

MJPRRS Technology

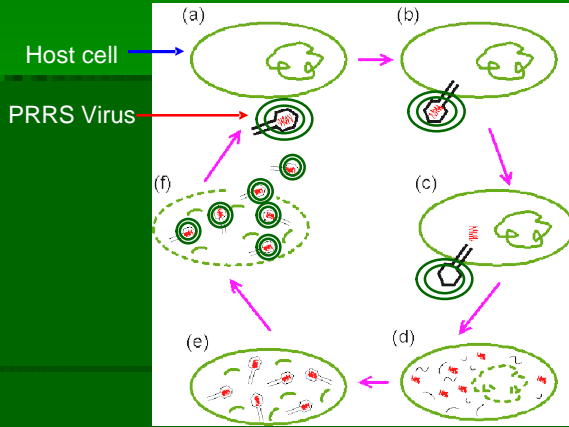
PRRS virus (PRRSV) belongs to the family *Ateriviridae*, that is one of animal RNA virus families. It means antigenic property of PRRS viruses keep changing like other RNA viruses, that is the most problematic issue to develop vaccine for the causative agents. However, there are consequences that are not changed in biological systems. First, the virus needs the host cells for its replication (growth). Second, the virus has to attach on host cell before starting replication. For attachment, the virus has to recognize the specific receptor on the host cell. Third, the host cell does not change its own receptor's nature. Because, the receptor on the host cell (RHC) is not originally for virus recognition, RHC has its own function in the cell. Only the specific virus utilizes RHC for its own purpose, cell-attachment. Instead of modifying RHC structure, the host cell normally produces antibodies that attack the receptor recognition protein on the virus (RRPV) to block cell-attachment of virus. It may be call neutralizing antibodies (NA). Once the host cell produces NA, the virus must change RRPV to survive from the current NA attack. However, the modification of RRPV is limited by the fact that the modified RRPV should recognize RHC for cell-attachment. If the modification results the non-functional RRPV, the virus cannot survive in the nature (Slide #1).

Based on this background knowledge described above, MJ Biologics has reviewed current PRRS viruses not only genetic information (RNA sequences), but also Amino acid sequence of GP5 protein encoded in ORF5 on PRRSV genome. GP5 is RRPV in PRRSV. Currently, people use Dendograms that are made based on over-all DNA sequence changes on DNA sequence for ORF5. However, MJ Biologics found that lots of changes on ORF5 DNA may not be necessary to change immunological property of viruses because (1) there is degeneracy of the codon (Wobble effect) and (2) extodomain (protein part exposed out from virus particle) is from about amino acid postion 28 to about 60 out of 200 amino acids. In other words, if you choose isolates to make vaccines based on the current dendogram, you may use the immunological same PRRS strains, that results less cross-protection. Therefore, MJ Biologics has grouped more than 2,000 PRRS field virus sequences based on immunological properties influenced by amino acid sequences (not DNA sequences) at the specific locations in extodomain, that is MJ Biologics's proprietary information under patent pending process (Slide #2, #3). As results, our process overcomes several major problems in current PRRSV autogenous killed vaccine; issues for PRRSV leakage-problems from the vaccinated farms (Slide #4), selection of isolates for making vaccine to provide broader protection against chronic strain variation (Slide #3, #5), and the concentration and amount of virus antigens for early protection (Slide #6).

Slide #1



Blocking Viral Attachment on Host Cells prevents the disease!!!



How can Pig cells prevent virus-attack?
à Need Abs against viral surface proteins, especially ORF-5 Protein.

