Polyketide synthase (PKS) pathway modifications offer a limitless diversity of products. Soil microbes, such as the Acidobacteria phylum, are physiologically diverse, however their fastidious nature does not allow them to be easily cultured *in vitro*. These bacteria have been found to be rich in polyketide production and are a desired focus for polyketide discovery, specifically antibiotics compounds. Environmental DNA (eDNA) offers a new route to examine these PKS pathways and assay their antibacterial activity, as well as their potential for antitumor and antiviral properties. eDNA transformed into *Escherichia coli* contain a sequence of genes to be tested for antibiotic activity. These samples are plated against the gram-positive *Bacillus subtilis*, in both liquid and solid media, to determine their antibiotic activity.

Even when these compounds are discovered, their efficacy decreases when the target bacteria develop resistance to their effects. Chimera compounds, utilizing the deoxysugars, loading domains, and PKS pathways of other compound production mechanisms offer an untapped source of novel antibiotics, for which no bacterial resistance has yet to be seen. Erythromycin, a highly-effective antibiotic, has faced resistance from a multitude of prevalent bacteria today. Its synthesis consists of iterative addition of carbonyl groups to form the erythromycin precursor, 6-deoxyerythronolide B (6-dEB). This then undergoes post-translational modification with the addition of two-deoxysugar groups and methyl-hydroxylation. Through the genomic modification of the loading domain and diversifying which molecule the synthesis begins with as well as the sugar groups that are added onto the molecule, novel compounds are formed that can exhibit greater antibiotic activity than erythromycin.