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B Moon Kim

Seoul National University, Republic of Korea

Development of potent autoinducer-2 quorum-sensing inhibitors equipped with novel bicyclic brominated furanones against bacterial biofilm formation

Biofilm formation is one of the critical factors affecting bacterial survival in association with bacterial virulence factors. It is effectively regulated through a process called quorum sensing, which is an intra- and interspecies bacterial communication system. According to changes in cell density and species complexity, complex biological responses are triggered through the quorum sensing. Chronic inflammation of the periodontium is one of the most common inflammatory diseases, which is in part caused by subgingival biofilm formation from periodontopathogens. Particularly, the early and late colonizers in periodontal biofilms are linked together by *Fusobacterium nucleatum*, which is thus regarded as a major co-aggregation bridge organism in forming and growing subgingival biofilms. We have previously shown that autoinducer-2 (AI-2) of *F. Nucleatum*, the intergeneric quorum-sensing signal molecule, can be a possible target for the inhibition of periodontal biofilm formation, since it plays a key role in intra- and interspecies interactions of periodontopathogens. Recently, inhibition of biofilm formation via AI-2 by novel brominated furanones originated from marine natural products such as those from macroalga *Delisea pulchra* has been reported, and further studies toward the goal of increasing the inhibition effect have been conducted. Herein, we describe the synthesis and quorum sensing inhibitory activities of new bromofuranone analogs in relation with biofilm formation by periodontopathogens such as *F. nucleatum*, *Porphyromonas gingivalis*, and *Tannerella forsythia*.

Biography

B Moon Kim has completed his PhD and postdoctoral studies at M.I.T. After 5 year experience at Merck Research Laboratories in USA, he took a faculty position at the Chemistry Department of Seoul National University in Seoul, Korea. He was Chemistry Department Chair and Director of the BK21 Chemistry & Molecular Engineering Division at SNU. He has published more than 120 papers and 25 patents and has been serving as an editorial board member of *Bioorganic Medicinal Chemistry* and *Bioorganic & Medicinal Chemistry Letters* and an editor-in-chief of *Bulletin of the Korean Chemical Society*.

kimbm@snu.ac.kr

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