of strep <u>protein</u>.

More information: Streptococcal M1 protein constructs a pathological host fibrinogen network. <u>DOI:10.1038/nature09967</u>

Provided by University of California - San Diego



Citation: Structure formed by strep protein can trigger toxic shock (2011, April 6) retrieved 2 May 2024 from <u>https://phys.org/news/2011-04-strep-protein-trigger-toxic.html</u>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.