

the present study, PARV4 and PARV5 have been identified in blood samples obtained from persons from the United Kingdom. For parvovirus B19, there is evidence of persistent virus infection, at low levels, in bone marrow of previously exposed persons (7) and in plasma of immunocompromised and immunocompetent persons (8,9). There is also evidence for the lifelong persistence of parvovirus B19 (genotypes 1 and 2) in tissues such as skin and synovia (10). PARV4 and PARV5 virus genomes share only limited homology with parvovirus B19 (<30% amino acid similarity). Although they have been detected in blood and plasma, nothing is known about the role of these viruses in human disease or their ability to persist in infected persons, healthy or otherwise. Further studies will be required to determine the prevalence of PARV4 and PARV5 in healthy persons compared with its prevalence in those with chronic infections and at high risk, such as IVDUs, and to investigate the nature of persistence of these novel viruses.

Jacqueline F. Fryer,\*  
 Sebastian B. Lucas,†  
 David Padley,\*  
 and Sally A. Baylis\*

\*National Institute for Biological Standards and Control, Potters Bar, United Kingdom; and †Saint Thomas' Hospital, London, United Kingdom

## References

1. Tattersall P. The evolution of parvovirus taxonomy. In: Kerr JR, Cotmore SF, Bloom ME, Linden RM, Parrish CR, editors. Parvoviruses. London: Hodder Arnold; 2006. p. 5–14.
2. Jones MS, Kapoor A, Lukashov VV, Simmonds P, Hecht F, Delwart E. New DNA viruses identified in patients with acute viral infection syndrome. *J Virol*. 2005;79:8230–6.
3. Allander T, Tammi MT, Eriksson M, Bjerkner A, Tiveljung-Lindell A, Andersson B. Cloning of a human parvovirus by molecular screening of respiratory tract samples. *Proc Natl Acad Sci U S A*. 2005;102:12891–6.
4. Baylis SA, Shah N, Minor PD. Evaluation of different assays for the detection of parvovirus B19 DNA in human plasma. *J Virol Methods*. 2004;121:7–16.
5. Fryer JF, Kapoor A, Minor PD, Delwart E, Baylis SA. Novel parvovirus and related variant in human plasma. *Emerg Infect Dis*. 2006;12:151–4.
6. Padley DJ, Lucas SB, Saldanha J. Elimination of false-negative hepatitis C virus RNA results by removal of inhibitors in cadaver-organ donor blood specimens. *Transplantation*. 2003;76:432–4.
7. Heegaard ED, Petersen BL, Heilman CL, Hornsleth A. Prevalence of parvovirus B19 and parvovirus V9 DNA and antibodies in paired bone marrow and serum samples from healthy individuals. *J Clin Microbiol*. 2002;40:933–6.
8. Flunker G, Peters A, Wiersbitzky S, Modrow S, Seidel W. Persistent parvovirus B19 infections in immunocompromised children. *Med Microbiol Immunol (Berl)*. 1998;186:189–94.
9. Lefrere JJ, Servant-Delmas A, Candotti D, Mariotti M, Thomas I, Brossard Y, et al. Persistent B19 infection in immunocompetent individuals: implications for transfusion safety. *Blood*. 2005;106:2890–5.
10. Norja P, Hokynar K, Aaltonen LM, Chen R, Ranki A, Partio EK, et al. Bioportfolio: lifelong persistence of variant and prototypic erythrovirus DNA genomes in human tissue. *Proc Natl Acad Sci U S A*. 2006;103:7450–3.

Address for correspondence: Sally A. Baylis, Division of Virology, National Institute for Biological Standards and Control, Blanche Lane, South Mimms, Potters Bar, Hertfordshire, EN6 3QG, United Kingdom; email: sbaylis@nibsc.ac.uk

## Saint Louis Encephalitis Virus, Brazil

**To the Editor:** Saint Louis encephalitis virus (SLEV), a member of the *Flaviviridae* family, is widely dispersed in the Americas (1,2). In Brazil, SLEV was first isolated in the 1960s from a pool of mosquitoes at the

Amazon Basin. Subsequently, the virus was repeatedly isolated from animals and arthropods in the Amazon region and São Paulo state (3). Nonetheless, isolation of SLEV from humans is rare; only 2 isolates from humans were described before 2005. Each isolate was from a patient who had jaundice and febrile illness without any neurologic symptoms (1,3). Recently in São Paulo, SLEV was isolated from a patient who had an incorrect diagnosis of dengue fever (2,4).

