



المعهد القومي للملكية الفكرية  
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## المجلة العلمية للملكية الفكرية وإدارة الابتكار

دورية نصف سنوية محكمة يصدرها

المعهد القومي للملكية الفكرية

جامعة حلوان

العدد الثالث

يوليو ٢٠٢٠



**الهدف من المجلة:**

تهدف المجلة العلمية للملكية الفكرية وإدارة الابتكار إلى نشر البحوث والدراسات النظرية والتطبيقية في مجال الملكية الفكرية بشقيها الصناعي والأدبي والفني وعلاقتها بإدارة الابتكار والتنمية المستدامة من كافة النواحي القانونية والاقتصادية والادارية والعلمية والأدبية والفنية.

**ضوابط عامة:**

- تعبر كافة الدراسات والبحوث والمقالات عن رأى مؤلفيها ويأتي ترتيبها بالمجلة وفقا لإعتبارات فنية لا علاقة لها بالقيمة العلمية لأى منها.
- تنشر المقالات غير المحكمة (أوراق العمل) فى زاوية خاصة فى المجلة.
- تنشر المجلة مراجعات وعروض الكتب الجديدة والدوريات.
- تنشر المجلة التقارير والبحوث والدراسات الملقاه فى مؤتمرات ومنتديات علمية والنشاطات الأكاديمية فى مجال تخصصها دونما تحكيم فى أعداد خاصة من المجلة.
- يمكن الاقتباس من بعض مواد المجلة بشرط الاشارة إلى المصدر.
- تنشر المجلة الأوراق البحثية للطلاب المسجلين لدرجتى الماجستير والدكتوراه.
- تصدر المجلة محكمة ودورية نصف سنوية.

**ألية النشر فى المجلة:**

- تقبل المجلة كافة البحوث والدراسات التطبيقية والأكاديمية فى مجال حقوق الملكية الفكرية بكافة جوانبها القانونية والتقنية والاقتصادية والادارية والاجتماعية والثقافية والفنية.
- تقبل البحوث باللغات (العربية والانجليزية والفرنسية).
- تنشر المجلة ملخصات الرسائل العلمية الجديدة، وتعامل معاملة أوراق العمل.
- يجب أن يلتزم الباحث بعدم إرسال بحثه إلى جهة أخرى حتى يأتيه رد المجلة.
- يجب أن يلتزم الباحث بإتباع الأسس العلمية السليمة فى بحثه.
- يجب أن يرسل الباحث بحثه إلى المجلة من ثلاثة نسخ مطبوعة، وملخص باللغة العربية أو الانجليزية أو الفرنسية، فى حدود ٨ - ١٢ سطر، ويجب أن تكون الرسوم البيانية والإيضاحية مطبوعة وواضحة، بالإضافة إلى نسخة إلكترونية Soft Copy، ونوع الخط Romanes Times New ١٤ للعربى، و١٢ للانجليزي على B5 (ورق نصف ثمانيات) على البريد الالكتروني: [ymgad@niip.edi.eg](mailto:ymgad@niip.edi.eg)
- ترسل البحوث إلى محكمين متخصصين وتحكم بسرية تامة.
- فى حالة قبول البحث للنشر، يلتزم الباحث بتعديله ليتناسب مع مقترحات المحكمين، وأسلوب النشر بالمجلة.



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## **Electronic Crimes against genetics in databases**

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## Electronic Crimes against genetics in databases Menna-Allah Mahmoud Atef Rashwan

### Abstract

Genetics information includes private databases of human genes or the results of the genetic researchers. Such information shall be protected to avoid hacking and unauthorized entry. The owner samples and his personal information might be threatened when someone hacked and disclosed his information.

Accordingly, Egypt issued a new Law No.175 of the year 2018 concerning Anti-cyber and Information Technology Crimes law. Such Law consists of four Parts, the first part consists of general provisions, the second one is provisions and the rules of procedures, the third part is crimes and penalties and the last one is concluding provisions.

Hacking the personal information and databases are one of the crimes stated by the law.

The abovementioned law defined Electronic data and information, and personal data as follows:

1. Electronic data and information: Everything that can be created, stored, processed, synthesized, transmitted, shared or copied by IT, such as numbers, codes, cyphers, letters, symbols, signs, images, sounds, etc.
2. Personal data: Any data relating to an identified or identifiable natural person, directly or indirectly by linking them to other data.



In addition, Article 17 of the law Anti-cyber and Information Technology Crimes states that.

“Anyone who damages, disables or modifies a route or cancels, in whole or in part, intentionally and unlawfully, the programs, data or information stored, processed, generated or synthesized on any information system and the like, regardless of the means used in the crime, shall be punished by imprisonment for a period of not less than two years and a fine not less than one hundred thousand pounds and not exceeding five hundred thousand pounds or either of those two penalties.”

