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2022 SEA Symposium Abstract

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tRNA and its Role in Bacteriophages

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tRNAs are highly structurally conserved molecules that are frequently found in specific clusters of bacteriophages. One tRNA was found in Bacteriophage Dignity of Cluster A based on SEAPHAGE tRNA identification criteria. Research into why tRNA may be found in bacteriophages was conducted. tRNA is usually found in certain areas of the phage genome and appears to serve a role in infecting multiple hosts. One study found that when the DNA’s G to C ratio is different between the bacterial host and the phage, the phages are more likely to contain tRNA in their genome. Another study proposed that tRNA in phage genomes may be lifted from bacterial hosts, but further research is needed. Phage Dignity’s tRNA appears to fit the findings of specific location for tRNA genes in Cluster A, typically found before lysin A and has a 4% G to C ratio difference than its host. Encoding its own tRNA appears to serve a beneficial role in infecting a wider host range, as differences in codon usage between bacterial host and bacteriophage can be overcome by phage-encoded tRNAs.