Despite the rare isolation of SLEV from humans, antibodies to this virus have been found in ≈5% of studied populations in the north and southeast regions of Brazil. However, because of antibody cross-reactivity among different flaviviruses and the fact that this population is vaccinated against yellow fever and exposed to dengue virus (DENV), such results should be interpreted carefully. Nevertheless, in these areas, SLEV may circulate and infect humans, although most infections are undiagnosed (1,3,5).

In contrast to previous instances in which the disease was detected in only 1 patient, we describe the first community outbreak of SLEV in Brazil. The outbreak was detected in São José do Rio Preto (population 400,000), in northwest São Paulo state. This outbreak was concurrent with a large outbreak of DENV serotype 3 (DENV-3), which occurred during the first half of 2006, with >15,000 possible cases reported to public health authorities. During this time, we were involved in an epidemiologic study to monitor the disease. We tested ≈250 samples for DENV, and 65% were positive. We tested for SLEV only those patients who were in our hospital or those who were referred to us for SLEV testing after an initial diagnosis of SLEV or DENV. The protocol approved by our ethical committee allowed us to test only samples from these patients (process no. 300/2004).

We used a multiplex nested reverse transcription-PCR (RT-PCR) assay to identify the most common flaviviruses in Brazil (DENV-1, DENV-2, DENV-3, yellow fever virus) as well as DENV-4, Ilheus virus, Iguape virus, Rocio virus, and SLEV. Of 54 samples (49 serum and 5 cerebrospinal fluid [CSF]) that were negative for DENV and yellow fever virus, SLEV RNA was detected in 6 (4 serum and 2 CSF) (6). RT-PCR results were negative for all other tested flaviviruses. Sequences of the amplified SLEV cDNAs from the 2 CSF samples were determined by using an ABI377 automated sequencer (Applied Biosystems, Foster City, CA, USA). The resulting sequences (GenBank accession nos. DQ836336 and DQ836337) were identical and showed 96% homology to an Argentinean SLEV isolate (AY6-32544). All 6 SLEV-infected patients had an initial diagnosis of dengue fever or viral encephalitis; 3 had a diagnosis of viral meningoen- cephalitis, and the other 3 had signs of hemorrhagic disease (Table).

Dengue is widely disseminated in Brazil and causes large outbreaks almost every year. The high preva-

lence of antibodies in the Brazilian population (1,3,6) suggests that SLEV infections are being misdiagnosed; its importance is underestimated. Brazil has no SLEV surveillance programs, and health professionals do not usually consider SLEV among their differential diagnoses. This SLEV outbreak was detected in a large urban center and was not specifically linked to patients who dwell in pockets of tropical forests, as previously reported (1-4).

This outbreak may represent the first time that hemorrhagic signs have been linked to SLEV infections. SLEV-associated hemorrhagic manifestations have not been reported in the literature. However, of our 6 SLEV-infected patients, 3 had hemorrhagic signs. Substantiating a causal link between SLEV infection and such clinical manifestations is difficult because DENV is endemic in the studied region (7). Possibly, SLEV-infected patients with hemorrhagic signs may have been previously infected by DENV. No reports have linked hemorrhagic manifestations to sequential DENV and SLEV infections; this possible link needs to be carefully evaluated.

In Argentina, SLEV has been isolated several times from animals (8). In some regions, SLEV seroprevalence in humans is  $\approx$ 13% (9), but the number of documented human infections is small (10). These findings indicate either that SLEV is more prevalent than reported or that SLEV is reemerging. The Brazilian cases may parallel the situation in Argentina.

Our results clearly indicate an SLEV outbreak among this local population in Brazil. This outbreak differs from isolated infections previously described and indicates that this disease may be more prevalent in Brazil. In fact, the number of samples tested for SLEV during this DENV outbreak was relatively small. Had more samples been investigated, more cases of SLEV infection might have been found. A more comprehensive epidemiologic study is required to fully assess the magnitude of SLEV infection in Brazil.

