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Cloning and editing of animals for human benefit

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Several international associations have banned the use of genetically modified animals in sports competitions. The latest development has been the Argentine Polo Association, following the announcement that cloned specimens of Pureza, a mare that has won multiple awards, have been produced. In addition, the five clones of the horse have an alteration in the myostatin gene, produced by gene editing, with the purpose of modifying its musculature and increasing its speed (*Kavanagh, Nature 2025*).

There is growing concern about the generation of laboratory animals with new properties and that these new "artificial" beings may alter ecosystems, as invasive species. It would be one more risk to achieving global health ("One Health"), which we must pursue and is at increasing risk (*Winkler et al., Lancet 2025*).

The production of transgenic animals in veterinary medicine aims to increase the production of meat, milk, or eggs, or to provide resistance to infections. For those reasons, cows, sheep, pigs, and other domestic animals with genetic modifications are being raised for human consumption.

Genetically modified animals are also used in transplant medicine. There are pig farms (Revivicor, eGenesis, etc.) where animals have multiple mutations aimed to reduce the risk of causing rejection. In 2023, a heart transplant was performed from a transgenic pig with 10 mutations to a patient with terminal heart failure. After 6 weeks of life, the patient suffered a reactivation of a porcine cytomegalovirus and died (*Griffith et al. N Engl J Med 2022*).

More recently, several kidney transplants from genetically engineered pigs have been performed on patients undergoing hemodialysis. Some have already survived more than 6 months (*Fieldhouse R. Nature 2025*).

With long waiting lists for organ transplants, interest in xenotransplantation has made a strong comeback. The need for early experimental data and improvements in these transgenic animals to enhance transplant tolerance in humans has raised important ethical questions (*Hurst et al., Clin Anat, 2025*).

There is a risk of violating the precautionary principle, one of the fundamental pillars in medical ethics, by conducting experiments on humans without adequate control of risks and side effects. For example, a Chinese team has studied the performance and prognosis of a transgenic pig lung transplant using a young patient with brain death (*He et al. Nat Med 2025*).

Seven years ago, another Chinese researcher announced that he had produced in the laboratory, through *in vitro* fertilization, twins with genes modified for HIV receptors by gene editing. The two girls had been born well and were apparently healthy. However, there were other infants obtained in a similar way, for whom no information was available (*Cyranoski et al. Nature 2018*).

In light of all the above, there is a consensus that it is necessary to regulate the use of new genetic technologies that enable the modification of animals, and especially our own human species. There must be transparency and consensus approval of the objective of these experiments, which should primarily aim to cure or prevent a disease. There is no other type of justification for manipulating our genetic heritage (*Soriano V. Hereditas 2019*). On the other hand, the risks and side effects must be well understood by everyone involved – researchers, patients, and authorities – to avoid any chance of abuse (*Daley et al. N Engl J Med 2019; Rosenbaum L. N Engl J Med 2019*).

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