

The Virome of a New World Primate Unveils a Retrovirus that Causes Immunosuppression

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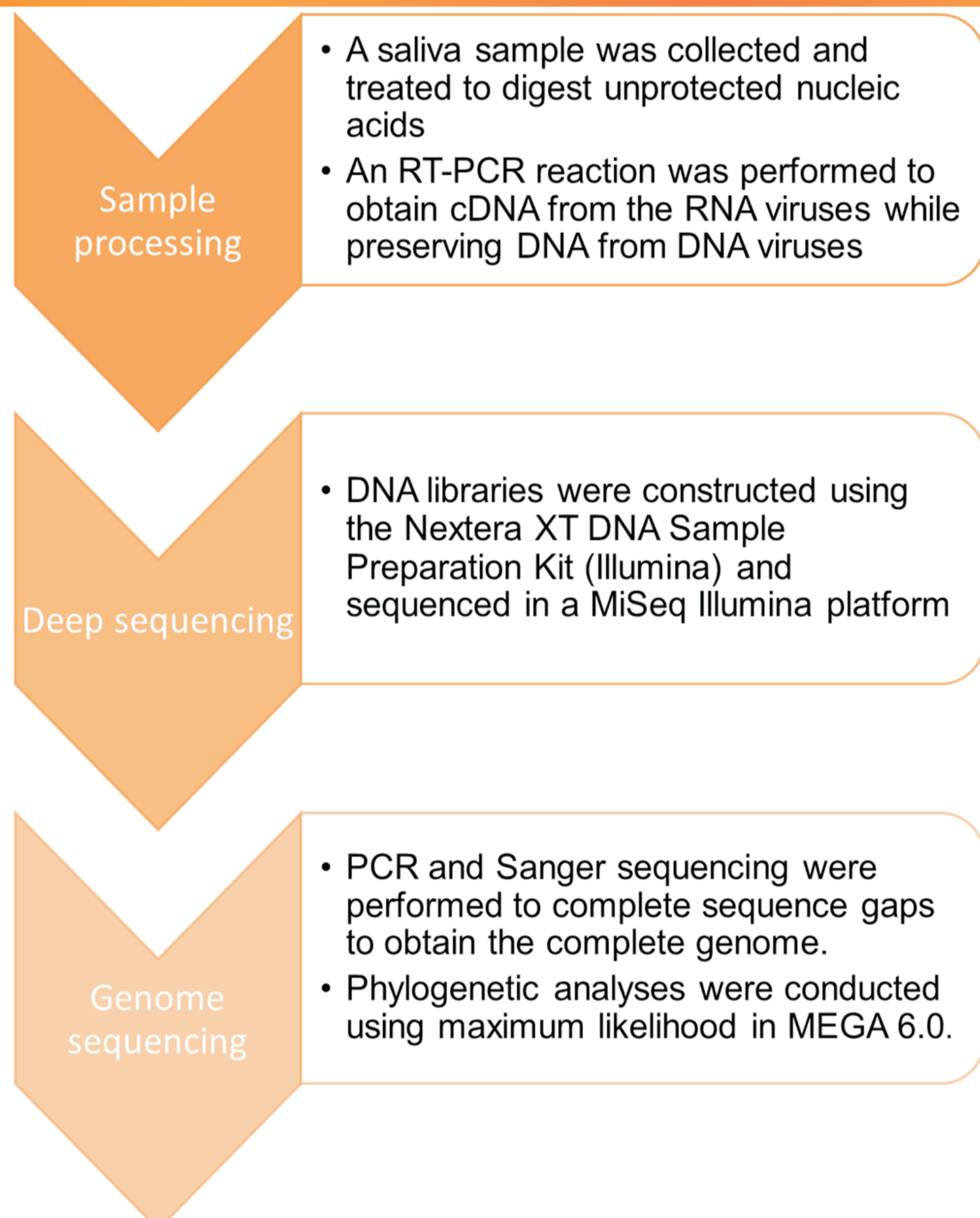
ABSTRACTS