### **The Research Argument & Methodology.**

#### **Introduction**

Electronic crime, also known as e-crime or cybercrime, refers to criminal activity that involves the Internet, computer or other electronic devices, violation may occur to genetics databanks. <sup>1</sup>

Some e-crime relates specifically to computers, such as distributing damaging electronic viruses or launching a denial-of-service attack which causes a computer system to deny service to any authorized user. <sup>2</sup>

Cyber Crime can also be defined as unlawful acts committed by using the computer as a tool or as a target or as both it can

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<sup>1</sup>Begovic ,sinisa . How to deal with E-Crime?E-business Development Project,page7 [https://europa.rs/images/publikacije/How\\_to\\_deal\\_with\\_E-Crime.pdf](https://europa.rs/images/publikacije/How_to_deal_with_E-Crime.pdf)

<sup>2</sup>Ibid 7

involve criminal activities that are traditional in nature, such as theft, fraud, forgery defamation ..... Etc. <sup>1</sup>

Computer misuse has also generated a host of new crimes that are important for developing new regulations and laws that are able to protect from hacking into computers.

Advances in genetics and biotechnology may create conflicts with many legal principles, many of which are located on the boundaries between acceptable and unacceptable progress in this area. At present, scientific research has great demands, but at the same time, the privacy of individuals should be preserved.<sup>2</sup>

Genetics Information includes information about individual's genetics tests and his family members. As well as the history of diseases or disorder in an individual's family members medical history and it is important to determine the ability and the risk of getting a disease, disorder or condition to a family member in the future. Genetics information also participated in clinical researches that include genetics services by the individuals or a family member of the individuals.

### **Research problem**

Genetic information, especially about humans, is collected and stored in DNA databanks or databases with the permission of the owner of the sample and his approval, this information are

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<sup>1</sup> -Vadza,kejal (2013)Research Gatevolume3 issue 5 page 1  
[https://www.researchgate.net/publication/274652160\\_Cyber\\_Crime\\_its\\_Categories](https://www.researchgate.net/publication/274652160_Cyber_Crime_its_Categories)

<sup>2</sup>شمس الدين،أشرف توفيق (٢٠١٦).الجينات الوراثية و الحماية الجنائية للحق في الخصوصية دراسة مقارنة الطبعة الثانية دار النهضة العربية ص٨

considered confidential and shall not be shared with anyone without written permission from the owner of the sample.

Therefore, the unauthorized access to such data through electronic crime for the databases stored in computers endangered the private data of the individual and starts to threaten him with it or distortion of this genetics information.

Developers and researchers trying to make it more secure and safe from hackers through solving this problem and prevent any disclosure may happen on those databases.

The main problem the research will include is that how to prevent hacking as the hacking may affect the personal rights and the privacy rights of the owner of such information, imagine someone stole the information and use it against the owner, the insurance, the labor and many other rights may be effected when the information are disclosed. In addition, the individual shall feel secure when he went to apply for the test, the information shall consider confidential.

- What is genetics and how could we sort this information in Databanks under the protection of law?
- What are the types of violation acts against Genetics databanks and Genetics information?
- To What extent Genetics information is useful?
- To What extent the Egyptian laws protect genetics databanks and Genetics information from violation?

- To What extent the US laws protect genetics databanks and Genetics information from violation?

### **Importance of the study**

Due to the novelty of this field, legislations regarding this subject are absent in most legal systems and the existing legislations rarely maintain the genetic information databases protection.

To extent the knowledge of this field and try to regulate such situation in developing countries to develop in the medical field and to protect the privacy of any individual.

Protecting individuals from hackers and criminals' threats from publishing or disclose the information to concerning companies or entities for self-interests or money.

### **Methodology:**

**The Deductive Approach**<sup>1</sup>: It is a research methodology in which the thinking moves from general to specific general rule. According to this approach, it starts from the total facts to the partial facts. This method is the way to explain the general rules and to apply it in different circumstances.

In this study trying to prevent the right of genetics information to be a private right under law and to be a public right and the law start to regulate it in the public to be like the other laws and the Egyptian law must put the protection for genetics

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<sup>1</sup>سلامة، احمد عبد الكريم الأصول المنهجية لأعداد البحوث العلمية، مصر، دار النهضة العربية، (صفحة ٣٦)

information stored in databases to protect people from any harm that could happen from others.

**The Comparative Approach**<sup>1</sup>: The research of problems and phenomena based on observation and imposition of hypotheses and exact experience to verify the validity of hypotheses and access to results or solutions for the problems studied by this research in comparative way.

