## 5ᵗʰ World Congress on
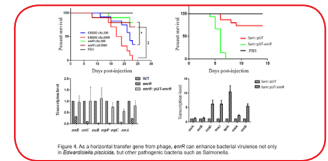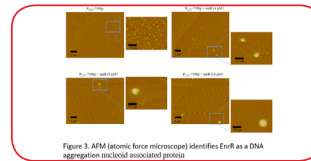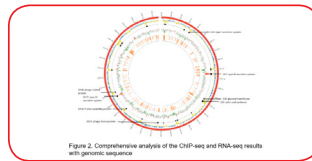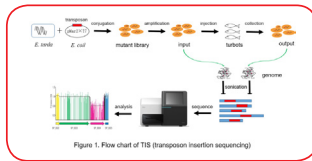# MICROBIAL BIOTECHNOLOGY & VACCINE DESIGN
### September 17-18, 2018 Lisbon, Portugal

## Transposon insertion sequencing identified a novel horizontal transfer nucleoid associated protein regulating virulence

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Horizontal acquired genes play important roles in bacterial chromosome evolution and they are typically grouped together in blocks termed genomic islands. Transposon Insertion Sequencing (TIS) is a powerful high-throughput genetic technology that facilitates exploration of conditionally essential genes. Using this technique, a horizontal acquired gene named enrR was identified in *Edwardsiella piscicida*, which is one of the chief infectious threats for farm-raised fish. The mutant of enrR can decrease the expression of whole T3SS and T6SS gene islands, thereby attenuate its virulence in host. With comprehensive analysis of its function by ChIP-seq and RNA-seq, we discovered an interesting phenomenon that the working areas of protein EnrR in genome are closed to GIs (genomic islands) and EnrR can repress their expression by binding to their nearby regions. We finally identified EnrR as a nucleoid associated protein with non-specific DNA binding ability and DNA aggregation ability *in vitro* and its binding ability with DNA is dependent on the length of DNA fragments. As a horizontal transfer regulator, EnrR can also enhance virulence in Salmonella. Our study discovered a universal significant horizontal-transferred virulence activator, which deepens our understanding for bacterial virulence evolution.



Figure 1. Flow chart of TIS (transposon insertion sequencing)

Figure 2. Comprehensive analysis of the ChIP-seq and RNA-seq results with genomic sequence

Figure 3. AFM (atomic force microscope) identifies EnrR as a DNA aggregation nucleoid associated protein

Figure 4. As a horizontal transfer gene from phage, enrR can enhance bacterial virulence not only in *Edwardsiella piscicida*, but other pathogenic bacteria such as Salmonella.

## Biography

Ruiqing Ma is a PhD student of East China University of Science and Technology focusing on marine pathogenic microorganism. He devotes to identify new virulence regulator using sequencing technology including TIS, ChIP-seq and RNA-seq, which is used for developing new attenuated live vaccine. His project is focused on Edwardsiella piscicida that is a bane for aquaculture industry.

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