

**BIOSECURITY AND CONTROL OF ASF**  
**非洲猪瘟的生物安全与控制**

***SHANGHAI, 2018***

***上海, 2018***

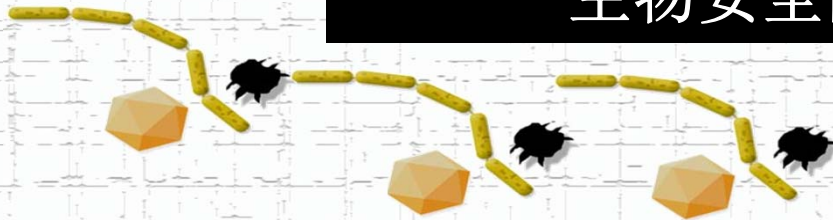
**Prof. JM. Sánchez-Vizcaíno**

**Complutense University of Madrid  
Visavet Center**

***OIE-ASF Reference Laboratory***

# THE ROLE OF BIOSECURITY

## 生物安全的角色



### FIRST BARRIER: AVOID THE VIRUS ENTRY:

第一道屏障：避免病毒进入

**BIOSECURITY: Food, Blood, Vehicules, carriers**

生物安全：食品，血液，车辆，媒介

**EDUCATION AND TRAINING. Knowing the disease**

教育与培训：了解疾病



**OUT**  
外部

STOP



**IN**  
内部

## SECOND BARRIER: DIFFUSION:

### 第二屏障：防止扩散

**EARLY DETECTION. How can be ASF detected**

早期诊断：如何检测非洲猪瘟

