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Applications of signaling molecule indole to control biofilm formation and host immunity

A number of bacteria and some plants produce large quantities of indole, which is widespread in animal intestinal tracts and in the rhizosphere. Although it has been known for over a hundred years that many bacteria produce indole, the real biological roles of this molecule are only now beginning to be unveiled. Recently, indole is considered as a signaling molecule and controls diverse aspects of bacterial physiology, such as plasmid stability, antibiotic resistance, spore formation, biofilm formation, and virulence in indole-producing bacteria as well as in non-indole-producing bacteria. Moreover, indole derivatives are naturally abundant in bacteria, plants and animals. Indole and its derivatives are viewed as potential antivirulence compounds against antibiotic-resistant pathogens because of their ability to inhibit biofilm formation, quorum sensing, and virulence factor production. Furthermore, indole modulates oxidative stress, intestinal inflammation and hormone secretion in animals and controls plant defense systems and growth. Insects and nematodes can recognize indole, which controls their behaviors such as chemotaxis, egg-laying behavior and the survival. This presentation covers current knowledge regarding indole and its derivatives and their biotechnological applications and their role in prokaryotic and eukaryotic systems.

Biography

Jintae Lee has completed his PhD from Rutgers University and Post-doctoral studies from Texas A&M University, USA. He is an Associate Professor at Yeungnam University, Korea. He has published more than 100 papers (more than 3800 Google citations) in peer-reviewed journals. His research interests are in the areas of bacterial biofilms, quorum sensing, host-microbe interactions and nanobiotechnology.

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