

Genomic Archaeology: Chromosome II in *Agrobacterium* & Its Relatives

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Abstract:

It is rare when the opportunity arises to trace the evolution of a chromosome from scratch, but that is exactly what the multi-partite genome of *Agrobacterium* offers. Previous genetic and physical maps of the *A. tumefaciens* strain C58 genome suggested that the linear chromosome II may have originated from a nonchromosomal element and the complete genome sequence strongly supports a plasmid origin for chromosome II (2-5). In this presentation, we will present bioinformatic, functional and comparative genomics analyses to further characterize chromosome II in terms of its relative conservation during the diversification of the genus, and the origin of its linearity and its relationship to second chromosomes in other α -Proteobacteria. We have evidence for a conserved linear chromosome II in *Rhizobium* strains that fall into the same 16S rRNA gene clade as biovar I strains of *Agrobacterium* (6). We also will present data on the timing of various gene transfers from chromosome I to chromosome II during the diversification of the larger *Agrobacterium/Rhizobium* clade and the linearization of chromosome II, and then discuss the implications of our data on the phylogenetic legitimacy of the *Agrobacterium* genus (7-10). Finally, we will show evidence supporting independent origins of the chromosome II's in the *Brucella* clade versus the *Agrobacterium/Rhizobium* clade (11-12).

References:

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