40 | SPUMAVIRUS (SIMIAN FOAMY VIRUS)

This fact sheet is archived and will not be further updated without further evidence that the pathogen poses a threat in the context of transfusion medicine.

40.1 | Disease agent

- Simian foamy virus (SFV)

40.2 | Disease agent characteristics

- Family: *Retroviridae*; Subfamily: *Spumaretrovirinae*; Genus: *Spumavirus*.
- Virion morphology and size: Enveloped, spherical to pleomorphic virions containing prominent surface spikes and a central uncondensed core, ~80–100 nm in size.
- Nucleic acid: Dimer of linear, positive-sense, single-stranded RNA, ~11.6 kb in length.
- Physicochemical properties: As an enveloped retrovirus, it should be susceptible to many disinfectants, such as 1% sodium hypochlorite, 2% glutaraldehyde, formaldehyde and ethanol.

40.3 | Disease name

- No human disease has been identified.

40.4 | Priority level

- Scientific/Epidemiologic evidence regarding blood safety: Theoretical; transmission from transfusion has not been documented in humans but has been demonstrated in nonhuman primates. No known disease in infected humans.
- Public perception and/or regulatory concern regarding blood safety: Absent; public policy makers in the United States have discussed this agent in open public forums without concern expressed by stakeholder groups or other members of the public. Health Canada enacted in 2007 and maintains a permanent deferral for potential blood donors whose employment involved potential contact with monkeys or their body fluids.
- Public concern regarding disease agent: Absent

40.5 | Background

- The prototype foamy virus was isolated from human material in 1971 from a Kenyan patient; it was closely related to SFV from chimpanzees present in Kenya. Rigorous testing of serum samples from humans with autoimmune diseases by more than one serological assay or by RT-PCR did not confirm infection. Positive results were only observed in persons who may have acquired a zoonotic infection following severe primate bites via a laboratory accident or following an occupational exposure.
- SFV is a retrovirus endemic in wild and captive primate populations. In a number of research centers and zoos, 5.3%–23% of individuals were found to be positive for the viral genome. Because seropositivity is a likely indicator of chronic infection, this raises the issue of potential transfusion transmissibility in humans from seropositive donors.

40.6 | Common human exposure routes

- Wound injury from nonhuman primates in developed world
- Butchering and consumption of nonhuman primates in Africa

40.7 | Likelihood of secondary transmission

- Not known, but experimentally transmitted by blood in nonhuman primates.
- No male-to-female or household transmission has been observed in humans.

40.8 | At-risk populations

- Those exposed to nonhuman primates, such as animal handlers, zookeepers, or exotic pet enthusiasts, in developed countries; bushmeat hunters and handlers in the developing world are at risk for exposure to SFV. Contact with apes (e.g., chimps and gorillas) appear to pose greater risks for cross-species transmission than from monkeys.
- Nonoccupational exposure of tourists to simian retroviruses at sites in Asia, and possibly Africa, where nonhuman primates congregate could pose a risk. The probability of a tourist becoming infected with SFV at a monkey forest in Asia has

been estimated to be 0.3% (2.94/1000 travelers) annually.

40.9 | Vector and reservoir involved

- Nonhuman primates are the natural host.

40.10 | Blood phase

- Lifelong in nonhuman primates
- Identified in peripheral blood lymphocytes from one asymptomatic animal caretaker 20 years after exposure

40.11 | Survival/persistence in blood products

- Unknown

40.12 | Transmission by blood transfusion

- Experimentally transmitted by whole-blood transfusion between nonhuman primates. Transfusion transmission failed when high levels of neutralizing antibodies were present in the donor's blood, whereas virus transmission was successful with transfer of antibody-reduced blood cells.
- In humans, one lookback study showed lack of transmission in four recipients from a donor who was shown to be infected with SFV.
- Low viral loads were found in the peripheral blood of 13 infected persons; 7 had a very low viral load of 1–10 viral RNA copies and 4 had 100–1,000 RNA copies in 500 ng of total leukocyte DNA.

40.13 | Cases/frequency in population

- In the United States, seropositivity is only seen with nonhuman primate exposure in 3-5% of zoo workers and research-animal handlers.

40.14 | Incubation period

- Unknown in the absence of disease associations

40.15 | Likelihood of clinical disease

- None recognized despite follow-up of seropositive primate handlers for several years

40.16 | Primary disease symptoms

- Not applicable

40.17 | Severity of clinical disease

- Not applicable

40.18 | Mortality

- Not applicable

40.19 | Chronic carriage

- >6 months, probably lifelong in nonhuman primates

40.20 | Treatment available/efficacious

- Not applicable

40.21 | Agent-specific screening question(s)

- No specific question is in use in the United States.
- Health Canada enacted in 2007 and maintains a permanent deferral for potential blood donors whose employment involved potential contact with monkeys or their body fluids.
- Not indicated because of the low frequency in the donor population and the absence of disease in humans.

40.22 | Laboratory test(s) available

- No FDA-licensed blood donor screening test exists.
- Cell culture and research antibody and nucleic acid assays exist.

40.23 | Currently recommended donor deferral period

- No FDA Guidance or AABB Standard exists.
- Permanent deferral in Canada for occupational exposure to nonhuman primates.

40.24 | Impact on blood availability

- Agent-specific screening question(s): Minimal if deferral is confined to occupational exposure to nonhuman primates
- Laboratory test(s) available: Not applicable

40.25 | Impact on blood safety

- Agent-specific screening question(s): None in the absence of disease association
- Laboratory test(s) available: Not applicable

40.26 | Leukoreduction efficacy

- Unknown; there is the potential for impact in light of strong cell association of many retroviruses.

40.27 | Pathogen reduction efficacy for plasma derivatives

- Multiple pathogen reduction steps used in the fractionation process have been shown to be robust in removal of enveloped viruses.

40.28 | Other prevention measures

- Appropriate precautions to prevent exposure to infected apes and other primates

SUGGESTED READING

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