

Personal Rights of the Embryo in the Era of Gene Editing Technologies: Lessons for Legal Development from French Law

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Abstract—The rapid development of gene editing technologies poses significant challenges to the identification and protection of the personal rights of the embryo. While these technologies may directly affect fundamental personal rights such as the right to life, the right to bodily integrity, and genetic identity, the absence of a clear legal qualification of the embryo under Vietnamese civil law has resulted in an ambiguous and insufficient legal framework for protecting such rights. This article examines the mechanisms for protecting the personal rights of the embryo in the context of gene editing, with particular attention to the approach adopted by French law in reconciling the freedom of scientific research with the protection of human dignity. Based on an analysis of French legislative perspectives, the article proposes several directions for improving Vietnamese law with regard to the protection of the personal rights of the embryo in an era where gene editing technologies are becoming increasingly prevalent.

Keywords— Gene editing; bioethics; personality rights; human embryo.

I. INTRODUCTION

The rapid development of gene editing technologies has opened new possibilities for the prevention, diagnosis, and treatment of genetic diseases. At the same time, these technologies raise significant legal and ethical challenges, particularly where they permit direct intervention in the human genetic structure at the embryonic stage. Ongoing debates over the limits of research on human embryos and the responsibility to protect human rights in the life sciences demonstrate the need for timely legal regulation in this field. However, Vietnamese civil law does not currently recognize the embryo as a subject of rights, resulting in a regulatory gap in the protection of fundamental personality rights such as the right to life, bodily integrity, and genetic identity. Against this background, examining mechanisms for the protection of embryonic personality rights under the impact of gene editing technologies is necessary. Drawing on French legislative experience, this study proposes directions for improving Vietnamese law in this area.

II. OVERVIEW OF MECHANISMS FOR THE PROTECTION OF PERSONALITY RIGHTS UNDER THE IMPACT OF GENE EDITING TECHNOLOGIES

A. Overview of Gene Editing Technologies

From a scientific perspective, gene editing refers to a set of biotechnological techniques that enable deliberate intervention in DNA structures in order to modify the genetic characteristics of living organisms with a high degree of precision. [1] When such interventions are performed on germline cells or human embryos, the resulting genetic changes may be heritable across generations, thereby creating significant potential for the prevention of inherited diseases. [2] According to Jennifer Doudna, one of the scientists who co-developed the CRISPR Cas9 technology, gene editing involves the use of biological tools to intentionally intervene

in an organism's DNA so as to alter or repair defective gene sequences. This mechanism is derived from the natural defense systems of bacteria and other unicellular microorganisms against foreign genetic material. [3]

At present, five main groups of gene editing technologies can be identified. Among them, CRISPR Cas9 is the most prominent due to its high efficiency, relatively low cost, and comparatively simple operational procedures. Other technologies, such as TALEN and ZFN, allow DNA cleavage with higher specificity but require more complex design and implementation processes. Newer generations of technologies, including Base Editing and Prime Editing, have been developed to enhance editing precision and reduce off target effects, reflecting a broader trend toward safety and sustainability in gene editing research and applications.

B. Concept and Characteristics of the Embryo

According to the World Health Organization, the embryo constitutes the early stage of human development from fertilization until the end of the eighth week of gestation. [4] From a biological perspective, the embryo carries the complete genetic makeup of a human individual and possesses the potential to develop into a fully formed human being under appropriate conditions. [5] Embryonic development involves successive stages of cell division, the formation of the blastocyst with cellular differentiation, and gastrulation, during which three germ layers are established as the foundation for organ formation. At this stage, however, the embryo lacks a developed nervous system, consciousness, and the capacity to perceive pain. [6] Accordingly, although it is a living entity with a complete genetic code, the embryo does not yet exhibit the characteristics of a conscious individual.

