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Title: CENTROMERE POLYMORPHISMS IN DROSOPHILA MELANOGASTER

Abstract: Centromeres are chromosomal regions where kinetochores assemble and spindle fibers attach to coordinate chromosome segregation during cell division. Despite their essential role, centromeres evolve rapidly across species. Although they are typically buried in highly repetitive genome regions, the role of DNA sequences in centromere function and specification is unclear, as they are epigenetically defined by the presence of the histone H3 variant CENP-A. To better understand the role of centromere-associated sequences in centromere function and evolution, we study centromere evolutionary dynamics within *Drosophila melanogaster*. We have recently shown that in *D. melanogaster*, centromeres correspond to islands of retroelements flanked by simple tandem satellite repeats. To ask if those centromere islands are conserved within *D. melanogaster*, we used CUT&Tag to identify CENP-A-enriched DNA in individuals from populations around the globe. We identified the centromere islands, compared their organization and composition amongst the different populations, and validated our observations with FISH on larval brains using oligopaints specific to each centromere island. We tested individuals from 5 populations with different geographical origins and compared them to the reference strain Iso1. Our analyses reveal that both the dot and the X chromosome centromeres are polymorphic between individuals, the reference centromere islands are absent from the genome. Altogether, our results highlight that the DNA sequences underlying centromeres are plastic and can be highly dynamic within species.