The natural reservoirs for some viruses that cause diseases in humans are still controversial, with several hypotheses raising the possibility of cross-species transmission of viruses from non-human primates (NHPs) to man. For this purpose, it is extremely important to characterize viral infections in NHP. A colony of *Brachyteles arachnoides*, a New World primate (NWP) species hosted at Centro de Primatologia of Rio de Janeiro (CPRJ), Brazil, has been affected by a disease of unknown cause. To identify putative viral agents that possibly led to this disease, specimen # 2506 was selected for this study. A saliva sample was collected to sequence its virome in a MiSeq Illumina platform. PCR and Sanger sequencing were performed to obtain the complete genome. The complete genomes of a simian foamy virus (SFV) and of a simian retrovirus (SRV) that infect the specimen were sequenced. Phylogenetic analyses showed that SFV from *B. arachnoides* grouped with NWP SFV and the SRV found grouped with SRV from Asian macaques. The SRV described in this study is the first exogenous retrovirus able to cause immunosuppression identified so far in a NWP, leading to its death.

INTRODUÇÃO

Several pathogens are already described and yet, an entirely new world remain to be discovered. Currently, the discovery of new viruses is possible due to deep sequencing technologies. Our group has recently applied such technologies to discover novel viruses that circulate in neotropical primates (NWP) and to evaluate the risk of zoonotic transmission to humans. The Centro de Primatologia of Rio de Janeiro (CPRJ), Brazil, shelters a wide NWP diversity. One species housed at CPRJ is *Brachyteles arachnoides* (Southern muriqui) that belongs to the Atelidae family. In the last years, some specimens from this colony showed clinical signs similar to those observed in immunosuppressive conditions. The specimen # 2506 from this colony showed clinical signs such as fungal and bacterial skin diseases, loss of hair, weight loss, weakness and prostration. It was treated with antifungal and antibiotics without success, and the animals eventually died. The clinical signs were temporary and relapsing. In order to identify the viral agents that possibly led these NHPs to death, specimen # 2506 was selected for this study.

METHODS



RESULTS



Figure 1. Specimen # 2506 appearance in sick (left) and healthy (right) conditions. Clinical signs such as loss of hair, weight loss and skin wounds can be observed in the left.