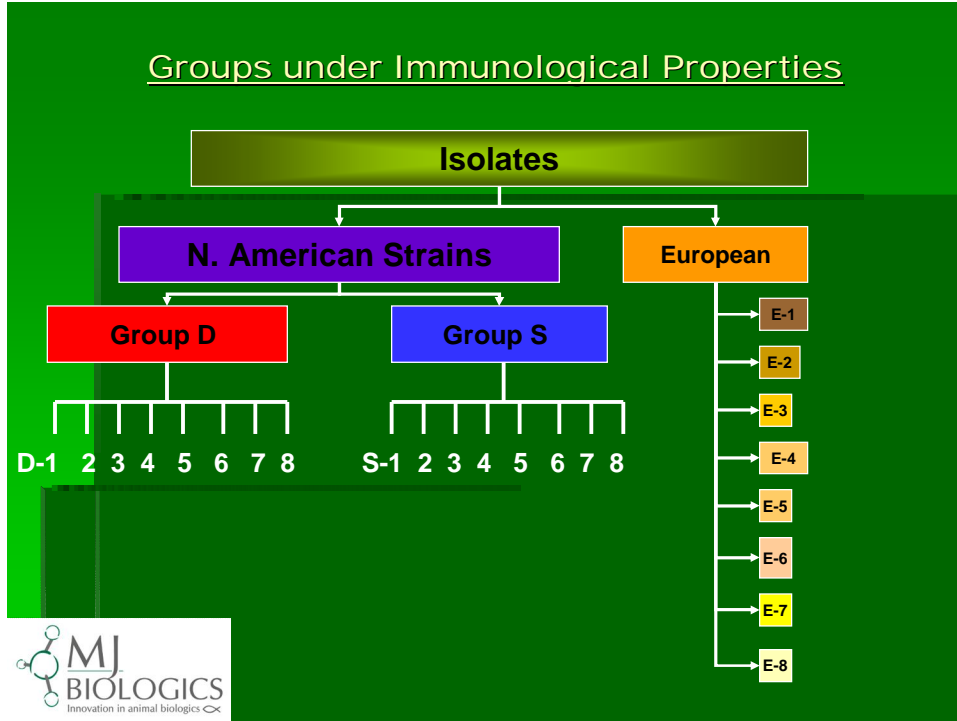
Slide #2



MJ Biologics' Technologies

- **Tech. #1 ; Grouping viruses**
 - Sort PRRSVs based on immunological properties
 - Select right viruses for vaccines
- **Tech. #2 ; Subunit Vaccine production**
 - Time-course study for right harvesting time
 - Apply Selectigen MJPRRS Technology™

Slide #3



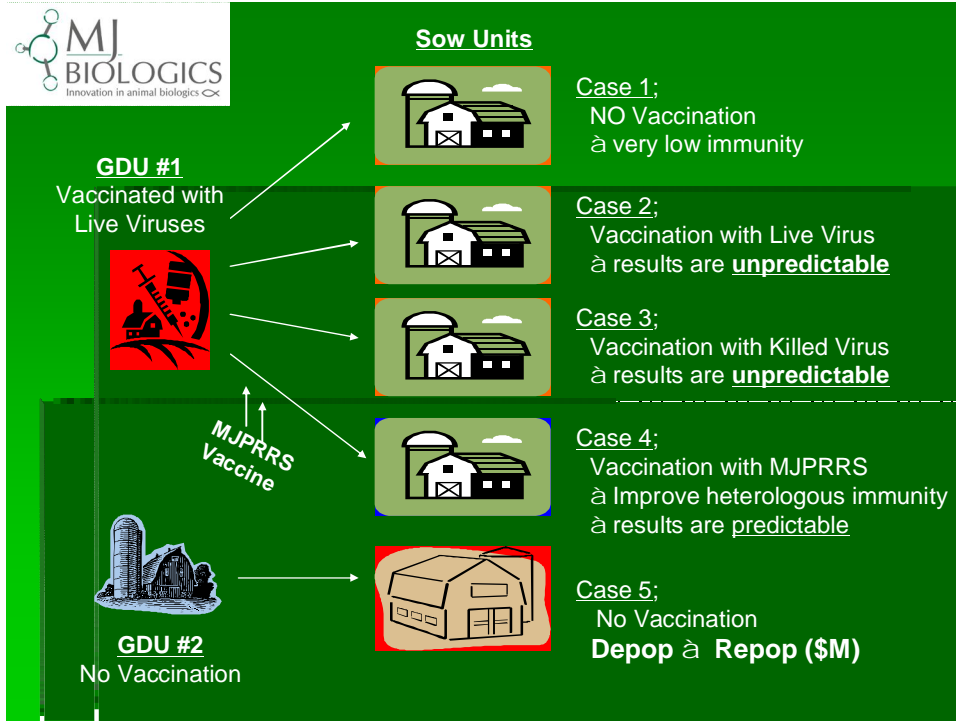
Slide #4

History of Farm YYY

Ori-FV-072905	AALVN AS NSSSHLQ LIYNLTICEL NGTDWLNSHF
GiltA1-082505	AALVN AS NSSSHLQ LIYNLTICEL NGTDWLNSHF
OfFdSG-061506	AALVN ASN SSSHLQ LIYNLTICEL NGTXWLNSHF
Gilt2-111506	AALVN ASN SSSHLQ LIYNLTICEL NGTDWLNSHF

MJ BIOLOGICS
Innovation in animal biologics

Slide #5



Slide #6

