Bundesamt für
Verbraucherschutz und
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Position statement of the Central Biosafety Commission (ZKBS)
on the risk assessment of simian immunodeficiency viruses
as donor or recipient organisms in genetic engineering operations according to
§ 5 paragraph 1 of the Genetic Engineering Safety Regulations

Simian immunodeficiency viruses, SIVs, belong to the family of *Retroviridae* and to the genus lentivirus. Over 40 different SIVs have been described (1). Their natural hosts are found among different African monkey species. The host species determines the name given to each isolate, for instance:

- Simian immunodeficiency virus-chimpanzee, (SIV-cpz)
- Simian immunodeficiency virus-mandrill, (SIV-mnd)
- Simian immunodeficiency virus-pig-tailed macaque, (SIV-mne)
- Simian immunodeficiency virus-red capped mangabey, (SIV-rcm)
- Simian immunodeficiency virus-Rhesus (*Maccaca mulatta*), (SIV-mac)
- Simian immunodeficiency virus-sooty mangabey SIV-H4, (SIV-smm)
- Simian immunodeficiency virus-stump-tailed macaque, (SIV-stm)
- Simian immunodeficiency virus-sykes monkey, (SIV-syk)

Natural infection in monkeys normally proceeds asymptomatically without significant T-cell depletion, even when the SIV multiplies to a high titre. Low levels of immune activation and low expression of the chemokine receptor CCR5 are thought to be responsible (1, 2). However, the development of an AIDS-like disease pattern after years of infection has been reported, although only in a small number of cases (3). Only two strains of SIV (SIV-cpz and SIV-smm) have crossed the species barrier, adapted to humans, and evolved to HIV-1 and HIV-2 (4).

In the USA, two workers are reported to have developed antibodies against SIV after handling SIV in the laboratory without taking the appropriate protective measures. However, the virus itself was not found in the SIV-antibody positive persons, and no disease was detected. Persons that came into contact with the infected individuals remained seronegative (5). In anonymous testing of 472 serum samples collected from workers who come into regular contact with SIVs, either in the laboratory or through animal care, three were found to be potentially positive (6). Many of the SIVs tested can be cultured in human PBMCs *in vitro* (1). Consequently, the host tropism of SIV can be said to include humans. There is no evidence to suggest that human-to-human transmission occurs, since no cases of human SIV infection or persons with anti-SIV antibodies have yet been found outside the laboratory.

Lentiviruses possess low levels of contagiousness and tenacity. They are not spread through the air.

According to the Genetic Engineering Safety Regulations (GenTSV) of 24 October 1990, SIVs were allocated to **risk group 2**. According to Annex III to the European Council Directive 93/88/EEC (12 October 1993), SIVs are assigned to **risk group 3****. In the Guidelines for Re-

search Involving Recombinant DNA Molecules (NIH Guidelines) issued in April 2002, SIVs are assigned to **risk group 3** (Appendix B-III-D).

Recommendation

As donor and recipient organisms for genetic engineering operations simian immunodeficiency viruses are allocated to **risk group 2** in accordance with § 5 paragraph 1 in combination with Appendix I No. 1 of the Genetic Engineering Safety Regulations (GenTSV).

Reasons

Non-human primates are the natural hosts of SIV. In the natural hosts infection is typically asymptomatic. Rare cases of SIV infection in humans have been described, which likewise remained symptomless and did not spread.

The risk of laboratory-acquired infection is assessed as low. Protection against infection requires monitoring of all possible sources of infection and transmission routes. SIVs are instable and are not transmitted through the air. Possible sources of infection could be through injury from a contaminated instrument or the bite of an infected animal. These scenarios should be avoided by implementing additional precautionary measures. Post-exposure prophylaxis can further reduce the risk of infection after exposure to the virus. Furthermore, level 2 safety measures are considered adequate to safeguard against infection and to protect the goods and interests listed in § 1 of the German Genetic Engineering Act (GenTG).

For the safety classification of genetic engineering operations with SIVs please refer to the position statement of the ZKBS on genetic engineering operations with simian immunodeficiency viruses (SIV) of October 1995, Ref. No. 6790-10-38. No new scientific evidence has emerged that would call into question the classification determined in the aforementioned position statement.

References

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