This work was supported by grants from Conselho Nacional de Desenvolvimento Científico e Tecnológico (0401396/2004-5) to M.L.N. and Fundação

Table. Clinical data, 6 patients with Saint Louis encephalitis, Brazil, 2006\*

Patient no. (age)	Sample tested by RT-PCR	Date of hospital admission	Initial diagnosis at admission	Signs, symptoms, selected laboratory results
1 (27 y)	Serum	Feb 25	Dengue fever	Clinical: fever, abdominal pain, diarrhea Serum: AST 58 IU/mL, ALT 69 IU/mL
2 (7 mo)	Serum	Mar 06	Dengue hemorrhagic fever, viral encephalitis	Clinical: fever, abdominal pain, melena, petechiae, positive tourniquet test Serum: platelets 311,000/mm <sup>3</sup> , hematocrit 29% CSF: 13 cells/mm <sup>3</sup> , lymphocytes 86%, monocytes 14%
3 (37 y)	Serum	Apr 22	Dengue hemorrhagic fever	Clinical: fever, headache, chills, myalgia, maculopapular rash, positive tourniquet test Serum: hematocrit 43%, platelets 280,000/mm <sup>3</sup> History: previous DENV infection (2002)
4 (34 y)	Serum	Apr 23	Dengue hemorrhagic fever	Clinical: fever, headache, chills, myalgia, maculopapular rash, positive tourniquet test Serum: platelets 141,000/mm <sup>3</sup> , hematocrit 38%, AST 81 IU/mL, ALT 56 IU/mL
5 (5 y)	CSF	Jun 05	Viral meningoen- cephalitis	Clinical: fever CSF: 286 cells/mm <sup>3</sup> , lymphocytes 60%, polymorphonuclear cells 37%, eosinophils 3%
6 (11 y)	CSF	Jun 07	Viral meningoen- cephalitis	Clinical: fever, facial palsy CSF: 12 cells/mm <sup>3</sup> , lymphocytes 100%

\*RT-PCR, reverse transcription-PCR; AST, aspartate aminotransferase; ALT, alanine aminotransferase; CSF, cerebrospinal fluid; DENV, dengue virus.

de Amparo à Pesquisa do Estado de São Paulo (FAPESP) (04/11098-2, 06/0170-9, and 03/03682-3) to M.L.N., F.C.N., and L.T.M.F., respectively. R.V.M.B. and I.L.S.C. received fellowships from FAPESP (grants 05/03260-7 and 06/00179-7). This work was supported by the Viral Diversity Genetic Network (VGDN-FAPESP-Brazil).

**Adriano Mondini,\*<sup>1</sup>**

**Izabela Lúcia Soares Cardeal,\*<sup>1</sup>**

**Eduardo Lázaro,† Silva H. Nunes,\***

**Cibele C. Moreira,\* Paula Rahal,‡**

**Irineu L. Maia,\*§ Célia Franco,\*§**

**Delzi V. N. Góngora,\*§**

**Fernando Góngora-Rubio,\*§**

**Eliana Márcia Sotello Cabrera,\*§**

**Luiz Tadeu Moraes Figueiredo,¶**

**Flavio Guimarães da Fonseca,#**

**Roberta Vieira Moraes Bronzoni,\***

**Francisco Chiaravalloti-Neto,\***

**and Maurício Lacerda Nogueira\*§**

\*Faculdade de Medicina de São José do Rio Preto, São José do Rio Preto, São Paulo, Brazil; †Secretaria Municipal de Saúde, São José do Rio Preto, São Paulo, Brazil; ‡Universidade Estadual Paulista, São José do Rio Preto, São Paulo, Brazil; §Hospital de Base de São José do Rio Preto, São Paulo, Brazil; ¶Universidade de São Paulo, Ribeirão Preto, São Paulo, Brazil; and #Universidade Federal de Minas Gerais, Belo Horizonte, Minas Gerais, Brazil

