

PRRSV RESISTANT PIGS

Development and Regulatory Status

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REGULATORY AND EXTERNAL AFFAIRS



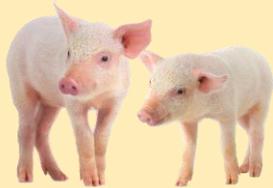
PRRS – WHY IMPORTANT

DISEASE

CAUSE

SYMPTOMS

TREATMENT



PRRS

RNA virus

Weakened immune system

Fever

Pneumonia

Stillborn litters

Vaccines ineffective

**Antibiotics treat
secondary infections**

PRRSv Cost Impact



**PRRS IS A
DEVASTATING AND COSTLY
DISEASE IN PIGS**

PRRS VIRUS RESISTANCE BY EDITING A SINGLE GENE IN PIGS

nature
biotechnology

 University of Missouri







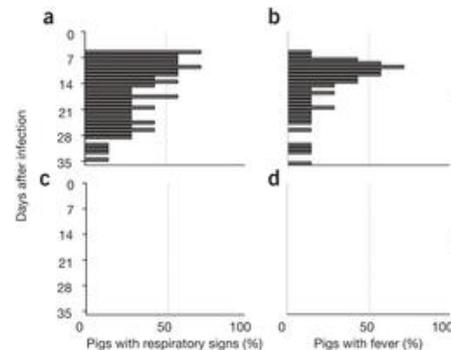
Gene-edited pigs are protected from porcine reproductive and respiratory syndrome virus

To the Editor:

Porcine reproductive and respiratory syndrome (PRRS) is the most economically important disease of swine in North America, Europe and Asia, costing producers in North America more than \$600 million annually¹. The disease syndrome was first recognized in the United States in 1987 and described in 1989 (ref. 2). The causative

disease syndrome and porcine circovirus-associated disease, and can establish a lifelong subclinical infection⁶. In 2006, a more severe form of the disease, called highly pathogenic PRRS, decimated pig populations throughout China⁷. Although genetic selection for natural resistance is an option, success to date has been limited, possibly due to the genetic diversity of the virus⁸.

homologous recombination and somatic cell nuclear transfer) were infected with PRRSV and compared with infected wild-type pigs, no difference in virus replication was found⁹. To test the role of CD163 in infection, we previously created 45 live-born piglets with insertions ranging from 1 bp to 2 kb, deletions from 11 bp to 1.7 kb, as well as a partial domain swap in *CD163* using



RESEARCH ARTICLE

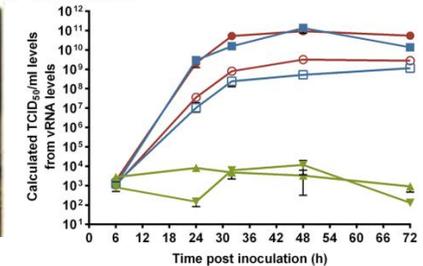
Precision engineering for PRRSV resistance in pigs: Macrophages from genome edited pigs lacking CD163 SRCR5 domain are fully resistant to both PRRSV genotypes while maintaining biological function

Christine Burkard¹, Simon G. Lillico¹, Elizabeth Reid², Ben Jackson², Alan J. Mileham³, Tahar Ait-Ali¹, C. Bruce A. Whitelaw³, Alan L. Archibald^{1*}