**BIOSECURITY. How avoid the spread**

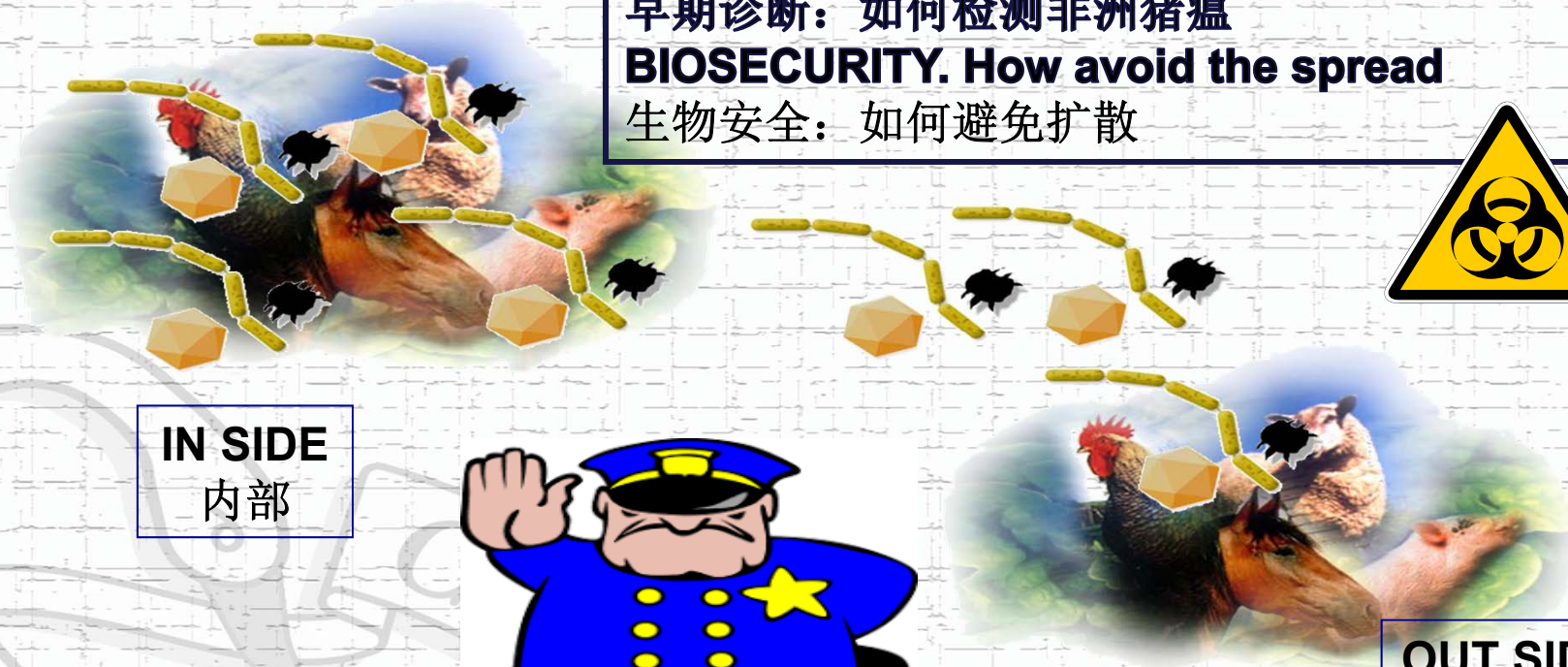
生物安全：如何避免扩散



**IN SIDE**  
内部



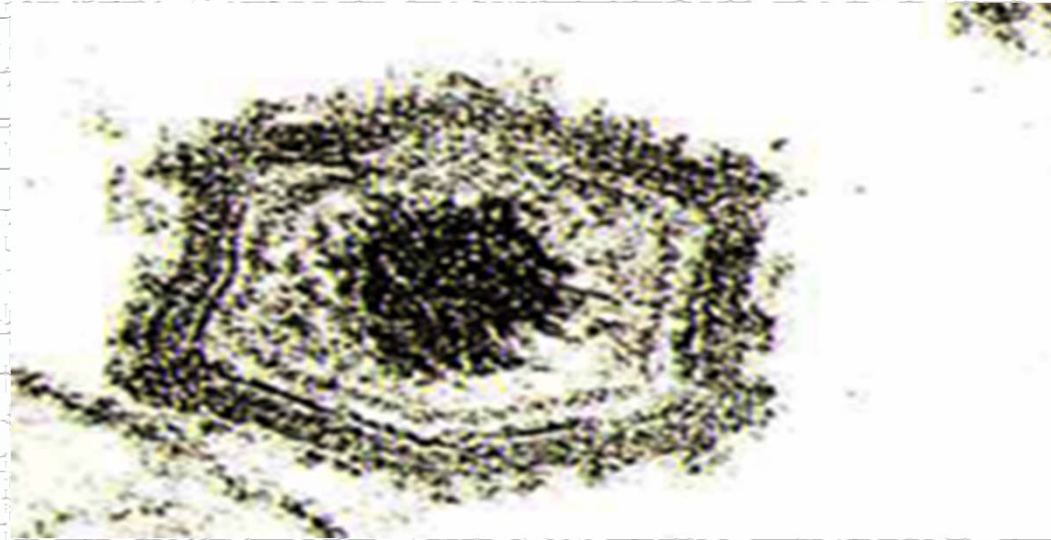
**OUT SIDE**  
外部





## ASF THE MAIN THREAT FOR ANIMAL HEALTH AND WELFARE OF THE EU SWINE INDUSTRY

非洲猪瘟是欧盟养猪业动物健康与福利的主要威胁



ASF is not infectious to humans and does not directly affect public health.

非洲猪瘟病毒不感染人类不会直接影响社公共健康

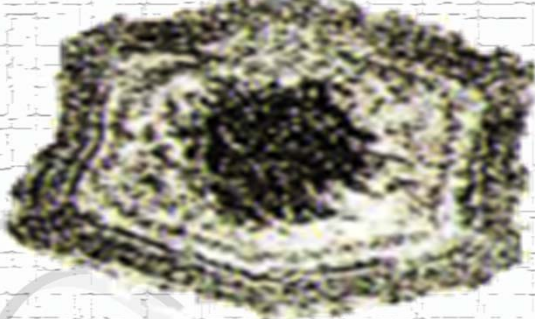
However, the ASF has a serious social and economic impact on the world trade of swine and swine products as well as a more Expesive swine production

然而，非洲猪瘟对猪及猪产品的国际贸易产生严重的社会及经济影响，同时造成生产成本提高

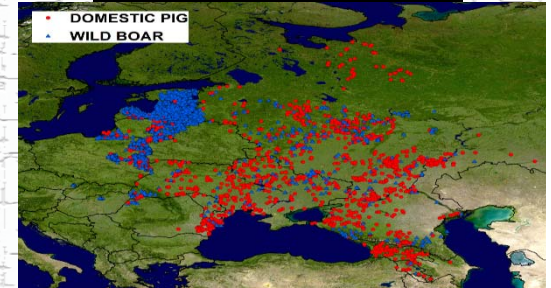
**FIRST, TO KNOW THE DISEASE**  
首先需要了解疾病

