



DEVELOPMENTS IN ANIMAL BIOTECHNOLOGIES – SWINE COMMERCIAL CONSIDERATIONS

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Global R&D External Affairs & Technology Market Acceptance

Genus plc

OUR CHALLENGE - THE PRRSV FALLOUT



THE ANIMAL

Suffering from secondary Infections

Higher mortality rates - 12%–15% die (millions),

pregnancies fail

THE FARMER

Loss of animals
Economic loss

Chooses to treat sick animals and use more antibiotics

US - \$1B in direct and indirect

EU - €1.5 B

China, Japan, Korea, Canada, Mexico

THE CONSUMER

Concerns about animal suffering

Wants less antibiotics

Wants the safest food system possible

Needs affordable choices

THE FOOD COMPANY

Concerns about sustainability impact

Looking to eliminate waste

Looking to reduce antibiotic use when possible

THE ENVIRONMENT

More waste

More chance for disease to spread to other geographies



WHO IS GENUS?

Committed to continuously improving the health of farm animals to produce higher quality milks and meat more sustainably.

World-leading animal genetics company

- Shared R&D platform
- Two operating companies – PIC (porcine) and ABS (beef, dairy)
- 50,000+ Customers (farmers, food companies, producers, packagers)
- 70+ Countries
- More than 2,700 employees

Produces improved genetic lines of pigs and cows

85 year history

#1 in pork, #1 in dairy, #1 in beef



Making animals healthier to help nourish the world



GENUS AND GENE EDITING

Commercialization Principles

- Technology choices emphasizing
 - Genuine animal well-being
 - Real farmer economic benefit
 - Science supported sustainability
- Developing technology transparently and responsibly
- Proactively engaging regulators, stakeholders and consumers

RESPONSIBILITY AND TRANSPARENCY

No unexpected traits: We make sure animals carry only desirable traits, no unexpected ones

No new risks: We reduce the risk of introducing new human allergens or other risks

Nutrition: We check that the meat has the same nutritional equivalency or more nutritional value

Meet Regulatory Standards: Comply with testing, safety requirements and requirements of regulatory bodies in markets around the world.



CONSUMER CONCERNS NEED TO BE TAKEN SERIOUSLY

- Transparency – what is in their food
- Questions about unintended consequences
- Commitment to safety and testing
- Doing the right thing for the animals

**WHAT WON'T WORK:
NOT MAKING INFORMATION
TRANSPARENT**



GENUS' ETHICAL COMMITMENTS

- Transparency
- Global Regulatory Compliance
- Monitoring Unintended Consequences
- Environmental Stewardship
- 3rd Party Oversight

It's About Doing the Right Things for Animals

GENE EDITING ETHICAL COMMITMENTS

Genus is the world-leading animal genetics company that produces genetic lines of pigs and cows for farmers and food companies around the world to be raised for meat and milk. Through our ever-growing knowledge of genetics, we strive to continuously improve the health of animals and to improve these animals' ability to produce higher quality meat and milk more sustainably. It is our responsibility, as part of the larger food system, to help farmers and food companies raise the healthiest animals. Genus uses gene editing to strive to reach this goal of raising healthier farm animals and creating a healthier and safer food system.

In the company's use of this technology, both in research and in eventual commercialization, it stands by the following ethical commitments:

- TRANSPARENCY**
Genus will provide information to our customers, partners and consumers about our use of gene editing. We will collaborate with our food system partners to create a process that makes information transparent to the public. Specifically:
 - We will look for opportunities to engage with the public regarding questions or information about our disease resistant animals from gene editing.
 - We will share the process of how gene editing is used to develop disease resistant animals, within the limits of proprietary business information and FDA regulations as well as the regulations of government bodies in key markets around the world.
 - We will share the outcomes of our research and testing processes, within the limits of proprietary business information and FDA regulations as well as the regulations of government bodies in key markets around the world.
 - We will provide clear disclosure to our customers and partners of any use of gene editing in the animals or the offspring of animals they purchase from Genus.
- HUMAN HEALTH COMES FIRST**
Genus will never use gene editing in animals in any way that will jeopardize human health or safety.
 - We will test to make sure no animal entering the food system introduces new human allergens or other new human risks.
 - We will test to make sure that meat from any animal entering the food system is nutritionally equivalent or more nutritional than meat from other farm animals
 - We will comply with all FDA testing and safety requirements.
- REGULATORY COMPLIANCE**
Genus will partner with and comply with all government regulations related to farm animals and gene editing.
- Making Animals Healthier**
Genus will use gene editing to make animals healthier.
 - We will not use it to cover up any animal abuse. Genus will not use gene editing in any way to create animals that can withstand mistreatment such as unsanitary conditions or physical abuse.
 - We will not use it for human entertainment or recreation. Genus will use gene editing only to produce healthier animals and eradicate disease in animals used in our food system.
- MONITORING FOR UNINTENDED CONSEQUENCES**
Genus will implement a monitoring system for any commercialized animals to ensure there are no unforeseen consequences to people, the animals themselves, farmers or the environment.
 - As part of our regular business operations, we continually test new generations of our pigs and cows to ensure they carry only desirable traits and not any unexpected ones.
- ENVIRONMENTAL STEWARDSHIP**
Genus will use gene editing to improve environmental stewardship whenever we can. We strive to produce animals that will lessen environmental impact through solutions like the need for less antibiotics or the ability to produce less waste in our food system. We will not introduce animals that create a heavier burden on the environment when raised for food.
- THIRD PARTY OVERSIGHT**
Genus will seek third party validation to certify our testing and scientific study results before bringing any animal from gene editing to commercialization.

WRAP UP HEADLINES

- Animals get sick and we can eliminate disease and death with gene editing
- This makes animals healthier, uses less antibiotics, makes food system more sustainable – all things consumers and food system wants
- Genus will seek global risk assessments to commercialize PRRS resistant pigs during next several years
- Needs to be transparent and focused on doing what is right for the animals





Thank you
Now we can do
right for the
animal

