#54: Comparative Analysis of the Y Chromosome Genomes of Great Apes

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The female genomes of the three hominines - human, chimpanzee and gorilla - have diverged from each other by less than 3%. Yet, the human and chimpanzee male-specific regions of the Y chromosomes (MSYs), the only two sequenced hominine MSYs, are highly divergent with more than 30% of non-homologous sequences. Moreover, we have previously demonstrated that Y-chromosomal X-degenerate genes are better conserved between human and gorilla than between human and chimpanzee. In this study, we are focusing on the comparative analysis of the male-specific regions (MSYs) of the hominine Y chromosomes.

The gorilla Y chromosome sequence has been the missing piece for a thorough investigation of the hominine Y chromosomes. Here, we sequence the whole genome amplified flow-sorted gorilla Y chromosome DNA with both short-read (Illumina) and long-read (PacBio) technologies. Combining existing tools with new methods for extracting and assembling Y-chromosome specific sequences established in our lab, we were able to generate the first draft assembly of gorilla Y chromosome. As a result of our analysis, we estimate the divergence level, gene content, and detect rearrangements among hominine Y chromosomes. Additionally, we study the polymorphism of the Y chromosome in hominine populations by analyzing male-specific microsatellites and copy number variations of ampliconic genes. These insights are important for conservation genetics.