A distinction must be drawn between the embryo and the fetus in both medical and legal contexts. The fetus represents a subsequent stage of development, typically from the ninth week onward, during which organs have formed and begun to function. This stage is generally accorded a higher level of

legal protection, particularly in relation to the prenatal right to life. By contrast, the embryo is commonly approached as a form of potential life rather than an independent human individual. [7] This conceptual distinction underpins ongoing legal debates concerning the legal status of the embryo in the context of advances in gene editing technologies. [8]

C. General Overview of Personality Rights and Their Protection Mechanisms

Personality rights constitute a set of fundamental rights inherent to each individual, reflecting human dignity and bodily integrity. In legal theory, these rights are non-proprietary in nature, inalienable, non-waivable, and subject to a high level of legal protection, thereby affirming the human being as an autonomous subject in society. [9] From the perspective of bioethics, the scope of personality rights extends to genetic rights, including the right to genetic integrity, the right to informed and autonomous decision making in medical interventions, and the right to be born free from avoidable genetic harm. [10]

In the context of advancing gene editing technologies, mechanisms for the protection of the personality rights of embryos must strike a balance between scientific progress and respect for human dignity. Such mechanisms encompass protection grounded in ethical values and human dignity, recognizing the embryo as an entity possessing potential life; protection through legal norms that limit interventions in the human body and genetic material while establishing legal liability for violations; and protection through oversight and control by bioethical and judicial bodies. Accordingly, the protection of embryonic personality rights is not solely a legal issue, but rather an integrated concern at the intersection of law, ethics, and science.

D. Impact of Gene Editing Technologies on the Personality Rights of the Embryo

First, from a medical perspective, gene editing technologies have brought about fundamental changes in reproductive medicine and the treatment of genetic diseases. The combination of techniques such as preimplantation genetic diagnosis with gene editing enables direct intervention in the embryonic genome to eliminate pathogenic mutations or enhance disease resistance. While offering significant promise for the prevention of inherited disorders, such interventions simultaneously alter the biological nature of the embryo, transforming it from a naturally developing entity into an object that can be shaped by technology. The capacity to select and modify genetic traits introduces a new boundary between natural life and technological production, thereby directly affecting conceptions of embryonic dignity and humanity. [11] In this context, the embryo extends beyond the traditional scope of civil law, which recognizes legal capacity only from birth, giving rise to the need to expand the range of entities entitled to legal protection.

Second, from the perspective of social ethics, gene editing raises a core concern regarding the boundary between therapeutic intervention and human design, since any modification of the embryo may affect future generations. The UNESCO Universal Declaration on Bioethics and Human

Rights of 2005 affirms the principle of respect for human dignity at all stages of life and rejects the treatment of human beings as mere means for scientific research. On this basis, gene editing must be framed within respect for human dignity, avoiding tendencies toward commercialization or objectification of human embryos. The World Health Organization, in its 2021 recommendations on human genome editing, called for a moratorium on reproductive applications of gene editing and permitted only laboratory research subject to strict ethical oversight. However, the pace of technological development is outstripping the capacity of soft ethical norms to regulate it, thereby increasing the need for binding legal rules.

Third, from a legal perspective, gene editing technologies challenge traditional civil law concepts of legal subjects and expose gaps in existing mechanisms for the protection of personality rights. Technological intervention in embryos requires the law to extend its protective scope beyond individuals who have been born to include human life in formation. In this sense, gene editing is not merely a source of legal challenges but also a catalyst for the redefinition of legal subjectivity, oriented toward more comprehensive protection of human dignity and personality rights from the earliest stages of life.

III. FRENCH LEGAL EXPERIENCE IN PROTECTING THE PERSONALITY RIGHTS OF THE EMBRYO UNDER THE IMPACT OF GENE EDITING TECHNOLOGIES

A. The Current Legal Framework of the French Republic on Research and Genetic Intervention in Embryos

France is among the first European states to adopt dedicated bioethics legislation, embodied in a series of Bioethics Acts enacted in 1994, 2004, 2011, and most recently in 2021. Unlike legal systems that focus primarily on regulating medical practice, French law places human dignity and humanity at the core of governance over life sciences, encompassing medically assisted reproduction, embryo research, and gene editing technologies. In terms of legal sources, the French framework is structured hierarchically. At its apex are constitutional principles, notably the principle that human dignity is inviolable and that the protection of the human being begins at the inception of life. [12] These principles permeate the entire field of biomedical legislation and serve as standards for constitutional review of bioethics statutes.

