Genus

HARNESSING TECHNOLOGY IN LIVESTOCK PRODUCTION

HEALTHIER ANIMALS

A MORE SUSTAINABLE FOOD SYSTEM

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Chief Scientific Officer

OUR CHALLENGE

Farm animals get sick, sometimes with a disease with no effective cure or vaccine

Disease often lead to death or a lifetime of secondary infections that need antibiotic treatment

THE FALLOUT





THE ANIMAL

Suffering from secondary Infections

Higher mortality rates

THE FARMER

Loss of animals

Economic loss

Chooses to treat sick animals and use more antibiotics

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

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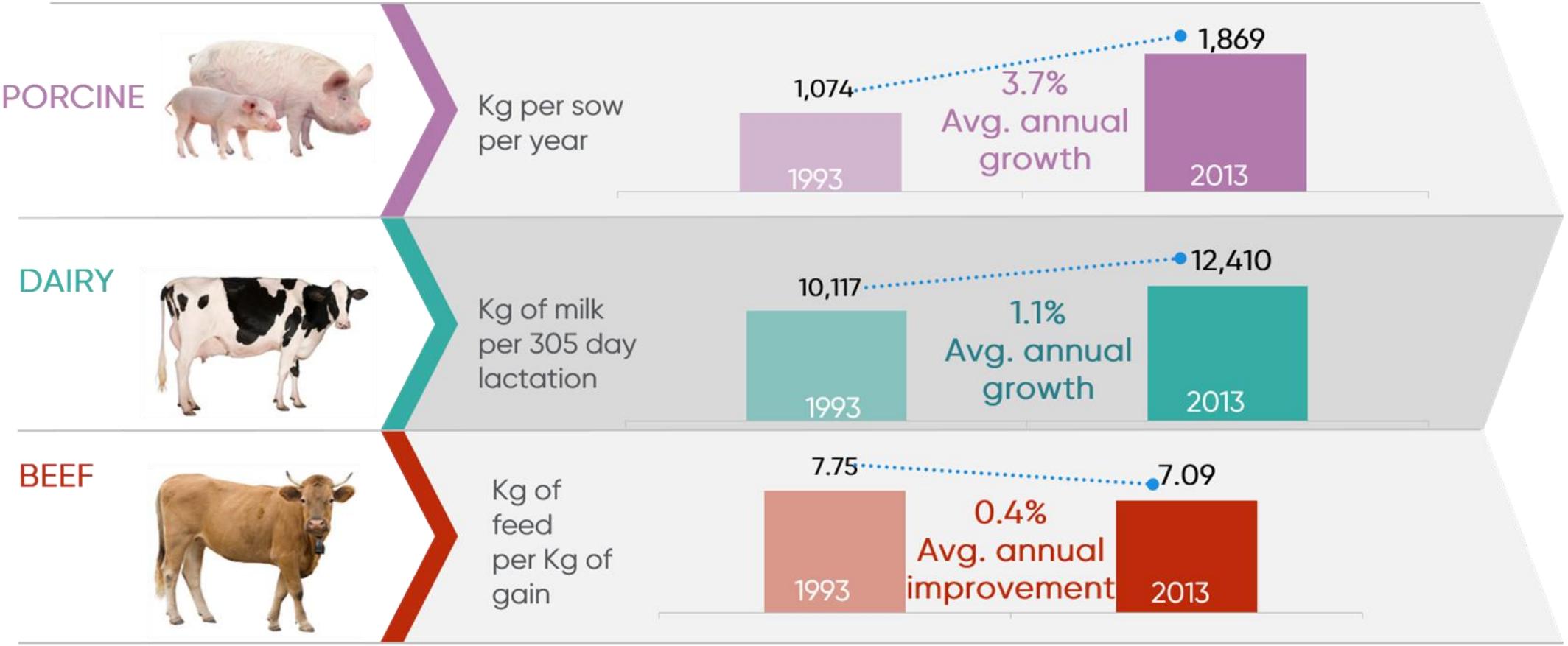
IMPROVEMENTS FROM BETTER BREEDING LEAD TO MORE SUSTAINABLE ANIMAL PROTEIN PRODUCTION



Note: Data refers to US pork, dairy and beef industries
Sources: Pork Checkoff (National Pork Board, US); Council on Dairy Cattle Breeding (US); Dan Shike, University of Illinois (2012); Genus analysis

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TODAY

1. Genus plc & Genus Research and Development Technology Platform

2. Technology Innovation Focus – Animal health & Food System Sustainability

3. Technology Acceptance Approaches – Government, Global Food System, Consumers acceptance

Genus plc and R&D Focus

WHO IS GENUS?

