## Genomics of nontuberculous mycobacteria





Plasmids

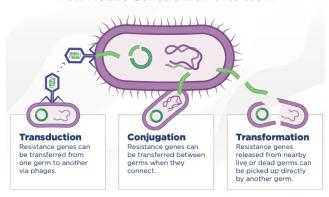


Viruses that attack germs and can carry DNA from germ to germ.

Plasmids
Circles of DNA that can move between cells.

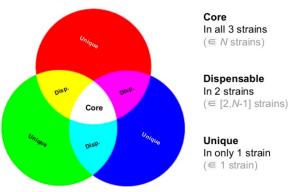
Small pieces of DNA that can go into and change the overall DNA of a cell. These can move from chromosomes (which carry all the genes essential for germ survival) to plasmids and back.

## **How Mobile Genetic Elements Work**

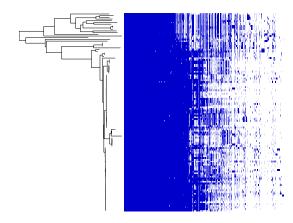


In addition to mutations, mycobacterial genomes also vary their content through mobile elements. Phages, plasmids and transposons introduce and remove genes each generation.

## Three genomes



Mobile elements change the genes present and absent between individual bacteria; so the pangenome includes the genes unique to an individual, genes found in some, and the core genes found in all bacteria within a species.



Pan-genome variation within a mycobacterial species shows that Hawai'i patient and environmental isolates have similar genes gained and lost.