

## WHAT PIRBRIGHT IS DOING

### Hope for a licenced vaccine

Scientists at The Pirbright Institute have been studying ASFV for over 50 years. Their expertise on how the virus works and how it interacts with the porcine (pig) immune system is crucial to the Institute's vaccine development research.

This work has identified several genes in ASFV that inhibit a pig's early immune response – making it easier for the virus to infect the animal. Our scientists are developing a genetically modified (GM) vaccine by deleting these types of immune inhibitory genes from the ASF virus.



Removing these genes produces modified viruses that cause less or no disease, and has resulted in new vaccine candidates that can protect pigs against the disease even if infected with the most virulent (severe) types of ASFV.

Pirbright researchers are also screening proteins in the virus to identify those most effective in generating a protective immune response, which is a highly complex process. Results from both approaches are promising and scientists are hopeful they may lead to the first licensed vaccine.



## Diagnostics and surveillance

As the clinical signs of ASFV are very similar to other swine diseases, accurate diagnosis is vital. At Pirbright we provide expert advice, early warning and rapid diagnosis through our Reference Laboratories for the UK government and the World Organisation for Animal Health (OIE). The data they collect is used to monitor the global patterns of disease distribution which helps ensure the UK and other countries are able to respond rapidly in the event of an outbreak and put the necessary control measures in place.

For example, our scientists quickly and successfully diagnosed the first outbreak of ASFV in Georgia in 2007. The disease has since spread to the Russian Federation and Eastern Europe, including EU countries.



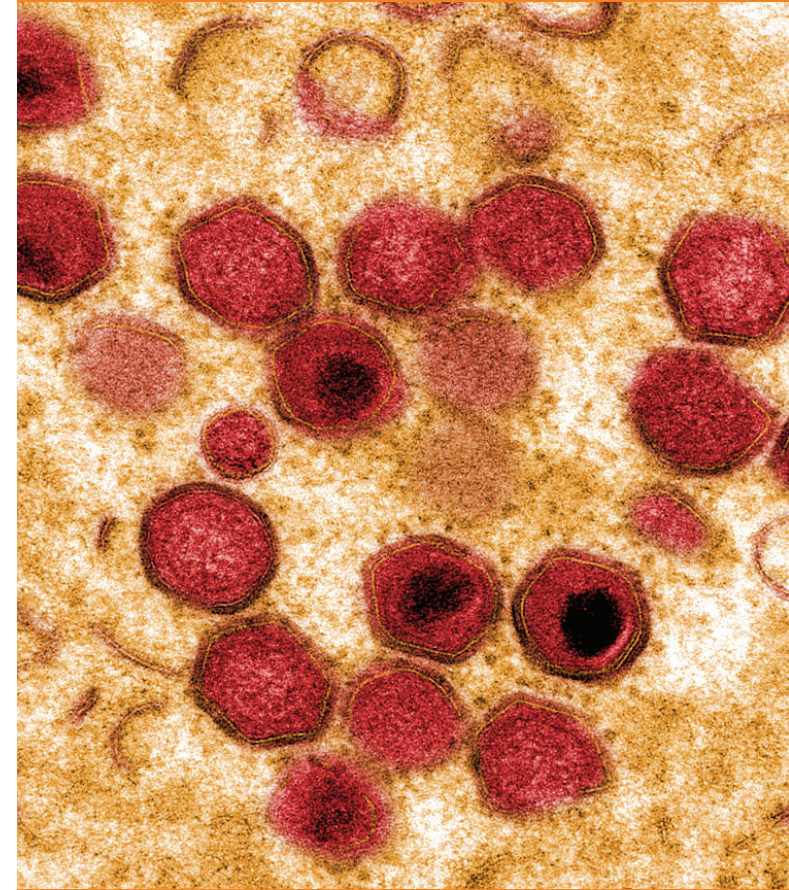
Institute scientists also sequenced the full genome (genetic composition) for the Georgia 2007 strain - a major achievement which provided information for research on vaccine development and diagnosis.