**SCENARIOS**  
区域

**THE VIRUS**  
病毒



**THE HOST**  
宿主



**No commercial vaccine yet**  
目前无商品疫苗





# AFRICAN SWINE FEVER VIRUS (ASFV) 非洲猪瘟病毒

Complex virus, big size, large genome: 170-190 kb  
复杂病毒，基因组大，170-190kb

Complex molecular structure  
复杂的分子结构

Very Resistant in the environment  
环境抵抗力强

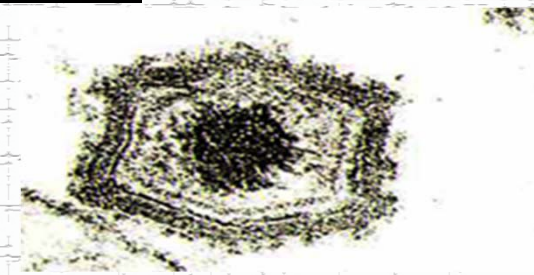
Genetic variability\*  
基因组变异性 \*

NO production of neutralizing antibodies  
不产生中和抗体

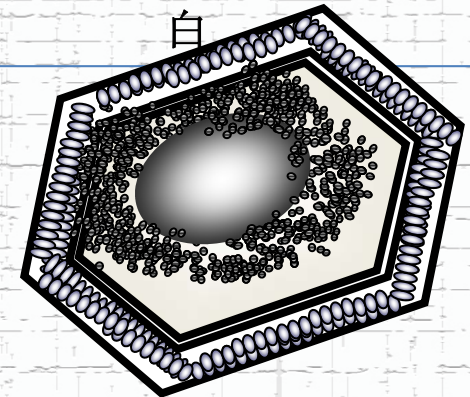
Lack of effective vaccine yet  
目前无有效疫苗

24 genotypes\* \*The current genotype classification is not related with the virus virulence or the disease evolution (Mur et al. 2016)

24个基因型  
目前的基因分型和病毒毒力及疾病进化并无关联



200 nm  
More than 100 structural proteins  
200纳米 超过100个结构蛋白

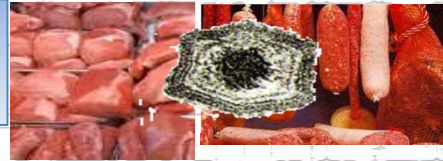


# ASF TRANSMISSION ROUTES

## 非洲猪瘟传播途径

### Transmission 传播

Indirect  
间接



Swill feeding  
泔水饲喂



Origin of most outbreaks  
目前最多的疫源

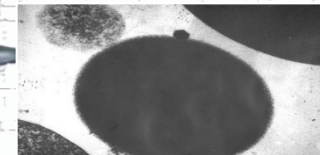
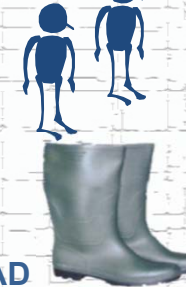
Direct  
直接



Biological  
Vectors  
生物载体



Only influenced in LocalSPREAD  
Outdoor productions  
只影响室外养殖模式



Faeces  
粪便

ASF is NOT a very transmissible disease Less than: FMD, PRRS, CSF...

But it goes everywhere

非洲猪瘟并非高传播性疾病，低于口蹄疫、蓝耳和猪瘟，但是依然四处传播

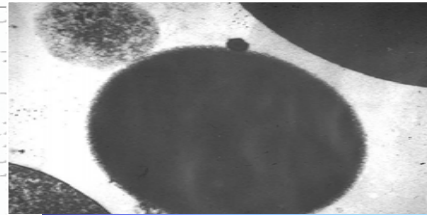




# •ASFV: Routes of transmission ASFV: 传播途径

## BLOOD!!!! 血液

- Hemorrhages 出血
- Necropsies 剖检
- Hunting 打猎

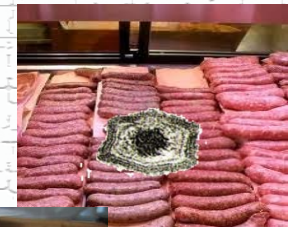


48 hours  
Mellor *et al.* 1987

It Usually doesn't start as:  
**EXPLOSIVE  
INFENCTION**  
通常不开始于爆发感染



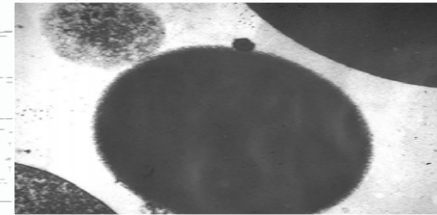
200  $\mu$ l of blood  
 $3 \times 10^6$  copies