World-leading animal genetics company

50,000+ Customers (farmers, food companies, producers, packagers)

70+ Countries

More than 2,700 employees

60+ year history

2019 Revenue: €489M[(1)]
2019 Operating Profit: €65M

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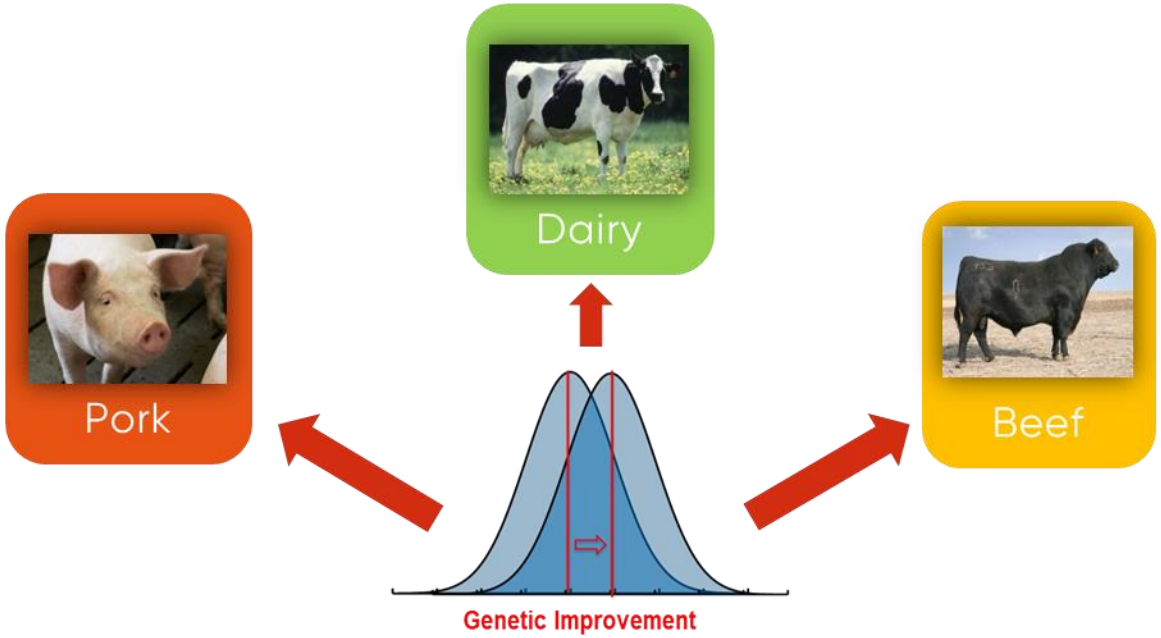
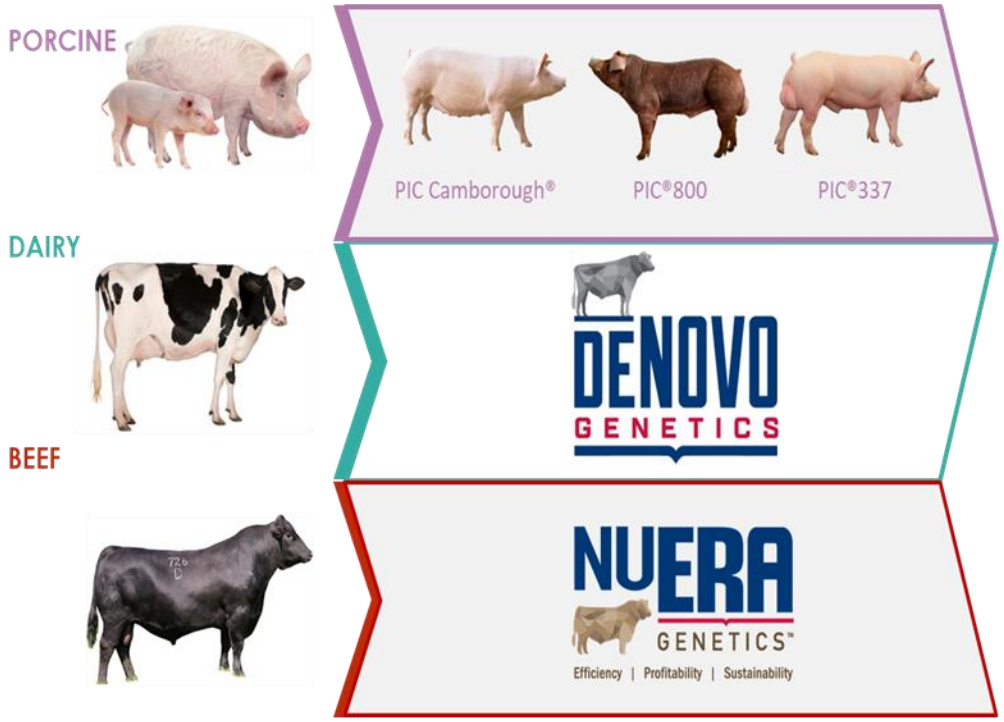
PIC®

