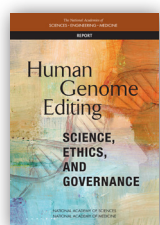


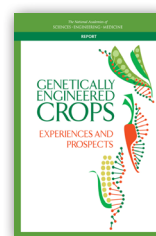
Reports on Gene Editing, Related Clinical Research, & Applications from the National Academies

Genome editing technologies such as CRISPR/Cas9 can be applied in myriad ways to achieve genetic changes in cells in the laboratory, in microbes, in nonhuman organisms, or in human subjects. Resources that explore a range of these applications are listed below.



Human Genome Editing: Science, Ethics, and Governance is a comprehensive study of the scientific underpinnings of human genome editing technologies, their potential use in biomedical research and medicine—including human germline editing—and the clinical, ethical, legal, and social implications of their use.

Genetically Engineered Crops: Experiences and Prospects addresses safety, environmental, regulatory, and other aspects of food crops developed through the use of genetic engineering technology. Such crops can be produced using a number of methods, and new genome-editing tools are among

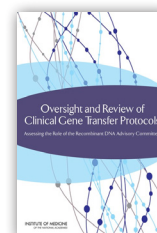


Gene Drives on the Horizon: Advancing Science, Navigating Uncertainty, and Aligning Research with Public Values focuses on a specific application enabled by CRISPR/Cas9 technology that allows genetic changes to spread in a population in the absence of selective advantage. This technology is not applicable to every species and is most commonly proposed for uses such as insect vector control. The ability of heritable genetic changes to spread through an ecosystem raises its own complex set of scientific, ethical, and governance challenges genome-editing tools are among them.



Workshop on Gene Editing to Modify Animal Genomes for Research: Scientific and Ethical Considerations: Genome-editing tools can be used to produce laboratory animal models enabling better study of diseases, as well as to produce livestock with desired traits. The workshop explored animal uses of genome editing, along with associated ethical and regulatory considerations.

Oversight and Review of Clinical Gene Transfer Protocols: Assessing the Role of the Recombinant DNA Advisory Committee examines the role of the U.S. Recombinant DNA Advisory Committee (RAC), recommending that it move toward more judicious use of its advisory power to review specific protocols, and that it focus primarily on novel applications of gene therapy or on providing a venue for broad public debate about the therapy.



Mitochondrial Replacement Techniques: Ethical, Social, and Policy Considerations presents an analysis of the special opportunities and concerns associated with making changes in mitochondrial DNA in gametes or embryos.

Guidelines for Embryonic Stem Cell Research outlines the regulatory landscape and provide a roadmap for professional self-regulation for emerging technologies that generate considerable public interest and controversy.



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