Genomic features of individual chromosomes in yellow fever mosquito

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Widespread mosquito *Aedes aegypti* is the primary vector of the yellow fewer and dengue viruses and also a convenient model for laboratory research (Nene et al. 2007). Among other mosquitoe species with sequenced genome, *Ae. aegypti* has the largest genome with the size of 1376 Mb and the highest density of repetitive elements in the genome. About 47% of its genome is represented by transposable elements (TEs). However, the distribution of various repetitive elements along the chromosomes of the mosquito remains unclear. Recently we developed mitotic chromosome-based approach for the physical mapping of the yellow fever genome (Sharakhova et al. 2011). Application of this method resulted in the development of integrated linkage, chromosome, and genome map of 100 BAC clones carrying major genetic markers (Timoshevskiy et al. 2013). BAC clones were placed and ordered on mitotic chromosomes using two-step fluorescent *in situ* hybridization (FISH) mapping (Timoshevskiy et al. 2012). Here we present mapping data for additional 400 BAC clones. From all 500 BAC clones, which have been examined for their chromosome location, 449 we successfully hybridized and mapped to the chromosomes. A total of 294 genomic scaffolds or 619 Mb of *Ae. aegypti* genome were assigned to the particular bands on chromosomes. This study developed a low resolution chromosome map for 45% of *Ae. aegypti* genome: 70 (23%); 142 (48%); and 82 (29%) genomic supercontigs were assigned to the chromosomes 1, 2, and 3, respectively. Supercontigs were not oriented or ordered within chromosome bands. Using bioinformatics we examined the distribution of protein-coding genes, TEs and satellite DNA in three chromosomes of the mosquito. The shortest chromosome 1 had the lowest gene density of 10.07 per 1 Mb and highest content of satellites (6.6%) and TEs (1715.1 per 1

Mb). The longest chromosome 2 had intermediate gene (11.87 per 1 Mb) and satellite (4.79%) densities and the minimal number of TEs per 1 Mb (1579.06). These values for chromosome 3 were 12.85, 4.68%, and 1604.90, respectively. Centromeric regions in all chromosomes demonstrated lower gene densities and higher content of satellites and TEs. These regions usually form small heterochromatic blocks on all three chromosomes. In addition to these areas, region 1q21-1q22 of chromosome 1, which is also characterized by bright staining with YOYO-1 iodide, demonstrated higher densities of satellites and TEs. We considered these 4 regions to be heterochromatin. Currently, the general picture of the distribution of genes, satellites and TEs is rather homogenous among the chromosomes. It does not display any extremely high peaks and low valleys. More detailed physical mapping is required for the better understanding of the relationship between DNA content and chromosomal banding patterns in chromosomes of *Ae. aegypti*. This information will contribute to our more complete understanding of the genome organization and function in the yellow fewer mosquito.

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