## References

1. Figueiredo LT. The Brazilian flaviviruses. *Microbes Infect.* 2000;2:1643–9.
2. Rocco IM, Santos CL, Bisordi I, Petrella SM, Pereira LE, Souza RP, et al. St. Louis encephalitis virus: first isolation from a human in São Paulo state, Brazil. *Rev Inst Med Trop Sao Paulo.* 2005;47:281–5.
3. Vasconcelos PFC, Travassos da Rosa APA, Pinheiro FP, Shope RE, Travassos da Rosa JFS, Rodrigues SG, et al. Arboviruses pathogenic from man in Brazil. In: Travassos da Rosa APA, Vasconcelos PFC, Travassos da Rosa, JFS, editors. An overview of arbovirology in Brazil and neighboring countries. Belém (Brazil): Instituto Evandro Chagas; 1998. p. 72–99.
4. Santos CL, Sallum MA, Franco HM, Oshiro FM, Rocco IM. Genetic characterization of St. Louis encephalitis virus isolated from human in São Paulo, Brazil. *Mem Inst Oswaldo Cruz.* 2006;101:57–63.
5. de Sousa Lopes O, de Abreu Sacchetta L, Coimbra TL, Pereira LE. Isolation of St. Louis encephalitis virus in South Brazil. *Am J Trop Med Hyg.* 1979;28:583–5.
6. de Moraes Bronzoni RV, Baleotti FG, Ribiera Nogueira MR, Nunes M, Moraes Figueiredo LT. Duplex reverse transcription-PCR followed by nested PCR assays for detection and identification of Brazilian alphaviruses and flaviviruses. *J Clin Microbiol.* 2005;43:696–702.
7. Mondini A, Chiaravalloti-Neto F, Gallopy-Sanches M, Lopes JCC. Spatial analysis of dengue transmission in a medium-sized city in Brazil. *Rev Saude Publica.* 2005;39: 444–51.
8. Sabattini MS, Aviles G, Monath TO. Historical, epidemiological and ecological aspects of arbovirus in Argentina: Flaviviridae, Bunyaviridae and Rhabdoviridae. In: Travassos da Rosa APA, Vasconcelos PFC, Travassos da Rosa JFS, editors. An overview of arbovirology in Brazil and neighbouring countries. Belém (Brazil): Instituto Evandro Chagas; 1998. p. 113–134.
9. Spinsanti LI, Re VE, Diaz MP, Contigiani MS. Age-related seroprevalence study for St. Louis encephalitis in a population from Cordoba, Argentina. *Rev Inst Med Trop Sao Paulo.* 2002;44:59–62.
10. Spinsanti L, Basquiera AL, Bulacio S, Somale V, Kim SC, Re V, et al. St. Louis encephalitis in Argentina: the first case reported in the last seventeen years. *Emerg Infect Dis.* 2003;9:271–3.

Address for correspondence: Maurício Lacerda Nogueira, Laboratório de Pesquisas em Virologia, Departamento de Doenças Infecciosas e Parasitárias, Faculdade de Medicina de São José do Rio Preto, FAMERP, Av. Brigadeiro Faria Lima 5416, São José do Rio Preto, SP, Brazil 15090-000; email: mnogueira@famerp.br



<sup>1</sup>These authors contributed equally to this work.

## *Cryptococcus gattii* Risk for Tourists Visiting Vancouver Island, Canada

**To the Editor:** An unprecedented outbreak of *Cryptococcus gattii* genotype amplified fragment length polymorphism (AFLP) 6/VGII on Vancouver Island, British Columbia, Canada, is affecting both human and animal hosts with normal immunity (1–3). So far, >100 human cases, including at least 6 fatalities, have been reported by the British Columbia Centre for Disease Control (4), ([www.bccdc.org](http://www.bccdc.org), [www.cbc.ca](http://www.cbc.ca)). Vancouver Island is a major tourist destination, with ≈7.5 million visits each year ([www.bcstats.gov.bc.ca](http://www.bcstats.gov.bc.ca)). We report the first known intercontinental transmission of *C. gattii* from this outbreak in a tourist from Denmark who visited Vancouver Island. This case indicates a potential risk for tourism-related acquisition.

A 51-year-old, HIV-negative, apparently immunocompetent man from Denmark, with known psoriatic gout and under treatment with a nonsteroidal antiinflammatory drug, was admitted to a hospital in Herning, Denmark, with chest pain radiating to the left shoulder and arm, lasting for 1 day. Six weeks before his admission, he returned to Denmark from a 3-week trip to Canada, during which he visited Victoria and surrounding areas on the eastern coast of Vancouver Island for 7 days. During their stay, the patient and his 3 fellow travelers visited gardens and studied the local natural vegetation.

During his stay in Canada, the patient had no symptoms, and symptoms had not developed in any of his family members as of October 2006. On admission to the hospital, his temperature was 38.2°C, and a chest radiograph showed 3 large nodular infiltrates suspect for malignancy or abscesses. Neither bacterial nor