# SPECIAL ATTENTION IN SUMMER

## 夏季特殊注意事项



# ASF virus is very stable in the environment 非洲猪瘟在环境中耐受性强



**ASFv could be stable for long periods of time and even more when organic matter is present**

非洲猪瘟病毒在环境中可以存在很长时间，尤其是当有机物存在时时间更长



# ASFV in pigs, products and organic material 非洲猪瘟病毒存在于猪体、产品和有机物中

ASFv is highly resistant  
非洲猪瘟病毒具有强耐受性



110 days in  
chilled meat  
冷藏肉中110天

1000 days in  
frozen meat  
冷冻肉中1000天



18 months in blood at  
4°C  
4°C可在血液中存活18个月

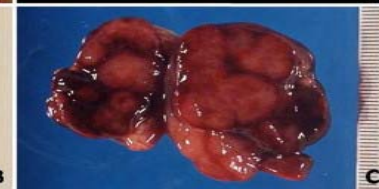
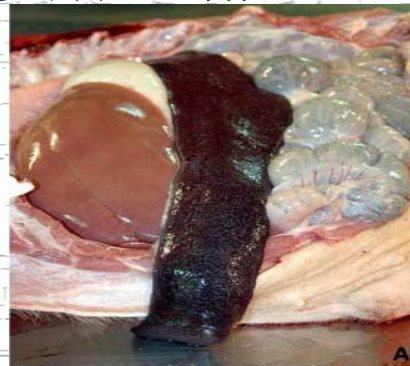


1 month in contaminated pig pens  
在污染的圈舍中存活1个月

**Different Forms are circulating.**  
**Usually not start as an EXPLOSIVE INFECTION**  
多种流行形式, 通常不始于爆发式感染

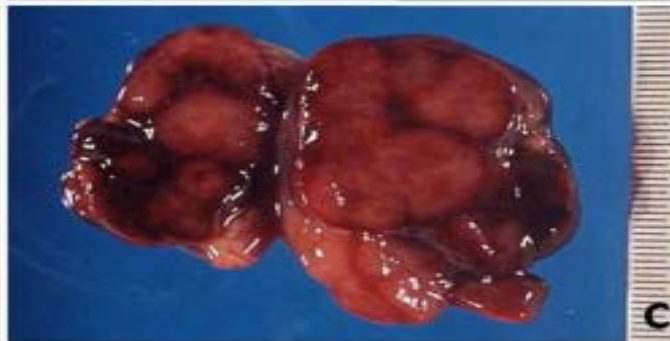


**Many different ASF isolate are in the field**  
田间分离了很多不同ASF毒株



- **SYMPTOMS and LESIONS: From Acute to Asymptomatic** 症状与损伤: 从急性到无症状
- **The ASF genotypes evaluated presented the same disease evolution** Mur et al. 2016
- 评估的ASF基因型呈现相同的疾病进程

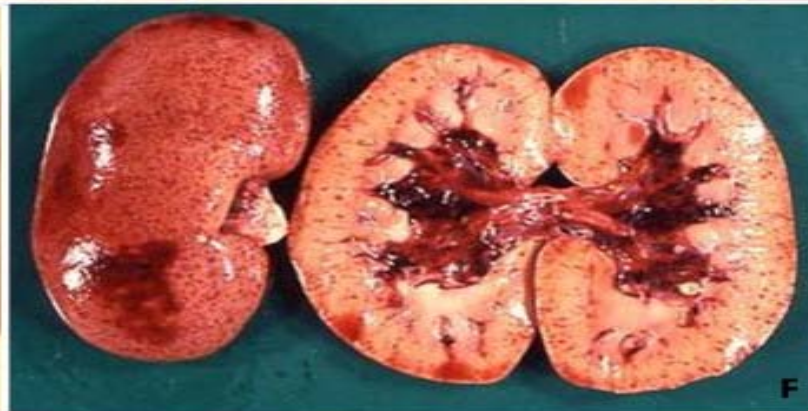
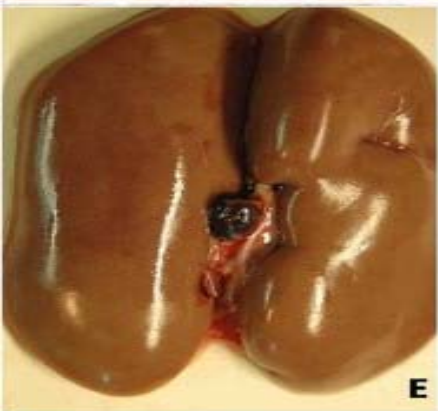
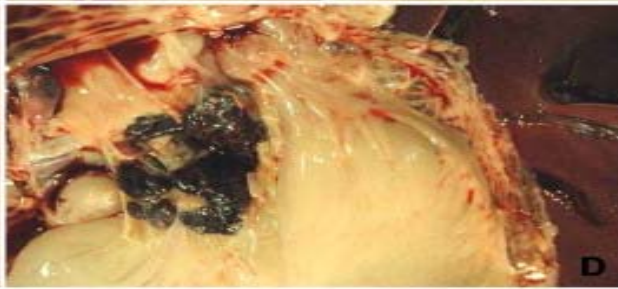




