



TECHNOLOGY

Single Generation Genetic Modification of Large Domestic Animals

OVERVIEW

Background

Pigs are an economically important agricultural animal and increasingly a coveted biomedical research tool. In recent years, there has been an increasing consensus that the mouse, while still a powerful genetic model species has limitations and cannot fulfill the full spectrum of biomedical demands. As an alternative, large domesticated animals such as pig are gaining favor because they are more similar anatomically, physiologically, and immunologically to humans while maintaining the advantages of being a litter-bearing species and having a relatively long life span, permitting long-term investigations. Large domesticated research animals are also not associated with the negative public response that non-human primate research models are. However, until now there has been a lack of incentive for the use of pig as “preferred models” due to the genetic modification technologies that lag behind the mouse models. The development of efficient genetic modification technologies and techniques for pigs would not only increase their use in biomedical research models but would also lead to technological advancements in pig agriculture such as improved feed efficiency, decreased environmental impact, and/or disease resistance.

Innovative Technology

Researchers at the University of Maryland have developed techniques to perform specific gene editing in large domestic animals. Their techniques allow for multiple gene deletion “knock-out” or gene insertion “knock-in” in one generation, a key factor in animals that take multiple years to reach sexual maturity. The genetic modifications are more specific than current techniques with fewer off-target effects.

APPLICATIONS

- Development of transgenic porcine models for biomedical research
- Rapid genetic modification of livestock for increased production in agriculture

ADVANTAGES

- Increased gene translation efficiency
- Can generate genetically modified animals within a single generation

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Additional Information

INSTITUTION

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PATENT STATUS

Pending

LICENSE STATUS

Contact OTC for licensing information

CATEGORIES

- Agricultural

EXTERNAL RESOURCES

- [US Patent 10,349,639](#)

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