

Scientists pinpoint key ingredient in fighting pneumonia

July 19 2012, By Helen Dodson



Credit: Illustration by Michael Helfenbein

(Medical Xpress) -- A mysterious protein produced by a wide spectrum of living things is crucial in regulating the immune response to the most common form of pneumonia, a new Yale School of Medicine study shows. The study appears online in *Cell Host & Microbe* and in the July 19 print issue.

The [protein](#) — present in the blood of every human being – is crucial to a successful [immune system](#) response to the bacteria and also seems to prevent that response from damaging the host, according to the researchers.

“We believe this may be a major cornerstone in our understanding how

we respond to many different kinds of pathogens,” said Dr. Jack A. Elias, chair of the Department of Internal Medicine and senior author of the paper.

The Yale team investigated the protein, which has a number of names including chitinase 3-like-1 (Chi3l1), because it is a member of an ancient family of proteins found in species as diverse as plants, insects, and humans. This evolutionary conservation led researchers to believe that Chi3l1 plays an essential role in these organisms. However little was known about the functions of this protein in health or disease.

The Yale team found that when mice lacking this key protein were exposed to *Streptococcus pneumoniae*, they experienced exaggerated levels of inflammation, suffered much greater damage from inflammation and hemorrhage, and had a higher rate of mortality and sepsis (blood poisoning) than those with the protein. They found that the protein helped immune system cells called macrophages to clear the pathogens from the body.

They also found that Chi3l1 inhibited the innate [immune response](#) and decreased its ability to damage tissue in the host. The latter is particularly important, note the researchers, because an overwhelming innate immune system response contributes to the adverse consequences of infections, such as respiratory failure and sepsis, which are among the highest causes of death in hospitals.

“In recent years there has been a much greater appreciation that the perfect immune system response is one that eliminates bacteria but does not kill the host,” said Dr. Charles Dela Cruz, assistant professor of medicine and lead author of the paper. “This molecule seems to help the organism achieve that balance.”

Provided by Yale University

Citation: Scientists pinpoint key ingredient in fighting pneumonia (2012, July 19) retrieved 9 April 2024 from

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