# *Oryctolagus cuniculus*: A human model

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**Abstract**. The paper is a brief presentation of the similarities between human and rabbit in the context of biomedical research. The genetic similarities, mammalian physiology, disease susceptibility, reproductive biology, ease of manipulation, phenotypic variability, and practical relevance of rabbits make them an invaluable genetic model for studying human health and disease. By leveraging the strengths of rabbit genetics research, scientists can gain valuable insights into the genetic basis of human biology and develop novel strategies for disease prevention, diagnosis, and treatment.
**Key Words**: rabbit, rabbit genetics, genomic research, biomedical research, disease, mammals.

**Introduction**. The rabbit, scientifically known as *Oryctolagus cuniculus*, has long served as a valuable model organism in biomedical research, particularly in genetics, due to several key similarities with humans (Xu et al 2021). These similarities make rabbit genetics research highly relevant and informative for understanding human health and disease (Song et al 2021ab). Rabbits are considered a useful genetic model for human studies (Fan & Wang 2021).

**Genetic similarities**. While humans and rabbits are not closely related in terms of evolutionary history, they share a significant portion of their genetic makeup. Many genes in rabbits have orthologs (genes with similar functions) in humans, allowing researchers to study comparable genetic pathways and processes (Sengupta & Dutta 2020).

**Mammalian physiology**. Rabbits, like humans, are mammals, which means they share fundamental physiological processes, organ systems, and developmental pathways (Fontanesi 2021). This similarity in basic biology enables researchers to study genetic mechanisms underlying human diseases in a system that closely mimics human physiology.

**Complexity of genome**. The rabbit genome, while smaller and less complex than the human genome, still exhibits a level of complexity that allows researchers to investigate intricate genetic interactions and regulatory networks. Studying gene expression patterns, epigenetic modifications, and genetic variations in rabbits can provide insights into similar processes in humans.

**Disease susceptibility**. Rabbits are susceptible to many of the same diseases that afflict humans, including cardiovascular diseases, infectious diseases, cancer, and metabolic disorders (Hou et al 2022). By studying the genetic basis of disease susceptibility in rabbits, researchers can gain valuable insights into the genetic factors predisposing humans to similar conditions (Matsuhisa et al 2020).

**Reproductive biology**. Rabbits have a relatively short gestation period and large litter sizes, making them valuable models for studying reproductive biology, embryonic

development, and fetal programming. These aspects are crucial for understanding human reproductive health, fertility issues, and prenatal development.

**Ease of manipulation**. Rabbits are amenable to genetic manipulation techniques, including gene knockout, gene editing (e.g., CRISPR-Cas9), and transgenic technologies. This allows researchers to create rabbit models with specific genetic modifications to study the role of individual genes in health and disease (Brousseau & Hoeg 1999).

**Phenotypic variability**. Like humans, rabbits exhibit considerable phenotypic variability, both in terms of physical traits and disease susceptibility. This variability provides researchers with a diverse genetic landscape to explore genotype-phenotype relationships and to identify genetic modifiers of disease (Song et al 2020).

**Veterinary and agricultural importance**. Rabbits are economically significant animals in agriculture and veterinary medicine, making them the subject of extensive research into health management, disease prevention, and breeding strategies (Sikiru et al 2020; Petrescu & Petrescu-Mag 2018). Insights gained from rabbit genetics research can have practical applications in animal husbandry, food production, and veterinary care (Petrescu-Mag et al 2014; Petrescu-Mag & Creanga 2013).

**Conclusions**. The genetic similarities, mammalian physiology, disease susceptibility, reproductive biology, ease of manipulation, phenotypic variability, and practical relevance of rabbits make them an invaluable genetic model for studying human health and disease. By leveraging the strengths of rabbit genetics research, scientists can gain valuable insights into the genetic basis of human biology and develop novel strategies for disease prevention, diagnosis, and treatment.

**Conflict of interest**. The author declares no conflict of interest.

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Received: 18 November 2023. Accepted: 14 December 2023. Published online: 27 December 2023.
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How to cite this article:
Petrescu-Mag I. V., 2023 *Oryctolagus cuniculus*: A human model. Rabbit Gen 13(1):27-29.