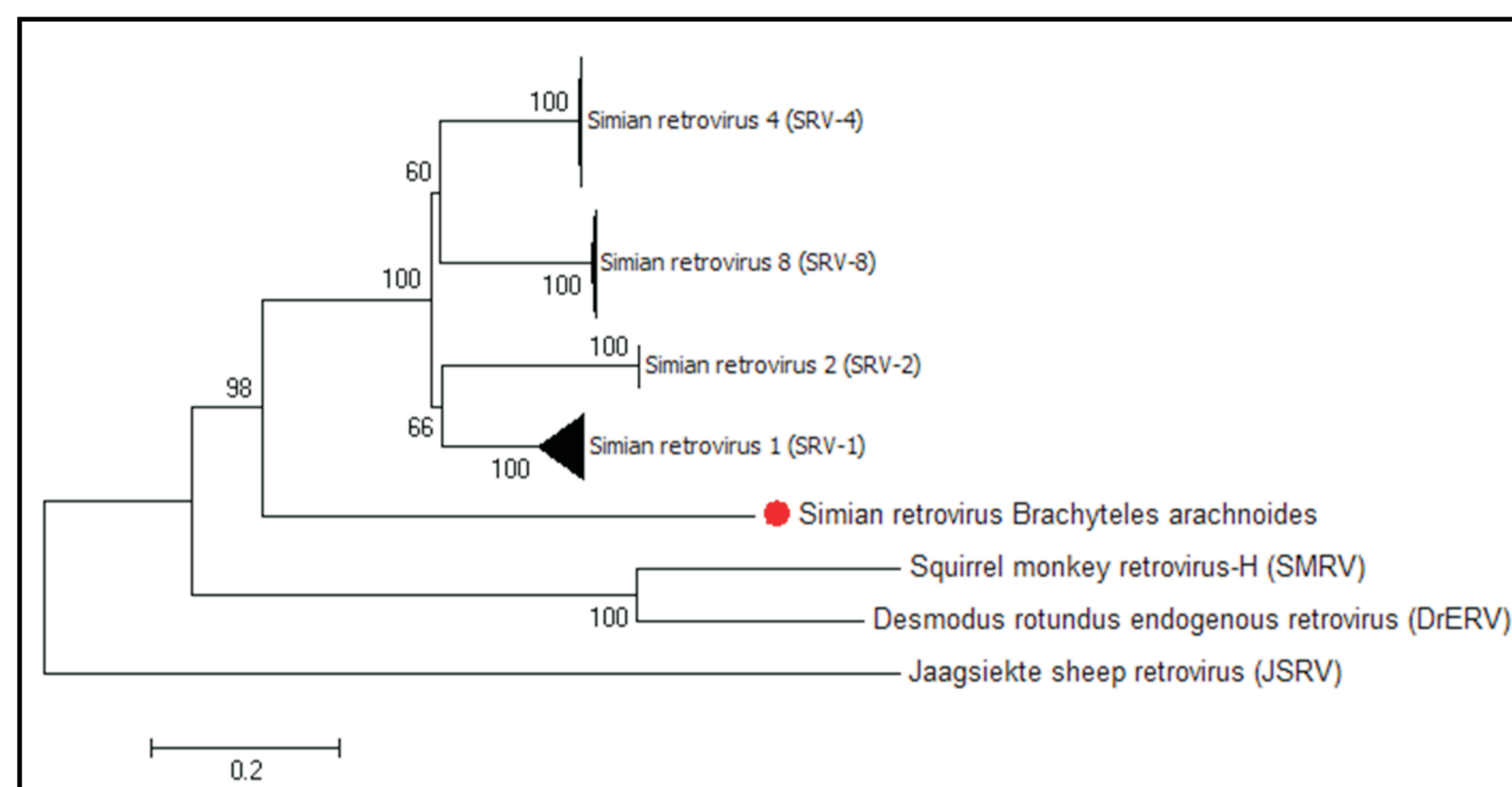


Figure 2. Phylogenetic inference of complete genome from a simian retrovirus isolated with related sequences available in GenBank using Maximum Likelihood inference. Simian retroviruses 1, 2, 4 and 8 were isolated from macaques. SMRV isolated from squirrel monkeys, a New World primate, grouped with DrERV isolated from bat, and both are endogenous retrovirus. The newly characterized SRV lineage SFVbar is indicated by a red dot. The JSRV is