## Social and economic impact

African swine fever has a huge social and economic impact; costing hundreds of millions of pounds in affected countries in Europe and Africa. With such a high mortality rate, the disease hits smallholders especially hard, but it can also be devastating for national economies too; potentially incurring years of international trade bans on live pigs or pork meat products.

The expertise at Pirbright is crucial in helping countries respond to outbreaks quickly – saving animals' lives and farmers' livelihoods. The availability of a vaccine would help to control the disease and help secure supplies of pork meat and products around the world.

# AFRICAN SWINE FEVER VIRUS



# AFRICAN SWINE FEVER VIRUS - KEY FACTS

African swine fever (ASF) is a highly contagious, haemorrhagic viral disease which can be fatal for all infected domestic pigs and wild boar.

ASF virus (ASFV) is a DNA virus of the *Asfarviridae* family with 23 different genotypes (the inherited map an organism carries within its genetic code).

ASFV is prevalent in most countries of sub-Saharan Africa. In African wildlife hosts such as warthogs, it causes long term infections without clinical signs. It does not infect humans.

Pigs are usually infected through direct contact with other infected pigs, or indirectly by eating infected meat or meat products. ASFV can also be spread by soft ticks and through contaminated objects such as vehicles, clothes and equipment.

The virus was first introduced to Europe in 1957, but was eradicated from everywhere other than Sardinia by the mid-1990s. In 2007 there was a second incursion in the Caucasus, and since then outbreaks in the Russian Federation and bordering countries.

ASFV was introduced into the EU in Poland and the Baltic States in 2014 and has continued to spread in wild boar and cause outbreaks in domestic pigs.

## PREVENTION

There has never been an outbreak of ASFV in the UK, and ASFV-free countries in Western Europe have strict policies in place to prevent infected live animals and pork products being imported.

Feeding pigs with swill, which contains human food waste, is banned in the UK and EU in case it contains contaminated pork products. Elsewhere however, swill feeding remains popular, especially amongst smallholders.



Eliminating the disease is difficult because the virus is highly infectious and in countries where ASFV is persistent there are often large numbers of wild pigs roaming free which can easily infect domestic pigs.

## CONTROL

There is no treatment or vaccine available for ASFV. Measures to control the disease rely on effective surveillance, rapid diagnosis and movement restrictions. Control of ASFV can be particularly difficult amongst smallholders in poorer countries, where awareness of the infection signs tends to be low. This means farmers may not put controls in place quickly enough, enabling the disease to spread.

ASFV is a notifiable disease in the UK and should be reported. Please see the Defra website for advice on how to spot and report the disease: [www.gov.uk/guidance/african-swine-fever](http://www.gov.uk/guidance/african-swine-fever).

## CLINICAL SIGNS

Clinical signs of ASFV vary and are similar to some other pig diseases, such as classical swine fever. These typically occur 3-15 days after infection. Pigs infected with mild strains may not become ill or show typical clinical signs.

Moderately virulent types of the virus produce less intense signs, but mortality can still range from 30% to 70%. Severe cases can lead to death in 2-10 days however, with a mortality rate as high as 100% and sudden death can sometimes be the only sign of infection.

### The main clinical signs include:

High fever and reddening of the skin (visible only in pale-skinned pigs), with patches appearing on the tips of ears, tail, feet, chest, or under the belly.

Diarrhoea, vomiting.

Abortions, still-births and weak litters.

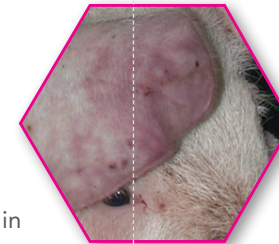
General weakness.



Infected pigs become weak and listless



Our scientists study the virus to understand how it works



### Other signs can include:

Swollen, red eyes, eye discharge.

Laboured breathing and coughing.

Decreased appetite, listlessness, poor coordination.

