FAST MOVING FRONTS - 2009

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Jorge E. Galan talks with *ScienceWatch.com* and answers a few questions about this month's Fast Moving Front in the field of Microbiology.

Article: Protein delivery into eukaryotic cells by type III secretion machines
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Journal: NATURE, 444 (7119): 567-573 NOV 30 2006
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SW: Why do you think your paper is highly cited?

One of the most exciting discoveries in the field of bacterial pathogenesis during the past few years has been the finding that many pathogenic or symbiotic bacteria use complex, supramolecular machines to transfer bacterial proteins into eukaryotic cells to modulate their function. There are at least three different types of these machines, which are known as type III, type IV, and type VI protein secretion machines.

Type III secretion systems, the subject of this article, were the first to be discovered and therefore are probably better understood. Since these machines are essential for the pathogenesis or symbiosis of many bacteria, this is a topic of great interest to many scientists.

SW: Does it describe a new discovery, methodology, or synthesis of knowledge?

This article attempted to synthesize the knowledge in the field from the standpoint of the article's authors, myself and my friend and colleague Hans Wolf-Watz of Umeå University. We have been working on these systems since their discovery and consequently have had an opportunity to see the field evolve into what it is today, an extremely exciting area of investigation.

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Type III secretion apparatus.

SW: Would you summarize the significance of your paper in layman's terms?

This paper describes a remarkable protein-delivery device that many pathogenic or symbiotic bacteria utilize to "inject" bacterial proteins into the cells of animals, plants, and even insects. Pathogens need this machine in order to cause disease, therefore its understanding could lead to novel therapeutic avenues.

SW: How did you become involved in this research and were any particular problems encountered along the way?

Both Hans Wolf-Watz and I have been working in this field essentially since its very beginning. Of course, as in any research endeavor, we have encountered many obstacles along the way, which has made it even more challenging and exciting.

SW: Where do you see your research leading in the future?

We are just beginning to gain a mechanistic understanding of these protein delivery machines. We do know all the "spare parts" of these systems and the challenge now is to understand how they function together to do what they do so well: inject bacterial proteins into eukaryotic host cells.

SW: Do you foresee any social or political implications for your research?

Since these machines are central for the pathogenicity of numerous and quite important bacterial pathogens, the understanding of their functionality offers a unique opportunity for the development of novel therapeutic strategies to combat key infectious diseases, among which are typhoid fever, food poisoning, plague, and cholera.

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