MAIN  
LESIONS  
OF  
ACUTE  
ASF  
NO

**PATHOGNOMONIC**  
急性非洲猪瘟感染没  
有特殊的病理特征

Sánchez-Vizcaíno et al. 2015 (J. Comp. Pathol)



**MAIN  
LESIONS  
OF  
ACUTE  
ASF**

急性非洲猪瘟疫

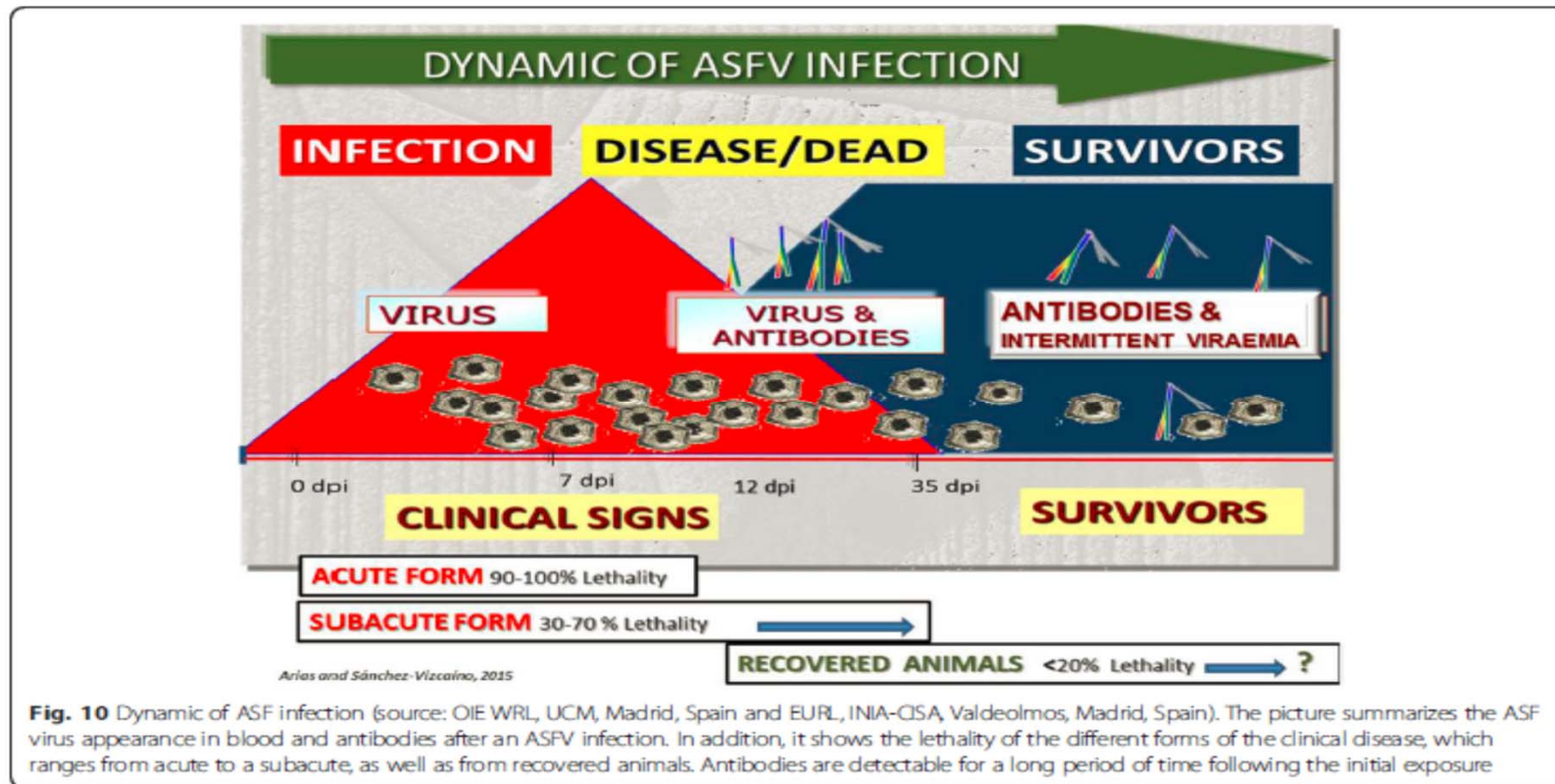
主要损伤

Sánchez-Vizcaíno et al. 2015 (J. Comp. Pathol)



