Significance of SprX1 and SprB in *S. aureus* Newman

The functional characterization of SprX1 and SprB in this study demonstrates the regulation of virulent factors in the pathogenesis of *S. aureus* Newman. Earlier, SprX was reported to have influence on glycopeptide antibiotic resistance. Here, in this study, the increased level of SprX1 increases the expression of cytotoxin namely delta hemolysin which in turn augments the synthesis of RNAIII level, another multifunctional regulatory RNA. Thus, it can be suggested that SprX1 may regulate the various virulent factors directly or via RNAIII. Recent study also indicates that RNAIII acts co-ordinately with another sRNA SprD in regulating the expression of single virulence factor immunoglobulin binding protein (Sbi) to overcome the host defense mechanisms (Chabelskaya *et al.,* 2014).

Small RNAs are important players in biofilm formation. Small RNAs in other bacteria such as *E. coli, V. cholera, S. typhimurium, P. aeruginosa* have been reported to be involved in biofilm formation (Chambers and Sauer, 2013). The only noncoding RNAs reported so far in staphylococcal biofilm formation are RNAIII and RsaA (Chambers and Sauer, 2013; Romilly *et al*., 2014). SprX is the third ncRNA shown here to be involved in biofilm formation in Newman strain. On the contrary, when SprB is overexpressed, it decreased the biofilm formation and production of staphyloxanthin, and increased the resistance to beta-lactam antibiotics. It is interesting to understand, how these two ncRNAs act differently in regulating the expression of the surface associated adhesin clumping factor B and thereby affecting biofilm formation.

The implication of several ncRNAs in bacterial pathogenesis is well established; however, very few have been demonstrated in *S. aureus* through animal models of infection. When SprX is overexpressed, it enhanced the pathogenicity of *S. aureus* Newman in mice model of infection, however, SprB didnot have any influence on pathogenicity.

Overexpression of ncRNAs permitted tuning the target gene expression by precise base pairing that leads to the modulation of cell physiology. It may be concluded that *S. aureus* controls its pathogenicity by switching the RNA regulator on/off mechanism and thereby maintaining a balance of ncRNA levels in causing infection.