

Clustered Regularly Interspaced Short Palindromic Repeats Interference (CRISPRi): An Approach to Inhibit Microbial Biofilm

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Abstract : Biofilm is a sessile bacterial accretion in which bacteria adapts different physiological and morphological behavior from planktonic form. It is the root cause of about 80% microbial infections in human. Among them, E. coli biofilms are most prevalent in medical devices associated nosocomial infections. The objective of this study was to inhibit biofilm formation by targeting LuxS gene, involved in quorum sensing using CRISPRi. luxS is a synthase, involved in the synthesis of Autoinducer-2(AI-2), which in turn guides the initial stage of biofilm formation. To implement CRISPRi system, we have synthesized complementary sgRNA to target gene sequence and co-expressed with dCas9. Suppression of luxS was confirmed through qRT-PCR. The effect of luxS gene on biofilm inhibition was studied through crystal violet assay, XTT reduction assay and scanning electron microscopy. We conclude that CRISPRi system could be a potential strategy to inhibit bacterial biofilm through mechanism base approach.

Keywords : biofilm, CRISPRi, luxS, microbial

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