We use it to compare between the different legal system and regulations in civil law countries and common law countries which give the protection of genetics information databases under the law of data protection laws and regulations and apply it in their laws or treaties they are members on it as Budapest treaty.

## **Chapter 1**

### **Overview of genetics information protection legally in databanks.**

#### **Background of genetics information**<sup>2</sup>:

Cells are the constituent parts of the body. There are many different cell types which have different functions. These are all the organs and tissues that make up your body. In a person's body virtually every cell has the same deoxyribonucleic acid, or DNA. DNA is the human inherited stuff, like virtually all other species. Most of DNA is in the nucleus of cells (where it is called nuclear DNA), but a small amount of DNA.

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<sup>1</sup>مصدر سابق، (صفحة ٤٣)

<sup>2</sup><https://www.ncbi.nlm.nih.gov/books/NBK115558/>

Genes are tiny parts of a long DNA chain. We are the fundamental units of heredity, both physical and practical. Among humans the number of genes ranges from a few hundred DNA bases to over two million bases. The Human Genome Project has estimated that between 20,000 and 25,000 genes belong to humans.-individual has two copies of same, but a small number of genes (less than one per cent of the total) are slightly different among humans. Alleles are variants of the same gene with slight differences in their DNA bases sequence. Those small differences contribute to the unique characteristics of each individual.

### **Ways of protecting genetics information**

The Genetics Privacy Acts is a Federal Legislation initiative. The Act is based on the premise that genetics information in ways which require special protection is different from other forms of personal information. The molecule of DNA contains a large amount of information which is literally indecipherable. The major goal of the Human Genome Project is to decipher this code so that the information it contains is accessible.<sup>1</sup>

The law forbids the discrimination on the basis of genetics information in the terms of employment and any aspect related to employment such as (hiring, firing, pay, job assignments, promotions, layoffs, training, fringe benefits, or any other term or condition of employment. Employment decision can't be depended on the employee genetic information, as he could use this information to decide whether the employee is relevant or able to

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<sup>1</sup>Annas,(George J), Glantz,(Leonard H.) ,Roche,(patricia A.)28 February(1995) The Genetic Privacy Act &Commentary. Page 2

current work because this information can change through environmental conditions.<sup>1</sup>

It is also unlawful for a covered entity to disclose genetic information about applicants, employees or members. Covered entities must keep genetic information confidential and in a separate medical file. There are limited exceptions to this non-disclosure rule, such as exceptions that provide for the disclosure of relevant genetic information to government officials investigating compliance with Title II of GINA and for disclosures made pursuant to a court order.<sup>2</sup>

### **Storing & collecting the Genetics samples in databanks legally**

DNA databanks samples should be collected and analyzed and obtained in legal ways.

#### Legal ways of collection of DNA samples

Prior to the collection of a DNA sample from a sample source for genetic analysis, the person collecting the sample or causing the sample to be collected shall verbally inform the sample source or the sample source's representative.

The owner of the sample shall have the following rights<sup>3</sup>:

1. That consent to the collection or taking of the DNA sample is voluntary;
2. That consent to the genetic analysis is voluntary;

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<sup>1</sup><https://www.eeoc.gov/genetic-information-discrimination>

<sup>2</sup> Ibidpage 1

<sup>3</sup> Annas,(George J), Glantz,(Leonard H.),Roche,(patricia A.) Ibid. Page 9,10

3. Of the information that can reasonably be expected to be derived from the genetic analysis;
4. Of the use, if any, that the sample source or the sample source's representative will be able to make of the information derived from the genetic analysis;
5. of the right to inspect records that contain information derived from the genetic analysis;
6. Of the right to have the DNA sample destroyed;
7. Of the right to revoke consent to the genetic analysis at any time prior to the completion of the analysis;
8. That the genetic analysis may result in information about the sample source's genetic relatives which may not be known to such relatives but could be important, and if so the sample source will have to decide whether or not to share that information with relatives;
9. That in the future someone else may ask if the sample source has obtained genetic testing or analysis and condition a benefit on the disclosure of information regarding such testing or analysis;
10. That the collection and analysis of the DNA sample, and the private genetic information derived from the analysis is protected by this Act; and
11. Of the availability of genetic counseling.

The privacy protection must regulate the collection, analysis and storage of DNA **samples**, as well as the storage and disclosure



of the genetic **information** derived from the analysis of these samples, no matter who performs that analysis.

The private genetic information extracted from DNA samples and the Control of these samples enables the custodian to analyze and reanalyze them to derive increasing amounts of genetic information as new tests are developed.