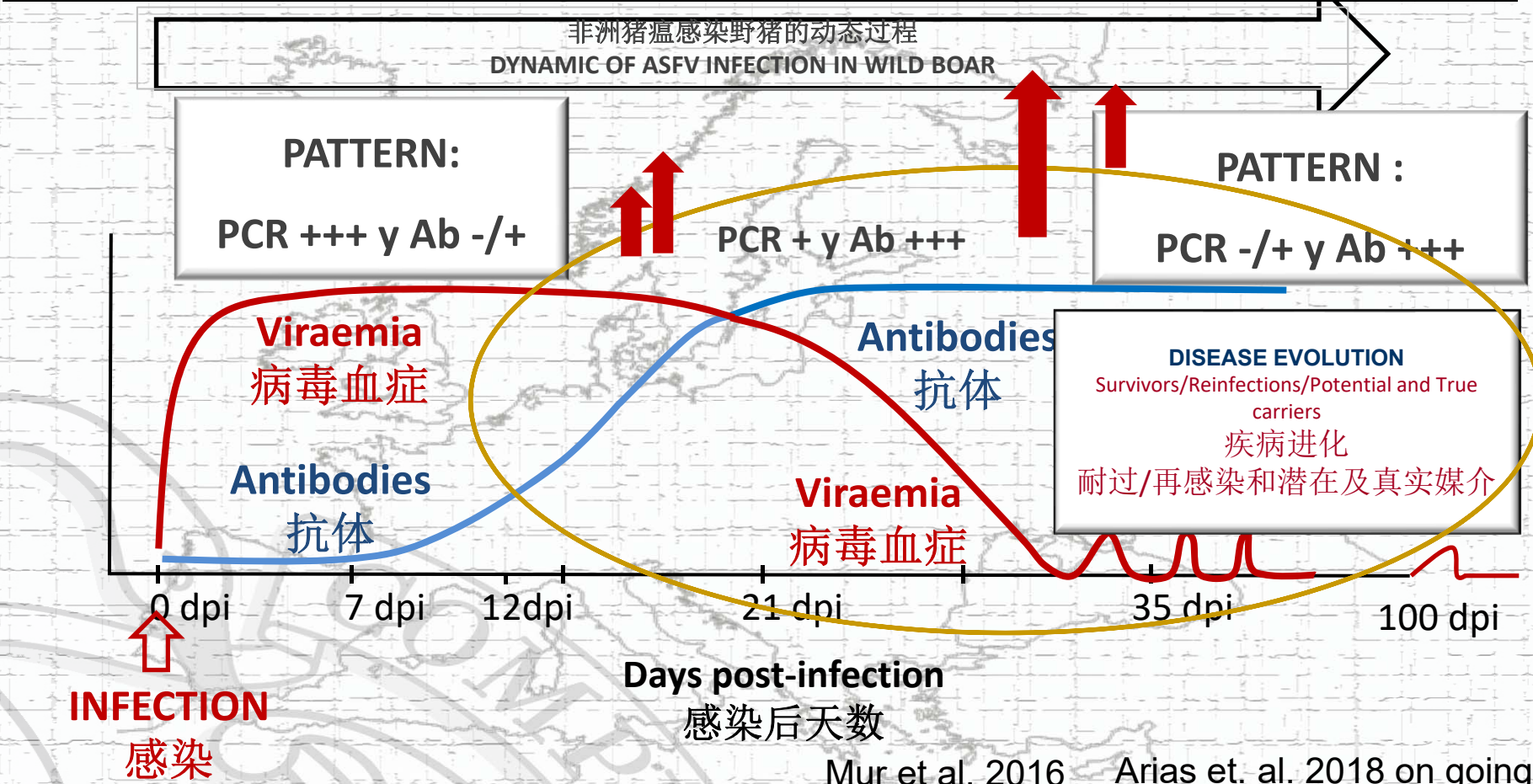
# Wb - ASF infected survivors are detected