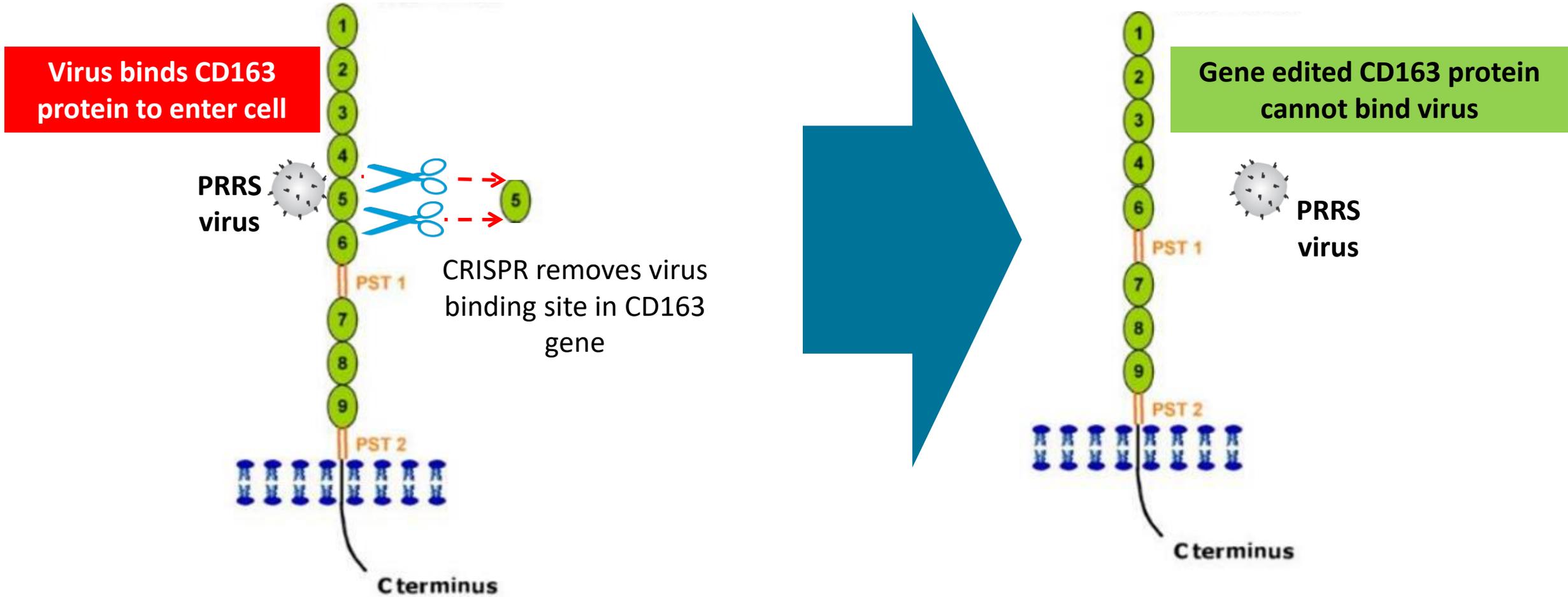
A



A PRRSV VR-2385



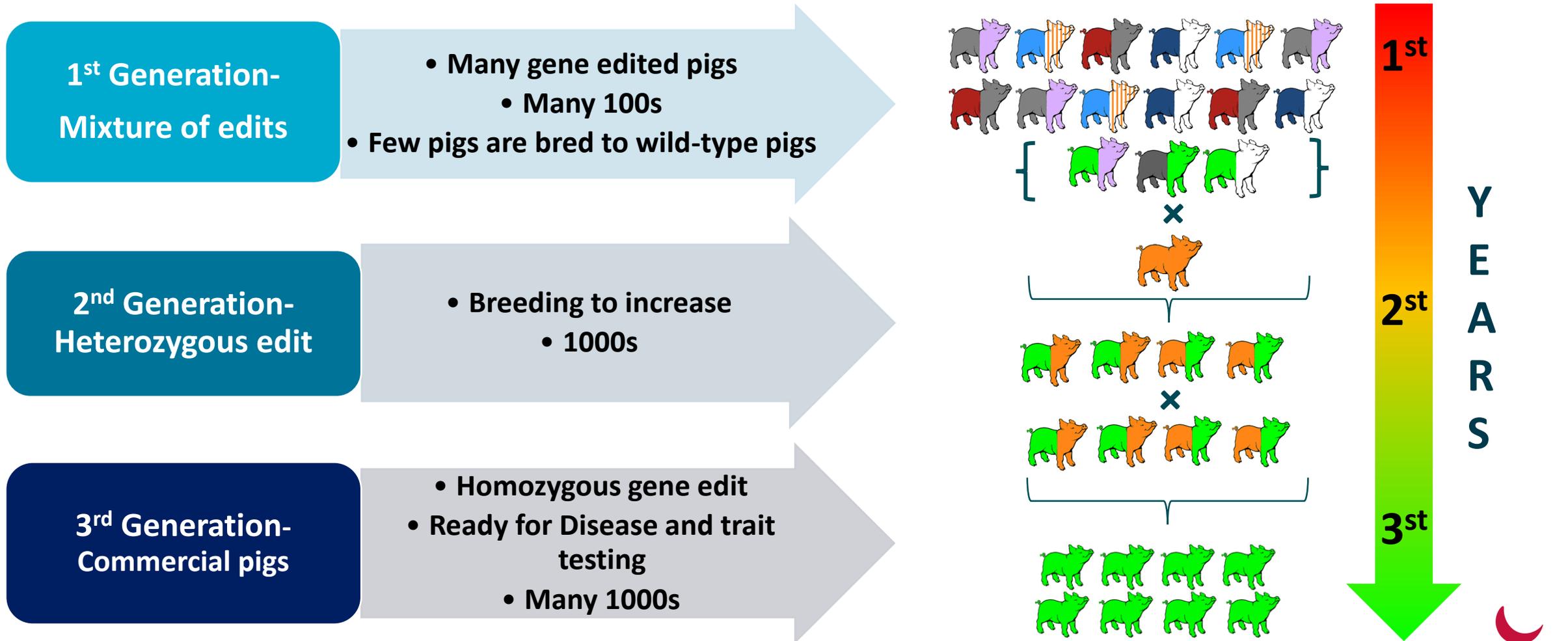
GENUS EDIT REMOVES PART OF PIG GENE



1. No foreign DNA added (not transgenic)
2. Repeatable, identical edits in multiple founders across four elite lines



GENUS SCREENS ALL GENERATIONS OF GENE EDITED PIGS



GLOBAL REGULATORY REVIEW

US FDA

- Submitted first 2 of 7 components
- Remaining submissions in 2023
- Est approval late 2023/early 2024

Global regulatory submissions in key markets (2023)

- Canada, Mexico, Colombia, Brazil, Chile, Japan, South Korea, Philippines, Australia, China
- Seeking full food/feed/production approvals

Thank you!

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