At the legislative level, the French Civil Code incorporates obligations to protect human dignity and bodily integrity derived from constitutional principles and from international instruments on biomedicine to which France is a party, in particular the Oviedo Convention. [13] Through provisions on personality rights related to the human body and genetic characteristics, the Civil Code establishes a protective framework in the genetic field and sets legal limits on genetic interventions, especially those capable of producing heritable effects for future generations. Within this framework, the Bioethics Act of 2021 affirms that research on embryos is permitted only under strict conditions. These include limiting embryo research to legitimate scientific objectives serving

medicine or fundamental biology, restricting embryo development to a maximum of fourteen days prior to the formation of the primitive streak in order to avoid encroachment upon neural development, and requiring approval from the National Consultative Ethics Committee. [14] The French approach reflects a model of controlled openness, allowing scientific research within ethical boundaries while ensuring absolute protection of human dignity and strict limits on intervention in human life.

B. The French Legal Position on the Personality Rights of the Embryo under the Impact of Gene Editing Technologies

French law does not recognize the embryo as a legal person, but regards it as a living entity in formation endowed with ethical value deserving of respect. Article 16 of the French Civil Code places the embryo within the scope of the human being in formation and subjects it to protection grounded in human dignity. This approach reflects an understanding of the embryo as a potential human being, possessing a particular moral value and constituting an object of legal respect, while lacking full legal personality. This position was affirmed in the landmark case *Vo v France* decided by the European Court of Human Rights in 2004, in which the Court held that member States retain a margin of appreciation in determining the legal starting point of human life. Accordingly, under French law, the embryo is treated as an object of protection rather than an autonomous subject of rights. Protection of the embryo in this sense is not intended to confer rights, but to prevent violations of dignity and genetic integrity affecting human life in formation.

C. Mechanisms for the Protection and Oversight of Embryo Research and Genetic Intervention in France

France has established a three tier oversight mechanism to ensure that all research involving human embryos and gene editing technologies is subject to strict control. First, the independent advisory body to the Government on ethical issues in the life sciences, the Comité Consultatif National d'Éthique, founded in 1983, is responsible for assessing research proposals, issuing recommendations, and publishing official opinions that guide public policy. [15] In its Opinion No 139 of 2019 on human genome editing, the CCNE emphasized that any genetic intervention on human embryos must comply with the principle of human dignity and must not produce heritable effects for future generations.

Second, administrative oversight is exercised by the regulatory authority under the Ministry of Health, the Agence de la biomédecine, which is empowered to grant, renew, or withdraw licenses for research involving human embryos, medically assisted reproduction, and the storage of stem cells. This body ensures compliance with both technical and ethical limits applicable to human biological research. [16]

Third, judicial oversight is ensured through the criminal law system. Under the Code pénal, Article 511 paragraph 1 provides for criminal sanctions including imprisonment of up to seven years and fines of up to one hundred thousand euros for unlawful creation of human embryos or for genetic modification of embryos for reproductive or commercial purposes. Taken together, this framework reflects a model of

ethical governance that combines binding legal norms in civil and criminal law with softer instruments of ethical review and social deliberation.

IV. THE CURRENT LEGAL SITUATION AND PROPOSALS FOR IMPROVING VIETNAMESE LAW ON MECHANISMS FOR THE PROTECTION OF THE PERSONALITY RIGHTS OF THE EMBRYO UNDER THE IMPACT OF GENE EDITING TECHNOLOGIES

A. Legal Gaps in the Protection of Embryonic Personality Rights in the Context of Gene Editing Technologies

Vietnamese civil law currently lacks a clear legal definition of the embryo, which creates difficulties in identifying and protecting the personality rights of this entity. Within the Vietnamese civil law system, Article 16 of the Civil Code 2015 provides that civil legal capacity of an individual arises from birth and terminates upon death. Accordingly, only a person who has been born and is alive may be a subject of rights and legal obligations. Clause 5 Article 2 of Decree No 10 of 2015 ND CP defines the embryo as the product of the fusion between an ovum and a sperm. Certain provisions such as Article 613 of the Civil Code 2015 on inheritance rights of the unborn child and Article 94 of the Law on Marriage and Family 2014 on determination of parentage in cases of assisted reproduction address only the fetus. At the same time, Vietnamese law contains no provisions directly regulating the legal status of the embryo. As a result, the embryo as the earliest stage of human life remains merely an object of medical practice, scientific research, and assisted reproduction, rather than a subject of rights. This situation complicates the legal assessment of activities such as gene editing, embryo storage, and embryo destruction in reproductive medicine and scientific research.