## 野猪-ASF感染耐过猪被检测



ASF在感染后出现在血液和抗体中，在不同发病情况下死亡率不同，可表现为急性、亚急性并存在耐过猪。抗体在首次感染后的很长时间内均能被检测。

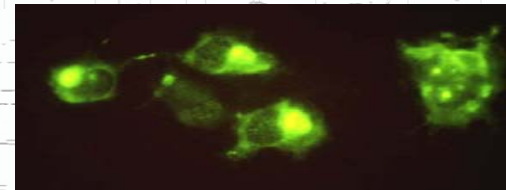
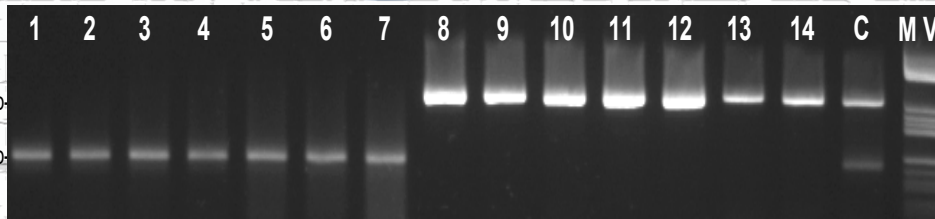
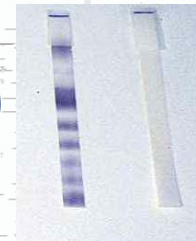
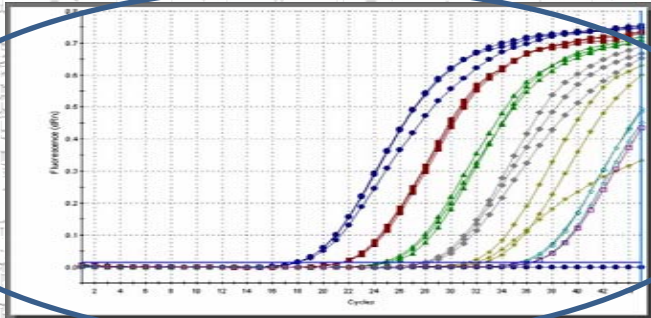
# Evolution of the ASF infection in WB 非洲猪瘟感染野猪的进程



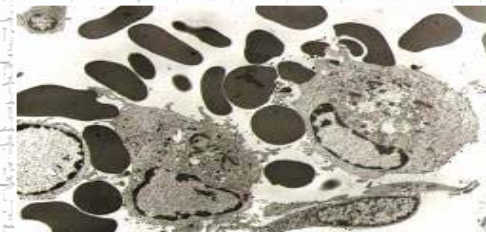
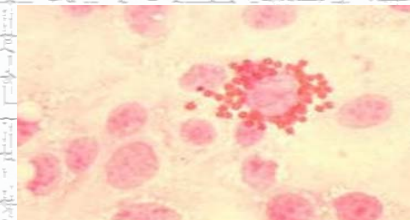


# ASF LABORATORY DIAGNOSIS

## 实验室检测



*CSF-3/4 + ASF-1/2*



**Monitoring the detection of both: Antigen-DNA and Antibodies it's critical for ASF control. Can be not excluded**

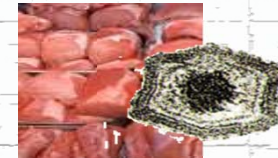
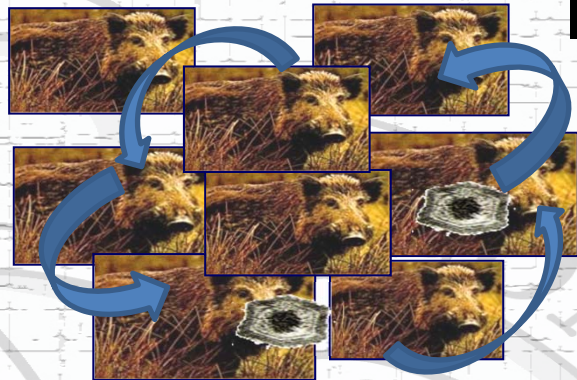
• 抗原和抗体检测同样重要，不能只选其一

**DIRECT TRANSMISSION: THE ROLE OF THE  
WILD BOAR and BACKYARD pigs**  
直接传播: 野猪和散养猪的角色

The presence of infected domestic pigs potentially in contact with wild boar will facilitate the endemicity

