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Selection and characterization of RNA aptamers targeting the genomic 5'-UTR in the dengue virus

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The increasing number of notifications of dengue infections is becoming a very important concern for global public healthcare programs. Combinatorial technologies aiming the selection of specific short conformational nucleic acid ligands against several biological targets, also known as aptamers, can be achieved by large-scale selections using the genomic SELEX technology. Our hypothesis is that aptamers can be selected directly against conformational structures that act as functional elements in the 5'-UTR sequence of dengue virus (DENV) RNA. These elements form RNA-RNA and protein-RNA interactions and play important roles in the virus RNA replication in the infected cell. Our aim was to select and characterize aptamers that bind to the 5'-UTR using the matrix-free SELEX method and *in silico* analyses. Products from the eighth selection cycle were isolated, cloned and sequenced. Nucleotide sequences from the 24 selected aptamers showed to contain linear motifs that were grouped into three families and motifs of family I, which contains the sequence GGGGG or similar sequences with a single substitution with either A or U at any position, were detected more frequently. Fourteen ligands were chosen for *in silico* prediction of secondary structure and revealed presence of loops/hairpins that might be potential regions for interaction with the DENV-1 and -3 RNAs, which may lead to the loss of their original conformation and prevent the viral RNA replication and/or transcriptional process. This is the first description of aptamers against RNA elements of the dengue virus genome that may have important implications in the disease control, since they may be useful for the development of antivirals or of reagents for diagnostic tests.

Biography

Adriana Freitas Neves completed his PhD at the age of 30 years from Universidade Federal de Uberlandia, Laboratory of Nanobiotechnology, Minas Gerais, Brazil. She is professor of Universidade Federal de Goiás, Brazil, and coordinates of the Molecular Biology Laboratory, developing work with prostate cancer and infectious diseases. She has published more than 23 papers in reputed journals.

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