Vietnamese law has not established a mechanism for protecting the personality rights or biological dignity of the embryo, resulting in a regulatory vacuum with respect to direct interventions in embryonic genetic material. Under Article 25 of the Civil Code 2015, personality rights are inherent to each individual and include the right to life, bodily inviolability, honor and dignity, and protection of privacy. However, because the embryo is not recognized as having legal personality comparable to that of an individual, these personality rights do not apply to it. Consequently, interventions or experiments conducted on embryos lack a clear legal basis for determining whether they constitute violations.

In practice, when acts such as gene editing, experimentation, or destruction of embryos occur, no legal provision clearly characterizes them as violations of personality rights, breaches of ethics, or merely permissible scientific activities. This situation not only leaves embryos inadequately protected, but also increases the risk of commercialization of human embryos.

In addition to conceptual and legal status gaps, Vietnam also lacks a robust bioethics control mechanism governing research and application of gene editing technologies on embryos. This deficiency limits the capacity of the legal system to manage human embryo research, particularly as medical institutions have already implemented

preimplantation genetic testing approaches that closely approach the boundaries of gene editing technologies. At present, the evaluation and approval of research projects involving human embryos are mainly conducted by the National Council for Ethics in Biomedical Research, established under Circular No 43 of 2024 TT/BYT dated 12 December 2024. However, this mechanism remains largely administrative and advisory in nature, without binding legal force or effective sanctions. Moreover, legal liability in cases where embryos are destroyed, improperly modified, or unlawfully used is not clearly regulated in the Civil Code or relevant specialized legislation.

B. Recommendations for Vietnamese Law on Mechanisms for the Protection of Embryonic Personality Rights under the Impact of Gene Editing Technologies

Drawing on the French legal model, several reference oriented directions can be identified for Vietnam in developing a legal framework governing the embryo.

First, Vietnamese law should introduce clear legal definitions of the human embryo and human gene editing. The concept of the human embryo should be articulated with reference to French law and World Health Organization guidance, as follows: the human embryo is a cell formed from the fusion of an ovum and a sperm, carrying the complete genetic makeup of a human individual and possessing the capacity to develop into a human being under appropriate conditions. In parallel, human gene editing should be defined as intervention in the DNA structure of human cells for the purpose of modifying, removing, or inserting genetic sequences. Clear definitions are necessary to delimit the regulatory scope and to prevent conflicts between civil, medical, and criminal law.

Second, Vietnamese law should recognize a special legal status for the embryo. Consistent with French experience, the embryo need not be treated as an independent legal subject, but should be acknowledged as a biological entity bearing human dignity and ethical value deserving of protection. On this basis, a mechanism can be developed to safeguard certain minimum personality related interests of the embryo, including respect for the embryo and prohibition of use for improper purposes, protection of genetic integrity and biological identity, and prohibition of commercialization or economic exploitation. These interests constitute potential personality rights, reflecting ethical value rather than full legal entitlement, analogous to the French notion of the embryo as a potential person.

Third, Vietnam should establish an independent bioethics oversight mechanism. The National Council for Ethics in Biomedical Research should be upgraded into an independent body operating along the lines of the Comité Consultatif National d'Éthique. This body should be vested with authority to license, supervise, and suspend research involving human embryos and gene editing technologies, to issue ethical opinions and public policy recommendations, to publish periodic public reports, and to coordinate with the Ministry of Health, forensic science institutions, and courts in addressing violations. Such an institutional design would strengthen ethical governance and ensure effective protection of

embryonic personality rights in the face of rapid technological development.

V. CONCLUSION

Gene editing technologies constitute a transformative scientific achievement, yet they also raise profound questions concerning the nature of human life and the scope of legal protection. Their impact on the legal status of the embryo reveals an urgent need to recalibrate the legal foundations for the protection of personality rights. French experience demonstrates that protecting the embryo does not entail conferring full legal subjectivity, but rather establishing ethical and legal limits grounded in respect for human dignity. The French model, reflected in its Bioethics framework together with the Comité Consultatif National d'Éthique and the Agence de la biomédecine, exemplifies a balanced approach between scientific freedom and humanitarian responsibility. For Viet Nam, introducing a legal definition of the human embryo, recognizing its special legal status, strengthening ethical oversight mechanisms, and adopting a Bioethics Law would constitute necessary steps toward building a humane legal system capable of keeping pace with the biotechnology era.

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