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Reverting antibiotic tolerance of bacterial persisters by a brominated furanone, (Z)-4-bromo-5-(bromomethylene)-3-methylfuran-2(5H)-one

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Persister cell is a small sub-population of bacterial cells which are tolerant to antibiotic treatment and hence is considered as a major reason for secondary infections and chronic infections. Since persister cell also facilitates the development of antibiotic-resistant mutants, it becomes a potent target to prevent antibiotic resistant infections. Recently, a synthetic analogue of a natural compound, (Z)-4-bromo-5-(bromomethylene)-3-methylfuran-2(5H)-one (BF8) was found to reduce persister formation of *Pseudomonas aeruginosa* and *Escherichia coli* and restore the antibiotic susceptibility of isolated persister cells at growth-non-inhibitory concentrations. In addition, BF8 was also found to reduce the persister formation in the culture of *P. aeruginosa* PDO300, a representative of the strains commonly developed in the late stage of cystic fibrosis.

Interestingly, BF8 was also demonstrated as an inhibitor of bacterial signaling system named quorum sensing, however, a signaling compound of *P. aeruginosa* quorum sensing system, N-(3-oxo-dodecanoyl)-L-homoserine lactone, was also found to restore the susceptibility of isolated persister cells of *P. aeruginosa*.

In the genetic level, a DNA microarray study revealed that BF8 induced genes encoding oxidoreductases in both *E. coli* and *P. aeruginosa* persisters. The results from this study established that BF8 is a promising control of bacterial persistence and also suggested that other targets of BF8 rather than quorum sensing system are responsible for restoring the susceptibility of isolated persister cells.

Biography

Jiachuan Pan has completed her Ph.D. from Syracuse University and in her 5-year study, she found a group of brominated furanones which reduced the antibiotic tolerance in *P. aeruginosa and E. coli*. She contributed four papers as the first author in reputed journals to demonstrate her work in reverting antibiotic tolerance and won a student award from American Society for Microbiology in 2012for her study.

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