Responses to questions on Schmallenberg virus

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What is Schmallenberg virus and where does it come from?
Schmallenberg virus is an *Orthobunyavirus* closely related to viruses of the so-called Simbu serogroup, which comprises e.g. the Akabane, the Shamonda and the Aino virus. So far, the strongest genetic similarity has been detected to the Sathuperi, Douglas and Shamonda virus within this group. These viruses are known from Africa, Asia, and Australia. This is the first detection of viruses of this group in Europe.

When and how Schmallenberg virus came to Europe is unclear.

Which animals are affected?
So far, cattle, sheep and goats are affected.

Can wild ruminants (deer, fallow deer, red deer, mouflons) become infected?
SBV-antibodies have been detected in alpacas, bisons, deer, red deer and mouflons. So far, the consequences of an infection of wildlife can however not be assessed.

Why do damages in the offspring occur and what is the time frame?
If infection occurs during a vulnerable stage of pregnancy (analogously to Akabane virus in sheep probably between week four and eight and in cattle probably between week eight and fourteen), the virus may infect the fetus and cause severe damages. In addition to abortions and mummified fetuses, premature or stillbirths and the birth of weak, malformed lambs are typical. Such severe damages may also occur in calves.

The most common malformations are severe arthrogryposes (ankylosis, tendon shortening), torticollis (severely twisted neck) and hydrencephaly (absence of brain structures and accumulation of cerebrospinal fluid, hydrocephalus). The central nervous system may show extreme deformations. Altogether, the clinical picture is very similar to that of infections with the Akabane virus. The malformations induced by viruses of the Simbu serogroup are designated “arthrogryposis hydrencephaly syndrome” (AHS).

How is the virus transmitted?
Like other viruses of the Simbu serogroup, Schmallenberg virus is probably transmitted by insects (biting midges and mosquitoes).

How can susceptible animals be protected?
There is no reliable protection. The development of vaccines is still under way. The protection of susceptible animals from biting midges/mosquitoes can decrease cases of infections.

Is a vaccine being developed?
Several vaccine producers and research groups are working on vaccines (inactivated virus with adjuvants). The development of a prototype will take several months. Then the safety and efficacy of the vaccine, particularly in pregnant animals, must be tested before the vaccine can be licensed and used. At present, the duration of this process cannot be estimated.

The FLI is involved in the development of such a prototype.

Are previously infected animals protected from re-infection?
It must be assumed that infected animals develop an immune protection. So far, neutralizing antibodies against the virus have been detected in infected animals. It is however unknown how long this immunity lasts.

Is it likely that the next offspring of an infected female that had an abortion will also be damaged?
To our current knowledge, the malformations induced by Schmallenberg virus are only to be expected in the offspring of infected, non-immune females. An infected female develops antibodies which should prevent a negative impact of re-infection on the fetus. However, it is unknown how long the natural immune protection of previously infected animals lasts.

Can other animals (horses, pigs, dogs, etc.) also become infected?
At present, this cannot be answered. It is known that Akabane virus can infect pigs. In horses and dogs antibodies have been detected; however, the animals did not show any clinical symptoms. This will also be investigated for “Schmallenberg virus”.

Can humans become infected with Schmallenberg virus?
It is no zoonotic pathogens.

How dangerous are dairy, meat and venison products?
To our current knowledge, there is no risk.

Who is responsible for investigating the animals?
The veterinary diagnostic agencies of the federal states are responsible for the investigations. The FLI clarifies suspected cases in so far unaffected areas and newly affected animal species.

Which sample material is best suited for investigation?
For pathogen detection during acute infection of adult animals, serum and EDTA blood samples can be used which must be collected during the clinical stage (fever, drop in milk yield, diarrhea).
Pathogen detection in fetuses, abortions, stillbirths, and in malformed lambs and calves (AHS) is mainly done from brain samples; supplementary investigation of spleen and blood samples is recommended. The sample material should at least include cerebrum, cerebellum, spleen and blood.

Is there an antibody test?
There are validated antibody tests (ELISA: Enzyme Linked Immunosorbent Assay) for milk as well as plasma and serum samples.