Recent advances in the T box riboswitch research

The T box riboswitch is a gene regulation mechanism found mostly in gram-positive bacteria, including many pathogens. As a natural survival response to scarce amino acid supply, the T box riboswitch senses the level of the uncharged tRNA relative to the charged tRNA, and induces transcription read-through upon binding of the uncharged tRNA. As a result, the enhanced expression of the downstream essential genes, i.e. aminoacyl-tRNA synthetase genes, amino acids biosynthesis genes, alleviate amino acids shortage and promote bacterial survival. The facts that the T box riboswitch exists only in bacteria and regulates global protein synthesis make it an intriguing drug target for novel antibiotics. Over the past a few years, several studies significantly advanced the understanding of the T box riboswitch mechanism. The co-crystal structure of tRNA in complex with stem I of the riboswitch provided a better and direct view for the interaction. (1) Another discovery showed that some T box riboswitches can interact with two different tRNA species using overlapping codons to regulate and balance the biosynthesis of two related amino acids.(2)

Key References:
