FEATURES OF GENETIC ENGINEERING RESULTS AS OBJECTS OF INTELLECTUAL PROPERTY

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Abstract. *This study examines the legal nature of genetic engineering technologies and their classification as objects of civil law. It argues that such technologies have a dual legal nature, combining features of both intellectual property and tangible assets. The study proposes a classification model that distinguishes genetic engineering technologies as processes, products, and data. It also justifies the need for a sui generis legal regime to regulate these objects more clearly and effectively. The paper provides recommendations for improving national legislation in the field of biotechnology and civil law. The findings contribute to the development of legal doctrine by clarifying the status, circulation, and protection of genetic engineering results as complex civil-law objects.*

Keywords: *genetic engineering, civil law objects, intellectual property, genetic processes, genetic products, genomic data.*

Introduction

In contemporary legal scholarship, defining the concept of genetic engineering technologies possesses not only scientific significance but also considerable theoretical and legal importance. A precise legal interpretation of this category plays a decisive role in determining its appropriate legal regime.

In its broadest sense, genetic engineering may be defined as a type of scientific and practical activity aimed at modifying the hereditary characteristics of living organisms through targeted and controlled intervention in their genetic apparatus. However, such a definition does not fully reveal its legal essence and implications.

Within academic doctrine, genetic engineering technologies are generally characterized through the following structural components:

- genetic material (DNA and RNA);
- gene-editing instruments (for example, CRISPR/Cas systems);
- biotechnological processes;
- materialized outcomes (such as transgenic organisms).

From this perspective, genetic engineering technologies should not be regarded as a "single-component object," but rather as a multifaceted and functionally complex system.

Methodology

This study uses a doctrinal legal research methodology to examine the legal nature of genetic engineering technologies as objects of intellectual property and civil law. The research is based on the analysis of legal doctrine, civil law concepts, intellectual property principles, and scholarly approaches related to biotechnology regulation. A descriptive-analytical method is used to explain the structural components of genetic engineering technologies, including genetic material, gene-editing tools, technological processes, products, and genomic data. The comparative method is applied to distinguish between monistic, materialistic, and dualistic

approaches to the legal classification of genetic technologies. The study also uses a systematic method to identify the place of genetic engineering technologies within the broader system of civil law objects. On this basis, the research evaluates whether existing legal categories are sufficient and justifies the need for a specialized sui generis legal regime for such technologies.

Results

Stages of Development

The evolution of genetic engineering technologies may conventionally be divided into several stages:

Stage 1 (1970s–1980s):

The emergence of recombinant DNA technologies. During this period, scientists developed the ability to isolate genes and transfer them into other organisms.

Stage 2 (1990s–2000s):

Genome research and decoding, particularly through the Human Genome Project. At this stage, genetic information began to acquire independent legal significance.

Stage 3 (from the 2010s to the present):

The development of precise gene-editing technologies, especially CRISPR systems. This stage enabled direct intervention into the human genome, thereby intensifying legal and bioethical challenges.

These stages demonstrate that genetic engineering technologies have evolved from a purely scientific instrument into a complex socio-legal phenomenon of strategic importance.

1.2. Legal Nature of Genetic Engineering Technologies

Determining the legal nature of genetic engineering technologies represents one of the most complex theoretical issues in contemporary civil law.

According to the traditional legal approach, objects of civil law are generally divided into two categories: material objects (property and tangible assets) and intangible objects (intellectual property). However, genetic engineering technologies do not fully fit within this binary classification.

In this regard, legal scholarship has developed several principal approaches to understanding their legal nature:

1. Monistic Approach

According to this approach, genetic engineering technologies are regarded exclusively as objects of intellectual property. However, this theory fails to acknowledge their materialized and tangible forms.

2. Materialistic Approach

This concept evaluates genetic objects solely as tangible property. Nevertheless, such an approach underestimates the significance of scientific knowledge and technological innovation embodied within these technologies.

3. Dualistic Approach (Predominant Concept)

The present research is primarily based on the dualistic approach.

According to this concept, genetic engineering technologies simultaneously constitute:

- objects of intellectual property; and
- material objects embodied in tangible forms.

This demonstrates that traditional legal regimes are insufficient for the effective regulation of such technologies.

1.3. The Place of Genetic Engineering Technologies within the System of Civil Law Objects

In civil law theory, the concept of an "object" constitutes one of the central legal categories. An object is understood as a benefit or value toward which the rights and obligations of legal subjects are directed.

The inclusion of genetic engineering technologies within this system gives rise to several theoretical and practical challenges:

1. Classification Problem

Genetic engineering technologies cannot be fully categorized as:

- tangible property, since they contain substantial intangible elements; nor as
- purely intellectual property, because they may acquire materialized forms.

2. Necessity of Recognizing Them as Complex Objects

The multifaceted nature of genetic engineering technologies necessitates their recognition as complex legal objects that combine scientific knowledge, technological processes, genetic information, and materialized biological outcomes within a single legal framework.

According to the author's perspective, genetic engineering technologies incorporate the following three interconnected elements:

- technology (process);
- product (genetic object);
- information (genomic data).

This combination necessitates their recognition as complex objects of civil law.

In legal theory, an object is understood as a benefit or value toward which the rights and obligations of participants in legal relations are directed.

3. The Issue of Transferability and Circulation Capacity

Genetic objects possess a specific legal status in civil circulation because they:

- cannot remain entirely within unrestricted commercial circulation;
- must be subject to state supervision and control;
- require licensing and special regulatory authorization.

Accordingly, such objects may be classified as "objects with limited circulation capacity" within the framework of civil law.

Discussion

The results of this study show that genetic engineering technologies have a complex legal nature and cannot be fully explained through traditional civil law categories. In classical civil law, objects are usually divided into tangible property and intangible intellectual property. However, genetic engineering results combine both features. They may exist as scientific knowledge, technological processes, genetic data, and material biological products at the same time. Therefore, classifying them only as intellectual property or only as physical property creates legal uncertainty.

The dualistic approach is more appropriate because it reflects the real structure of genetic engineering technologies. A gene-editing method may be protected as an intellectual product, while the genetically modified organism produced through that method may be treated as a material object. In addition, genomic data requires separate legal protection because it has scientific, commercial, and personal value.

The discussion also shows that such objects should not be freely circulated like ordinary property. Their use may affect human health, biodiversity, public safety, and ethical principles. For this reason, state control, licensing, and special legal requirements are necessary.

Thus, a specialized **sui generis** legal regime is needed to regulate genetic engineering technologies more clearly and effectively. This approach would help balance innovation, ownership, public interest, and bioethical responsibility.

Conclusion and Recommendations

The findings of the present study make it possible to formulate the following conclusions:

- genetic engineering technologies constitute a complex and multi-component system;
- they do not fully correspond to the traditional classification of civil law objects;
- their legal nature possesses a dual character, combining both tangible and intangible elements;
- recognizing these technologies as complex legal objects is scientifically justified;
- the development of a separate and specialized legal regime for such technologies is necessary.

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