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The cytogenetic map of the Nile crocodile (*Crocodylus niloticus*, Crocodylidae, Reptilia) with *in situ* localization of major tandemly arranged repetitive DNAs

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Motivation and Aim: Among other reptiles, Crocodilians demonstrate small diploid chromosome numbers (30–42), little interspecific variation of the chromosome arm number, and the absence of dot-shaped microchromosomes [1]. The Nile crocodile (*Crocodylus niloticus*, 2*n* = 32) karyotype described in 1967 [2] is composed of 20 meta-, six submeta-, and six telocentric chromosome and has a pair of NOR-bearing chromosomes. Since then, no study of the karyotype of this species has been carried out.
Methods and Algorithms: We applied cytogenetic approaches (CBG- [3], GTG- [4], and CDAG-banding [5]) for detailed *C. niloticus* karyotype description. Using low-coverage whole-genome sequencing data and graph-based clustering approach [5] we identified nine prevailing tandemly arranged repetitive elements in the genome of *C. niloticus* and together with 18S/28S-rDNA [6] and telomeric DNA probe [7] applied them as probes for molecular cytogenetic studies.
Results: CBG-banding revealed blocks of pericentromeric heterochromatin on all pairs of chromosomes. Less intensely stained interstitial heterochromatic blocks were found in all chromosomes, except for pairs 4, 7, 9 and 15. Intensive CMA_3-positive pericentromeric blocks were seen in all *C. niloticus* chromosomes except pair 2. Chromosomes 6 and 11 carry large bright CMA_3-positive blocks in p-arms. Weak DAPI-positive blocks were revealed in pericentomeric regions of chromosomes 1 and 2. The 18S/28S-rDNA probe gave the only interstitial signal on the pair 11. Telomeric repeat $(TTTAGG)_n$ marked distal parts of all chromosomal arms and did not demonstrate any interstitial signals. Eight tandemly arranged repeats demonstrated a chromosome-specific cluster organization and were localized mainly in the pericentromeric regions of chromosomes. Cluster 48 contains a dispersed repeat, which forms fairly clear blocks during hybridization in distal region of q-arm of chromosome 1 and in centromeric regions of chromosomes 6, 9, and 11.
Conclusion: An initial physical chromosome map of the Nile crocodile genome based on molecular markers will facilitate further genomic studies in reptile.
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