ABS®

Genus

GENUS R&D TECHNOLOGY PLATFORM & PRODUCT DEVELOPMENT





Exciting new tools and capabilities; combining the power of genomic science & technology with the power of genetic selection

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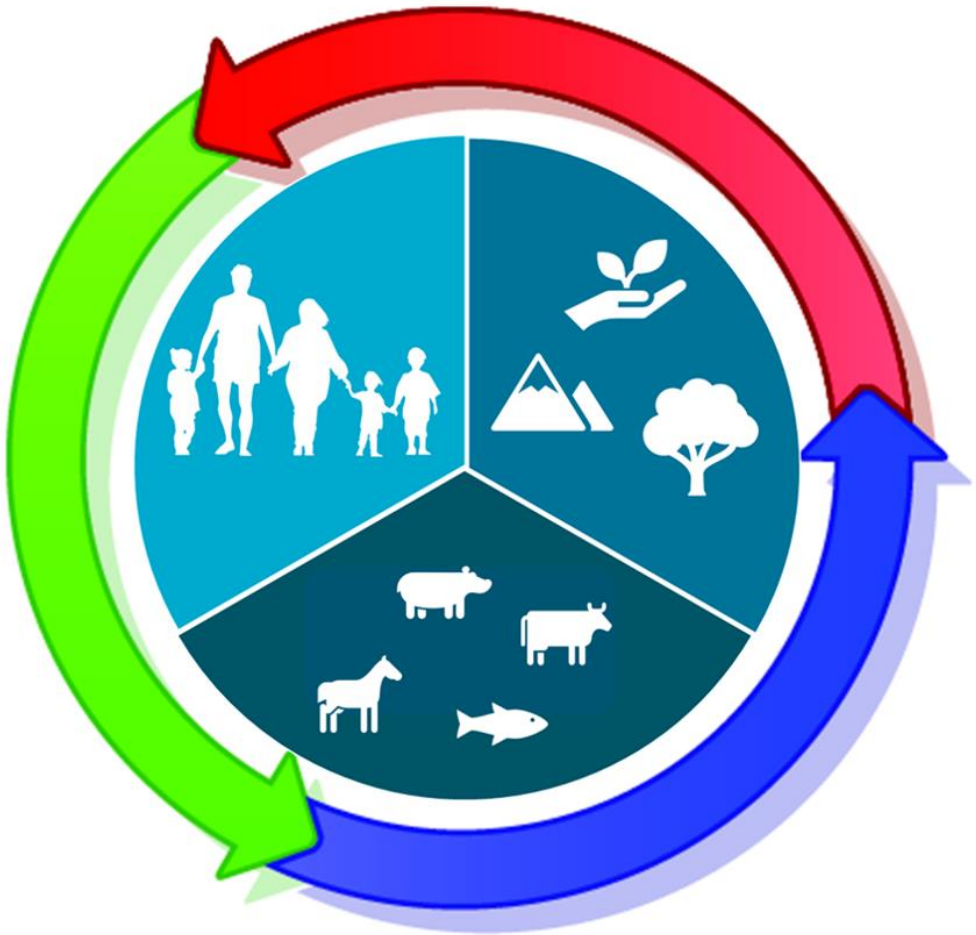
Animal Health and Food System Sustainability

ONE HEALTH INITIATIVES



- **Healthy People**
- **Health Environments**
- **Healthy Animals**

TODAY, ANIMAL AGRICULTURE FACES MANY CHALLENGES

Animal welfare	Carbon footprint	Sustainability	Antibiotic Use
Nutrition	Disease	Consumer Activists	Profitability of Small Farms
Food Safety	Aging Farmer Population	Food Waste	

