

### Polymorphism of rabies virus nucleoprotein from samples isolated in the Rio de Janeiro state, Brazil\*

*Polimorfismo da nucleoproteína do vírus da raiva de amostras isoladas no Estado do Rio de Janeiro*

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Rabies virus belongs to genus *Lyssavirus* of the family *Rhabdoviridae*. The viral nucleoprotein is responsible for several functions in viral particle such as, packing and protects the RNA genome, and participates of transcription and replication of genome. Rabies cause large loss in livestock industry from Rio de Janeiro State, Brazil. All regions of the State are affected by rabies virus transmitted by vampire bat. This work aims to evaluate the changes between the sequences of the nucleoprotein of rabies virus isolated in Rio de Janeiro State. The nucleoprotein gene of 32 samples was sequenced. The sequences length were 1,301 nucleotide, that encoding 433 amino acids. These sequences were aligned with reference sequence Pasteur virus fixed strain (PV GenBank accession number M13215), using ClustalW method. The nucleotide and amino acid polymorphism were analyzed manually using the BioEdit software. Among the samples of herbivores were showed 95 (7,30%) positions with mutation of nucleotides. When comparing the 32 samples of herbivores with PV (GenBank M13215), we observed that there were 257 (19,75%) positions with mutation. Replacements of the transition type were more frequent than the transversion type. Mutations in third nucleotide of the codon were more frequent than in first and second nucleotide. Among the sequences of amino acid from herbivores were showed 13 positions of amino acid substitution. It was observed an increase of 21 replacement of amino acid when the herbivores sequences were compared with PV, totalizing 34 amino acid mutations. The samples of rabies virus show high polymorphism of its nucleotides, but at the level of amino acid the polymorphism is low and even when there are changes in many cases amino acid replacement occurs by the same biochemical amino acid group. Thus the mutations found among the samples have little difference in functionality of the protein, but the nucleotide mutations can be used in rabies epidemiological studies.

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### Shelters of vampire bats: identifying and mapping in rural areas of Rio de Janeiro and Espírito Santo states, Brazil\*

*Abrigos de morcegos hematófagos: identificação e mapeamento em áreas rurais dos Estados de São Paulo e Espírito Santo*

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In Brazil, there are 150 species of bats, all of them from suborder *Microchiroptera*. Three of them correspond to vampire bats: *Desmodus rotundus*, *Diphylla ecaudata* and *Diaemus youngi*. The common vampire bat *D. rotundus* has been the main reservoir of rabies virus in rural areas. Shelters of bats can be classified as natural or artificial. The study was conducted between 2008 and 2011. Twenty-one shelters were mapped with a GPS unit. *D. rotundus* were captured in nine field trips, using mesh nets set up in front of shelters. Ten shelters were mapped in Campos dos Goytacazes; six were artificial and four were natural; they were located at S22°00'26,4"-W041°40'00,3"/S21032'14,7"-W041020'31,3"/S21048'31,2"-W041038'20,7"/S21048'29,4"-W041038'22,0"/S22000'40,6"-W041039'98,0"/S21057'53,2"-W041027'59,0"/S21058'18,3"-W041027'03,2"/S21047'09,6"-W041014'00,8"/S21046'02,6"-W041035'44,0"/S21047'54,2"-W041036'28,2". Six shelters were found in Cardoso Moreira; half of them were artificial, and the other half were natural; they were located at S21032'07,5"-W041035'46,9"/S21032'29,0"-W041036'31,8"/S21027'29,4"-W041034'36,2"/S21026'43,7"-W041033'43,1"/S21030'28,7"-W041027'20,5"/S21032'29,9"-W041036'31,8". Two shelters were mapped in Miracema; one was natural, and the other was artificial; their location was S21°23'39,3"-W042°04'32,4"/S21019'29,1"-W042007'49,1". One shelter was found in Quissamã; it was artificial and located at S22°05'15,7"-W041°41'20,2". Another shelter was found in Bom Jesus do Norte; it was artificial and located at S21°06'45,8"-W041°40'55,6". The last shelter was mapped in Italva; it was natural and located at S21°27'06,4"-W041°43'34,2". In a field trip to Campos dos Goytacazes (S22°00'26,4"-W041°40'00,3"), four male bats were captured. In Miracema (S21°23'39,3"-W042°04'32,4"), 28 males and 23 females were captured in three field trips. In Quissamã, 117 bats (59 males and 58 females) were captured in three field trips too. In a field trip to Bom Jesus do Norte, 26 males and 46 females were captured. In the last field trip, to Italva, one male and 13 females were captured. All mapped shelters were located in rural areas (distant from urban centers), and most of them were far from human habitations. Most shelters were artificial, showing the direct influence of humans on the spread of bats. All field trips were made during the day, except the one to Bom Jesus do Norte, made at night. In Italva, one vampire bat *D. ecaudata* was found. A total of 263 bats were captured. Vampire bats play an important role in rabies transmission, then the identification and mapping of their shelters are essential to control the rural cycle of the disease.

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### Diagnóstico molecular por PCR de ectima contagioso em caprinos e ovinos

*Molecular diagnosis by PCR of contagious ecthyma in goat and sheep*

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