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## U.S. Kavli Frontiers of Science

### 19th Annual Kavli Frontiers of Science Symposium

U.S. National Academy of Sciences  
Arnold and Mabel Beckman Center  
November 8-10, 2007  
Irvine, CA

**Inter-kingdom signaling: communication between bacteria and host** [-Presentation](#) 

*Vanessa Sperandio, The University of Texas Southwestern Medical Center*

Please click on the above link to watch the presentation - both slides and audio. This presentation file is in [Adobe Flash player](#) format, available free online.

Bacterial pathogens, such as enterohemorrhagic E. coli (EHEC) serotype O157:H7 that is typical of the new “superbugs”, exploit cell-to-cell signaling between the microbial flora and the host as a means to gage and recognize the host environment. This inter-kingdom signaling is predicated upon hormonal communication, and utilizes the host epinephrine and/or norepinephrine stress hormones and a bacterial aromatic hormone-like signal named autoinducer-3. Any of these signaling molecules can trigger the bacterial QseC membrane-bound sensor kinase (present in at least 20 other important human and plant pathogens). The QseC sensor is the first example of a receptor for both a bacterial and a host signal, thereby functionally integrating bacterial-host signaling at the biochemical level. QseC subsequently relays the presence of these chemical signals to a complex regulatory cascade, leading to transcription of key virulence genes. These transcription events allow pathogens to cause infection in the host. Because of the central role of this signaling system in bacterial pathogenesis, and the presence of this system in a broad array of pathogens, specific inhibitors of this signaling system constitute an innovative approach to antimicrobial development. Hence, we identified specific inhibitors of this signaling system that selectively block QseC’s recognition of these signals without interfering with host cells. Interference with this pathway constitutes a compelling and novel strategy for antimicrobial drug discovery. Further understanding of the molecular mechanisms underlying these signaling events is essential not only for drug discovery, but will also allow the pursuit of inter-kingdom signaling in more

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