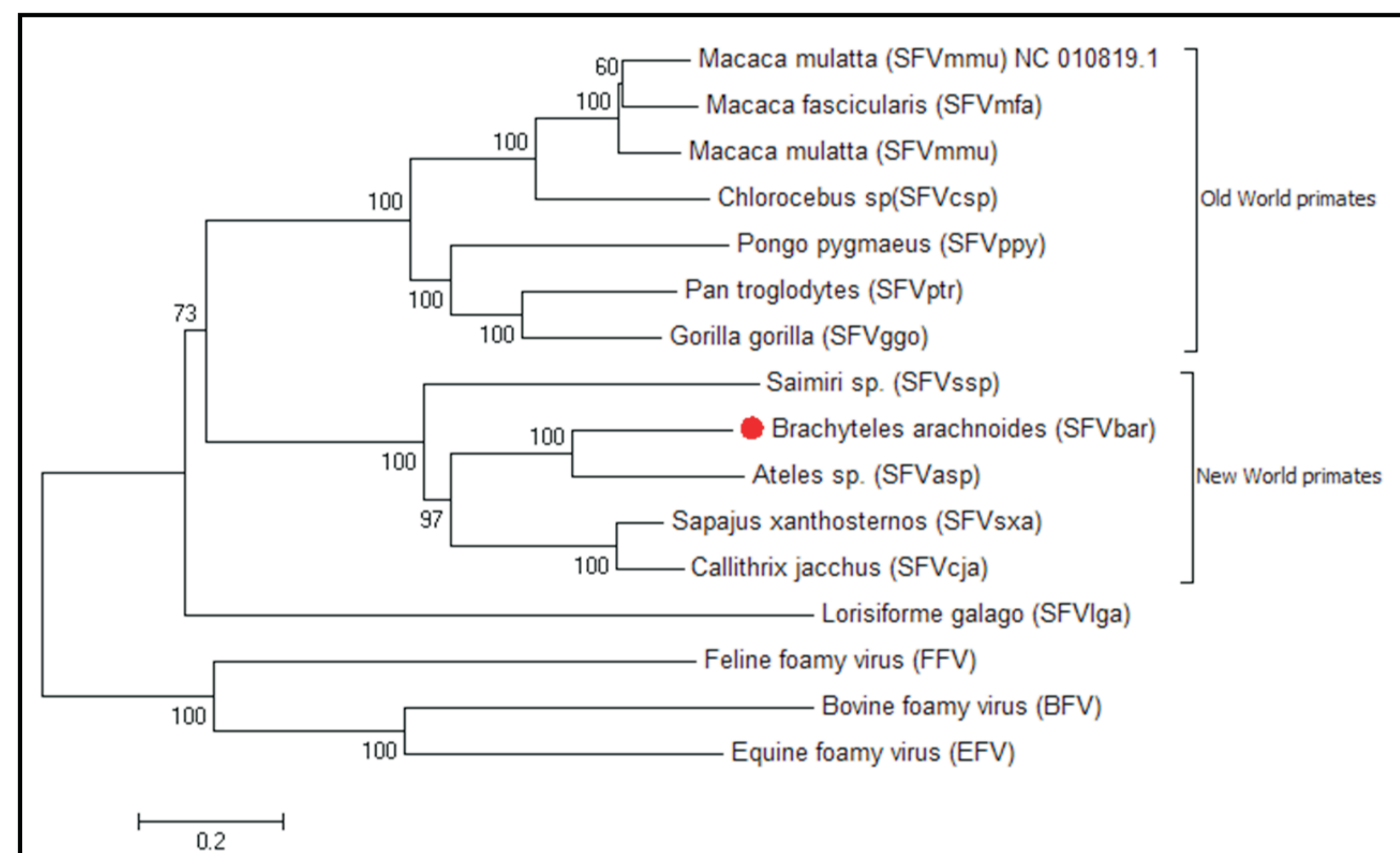


Figure 3. Phylogenetic inference of complete genome of exogenous foamy virus available at GenBank using Maximum Likelihood inference. The newly characterized SFV lineage SFVbar is indicated by the red dot and grouped with New World primates SFV, corroborating the cospeciation hypothesis for this group.

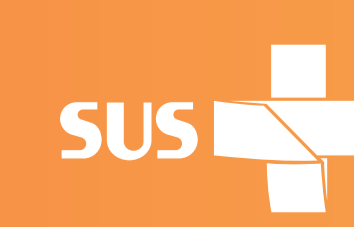
RESULTS

- For the first time, the complete genomes of a simian foamy virus and of a simian retrovirus from *Brachyteles arachnoides* were obtained.
- The simian foamy virus from *B. arachnoides* grouped with New World primate SFV, corroborating the cospeciation hypothesis for this group of viruses.
- The simian retrovirus infecting *B. arachnoides* grouped with SRV from Asian macaques and the clinical signs observed in specimen # 2506 were similar to those found in sick Asian macaques infected by SRV.
- The SRV described in this study is the first exogenous retrovirus able to cause immunosuppression identified in a NWP.

Partner



Projeto Gráfico: Área de Edição e Produção de Materiais Técnico-Científicos / INCA



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