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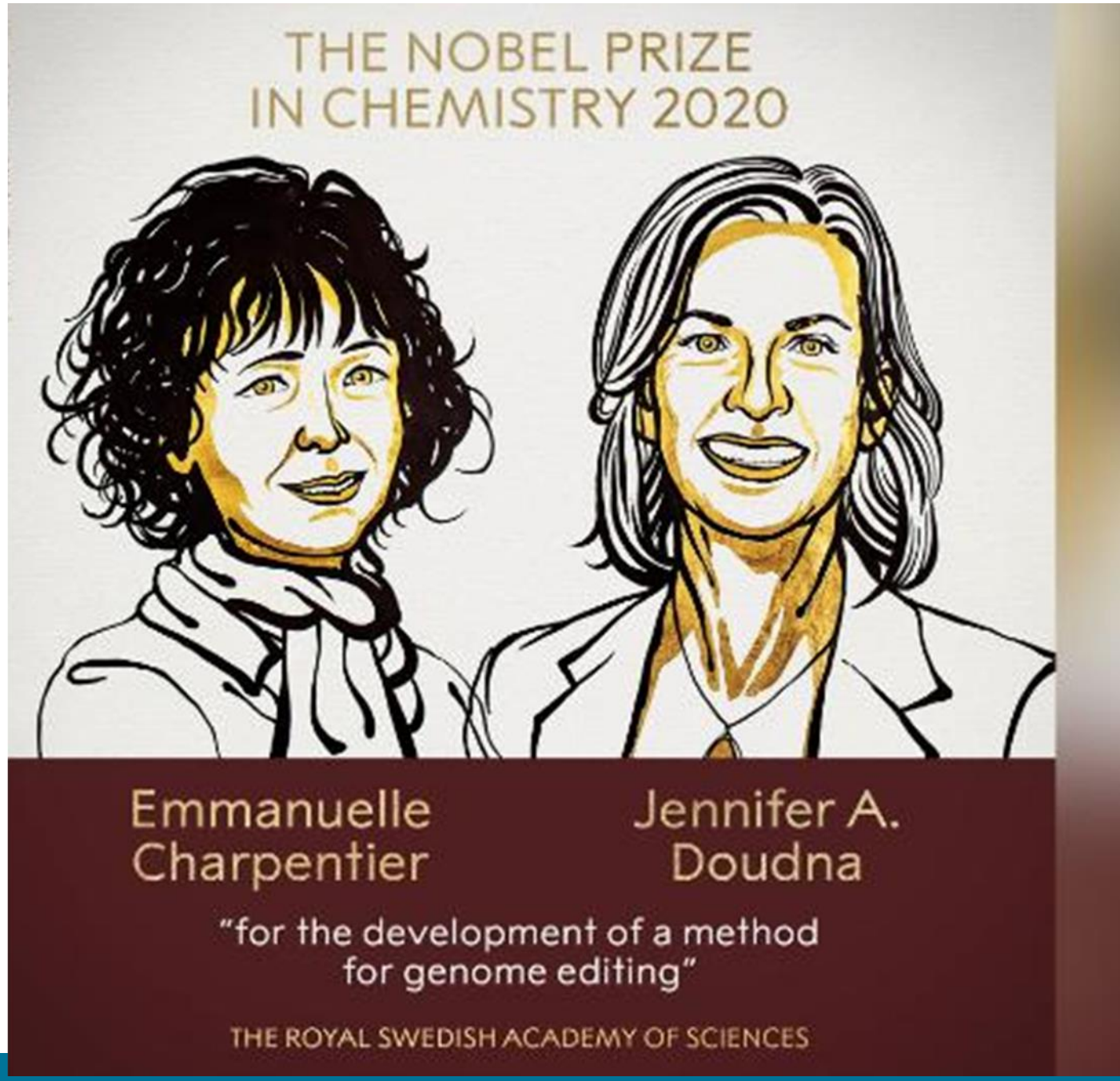
TRANSFORMATIVE TECHNOLOGY – GENE EDITING

"The ability to edit genes provides an incredible toolkit for scientific research that will benefit humankind for generations to come, from fighting and preventing diseases to feeding our growing global population…"

- Tom Welton, president of the Royal Society of Chemistry



THE POSSIBILITY:

Harness new innovation and technologies to greatly reduce diseases

Improving animal's lives today

Preparing for future unknowns and emerging diseases

Opportunities:

Porcine Reproductive and Respiratory Syndrome Virus (PRRS)
Bovine Respiratory Disease
Swine Flu
Swine Coronavirus
African Swine Fever

GENUS APROACH TO GENE EDITING

WHAT IT IS

- ✔ No addition of DNA from a foreign species
- ✔ "Turning Off Genes" that create diseases susceptibility
- ✔ Focused on making animals healthier
- ✔ Focused on eradicating diseases with no cure

WHAT IT ISN'T

- ✗ Transgenic – foreign DNA
- ✗ Used for human amusement (designer animals)
- ✗ Used to allow animals to withstand harsh conditions or allow for abuse

PATH FROM INVESTIGATION TO COMMERCIALIZATION- PRRSv resistant pigs

TECHNOLOGY ACCEPTANCE

Three areas required

- Government Review
- Aligned Global Food System
- Consumer Acceptance

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GENUS TESTS FOR UNINTENDED CONSEQUENCES

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 all FDA testing and safety requirements as well as the requirements of other regulatory bodies in markets around the world.

GENUS' ETHICAL COMMITMENTS

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 not 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.


NOW WE CAN
DO EVEN
BETTER FOR
THE ANIMAL