感染的家猪和野猪群体接触增加疾病流行

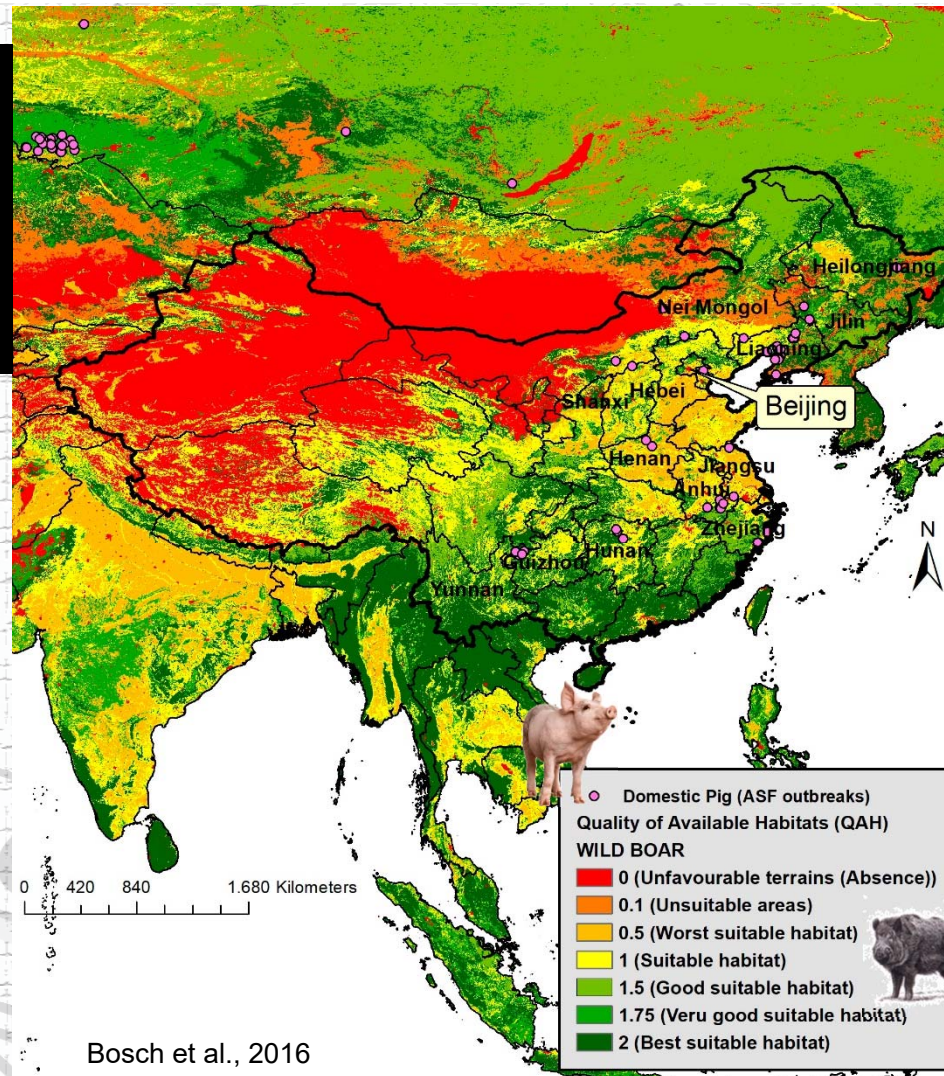
**Wb + backyard pigs: High Risk**  
野猪+散养猪: 高风险



**Swill feeding**  
泔水饲喂



# WILD BOAR ABUNDANCE In CHINA 中国野猪数量



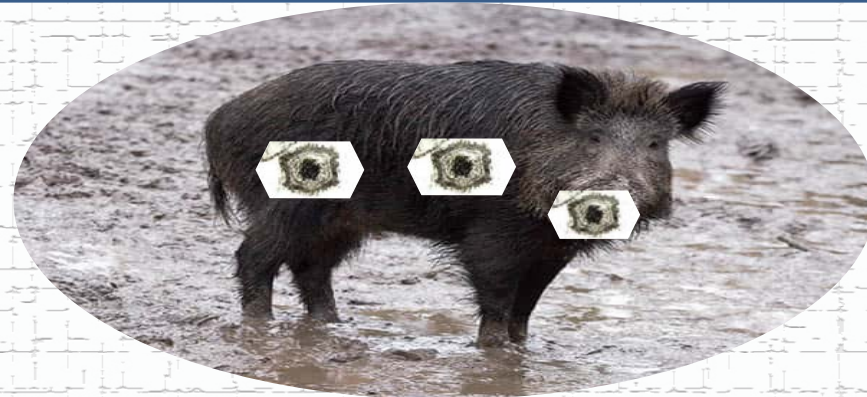
## Observations of WB and DP survivors: Potential (live or dead-carcasses) Carriers?

观察野猪和家猪中感染耐过猪：潜在媒介（活体或死亡胴体）



**Carcasses: How much virus are in field conditions?**

死亡胴体：在田间条件下有多少病毒



**Less virus but more movements**

低病毒但是大活动半径

•How much virus could be found in Organs: Spleen, Lymphonodes....?

器官中有多少病毒：脾、淋巴结

•How much virus could be shedding?

排毒量

•How much cross protection to other ASF isolates?

不同毒株间的交叉保护力如何？

**In our experience these animals create many problems to the ASF control and eradication (2-8% presented virus in LN...)**

根据我们的经验这对非洲猪瘟的根除造成了很多问题（2-8%病毒存在于淋巴结）