Therefore, to effectively protect genetic privacy, unauthorized collection and analysis of individually identifiable DNA must be prohibited. As a result, the overarching premise of the Act is that no stranger should have or control identifiable DNA samples or genetic information about an individual unless that individual specifically authorizes the collection of DNA samples for the purpose of genetic analysis, authorizes the creation of that private information, and has access to and control over the dissemination of that information.

## **Chapter 2**

### **Unlawful acts against genetics data stored**

#### **Genetics Database/banks overview<sup>1</sup>.**

A DNA database is a stored set of genetic profiles that can be used for a variety of needs. These databases may be public or private.

DNA Databanks We originally proposed drafting legislation to regulate DNA databanks. We thought of DNA databanks as entities that collected, stored, analyzed and controlled DNA samples and information derived from DNA samples, although the

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<sup>1</sup>Ibid3

term could also include entities that either only stored DNA samples or only stored information derived from genetic analysis. Thinking of such databanks as holders of genetic information.

### **Genetics database/banks Violation.**

Cybercrime is one of the largest and globally most active forms of crime. After all, the internet is available and visible to everyone, and that of course involves risks. Committing a crime via a computer or other device that is connected to the Internet is dangerous because the identity of the perpetrator is difficult to find out.

Hackers could threaten to revoke access or post the sensitive information online if you not given money, one Indiana hospital paid \$55,000 to hackers for this very reason. The genetics databases are very important as it could be sold to insurance companies, banks, and many organizations that could use this data for personal.

interest. Imagine one day you applied for long term loan and you be rejected because of your medical or Genetics History that shows you would die before finishing your loan instalments. Or you are trying to make a life insurance and you be rejected because you have chronic diseases<sup>1</sup>.

This is the data that could be valuable to insurance companies, employees, and police. In a world where this data is posted online, it could be used to genetically discriminate against people, such as denying mortgages or increasing insurance costs.

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<sup>1</sup>Chen ,Angela(2018) **The Verge**page 1  
<https://www.theverge.com/2018/6/6/17435166/myheritage-dna-breach-genetic-privacy-bioethics>

(It doesn't help that interpreting genetics is complicated and many people don't understand the probabilities anyway.) In the future, if genetic data becomes commonplace enough, people might be able to pay a fee and get access to someone's genetic data, too, the way we can now to access someone's criminal background.

Of course, police and companies would not want to actively work with hackers. But it can be unclear where the data comes from, and there will always be black markets through which this information could be bought and sold, or used as blackmail. And once this information is hacked and put on the web, it would have more protection than before<sup>1</sup>.

### **Genetics crimes.**

As the genetics is considered a part of a human beings so violating the genetics information or trying to steal a DNA print from an individual is considered stealing. As the natural organs would be considered as money if it separated from the human body as the genes is considered as a human property<sup>2</sup>.

if someone tried to violate victim by taking a sample of his hair (i.e. hair cutting is consider as a crime if it done without a permission from the victim) it will be considered as a forced crime. as the hair has a materialistic nature so after it separated from the human body and forced taken it will be consider as a crime if the offender tried to tie or forced the victim to be able to take a blood

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<sup>1</sup>Ibid 1

<sup>2</sup>شمس الدين، أشرف توفيق مصدر سابق. ص ١٦٦

or hair sample from the victim to use in self-interests. And that could be considered one of a moral coercion<sup>1</sup>.

Because of technology development most of clinics, hospitals, and governmental associations are now save all the personal data on an electronic database that is supposed to be secured and it could be violated from hackers to sell the information of individuals to different association for self-interests. Or could threaten individuals by this data for money or benefit from it. And it could also be violated by editing, erasing, distortion, switch or disclosure this information as it harms the individuals privacy.

Data breach depends on the individual state statue, but typically involves the unauthorized access or acquisition of computerized data that comprises the security, confidentiality or integrity of personal information.

Destroying the DNA means it's not eligible for analysis and it could be a partial damage or completely damaged. Damaging the sample could be considered as distortion or remove a part of the DNA, or adding another substance on the sample<sup>2</sup>.

Banks and insurance companies resorts to Genetics information data for self-interests as they can take a serious decisions towards their clients. And the governmental associations also resorts to that information towards their amines<sup>3</sup>.

### **Chapter 3**

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<sup>1</sup>مصدر سابق ص ١٦٧، ١٦٦

<sup>2</sup>شمس الدين، أشرف توفيق مصدر سابق. ص ١٧٢.

<sup>3</sup>مصدر سابق؛ ص ١٧٣.

## **Protection of Genetics information under Egyptian & US Law**

### **Database Protection**

Database security refers to the various measures organizations take to ensure their databases are protected from internal and external threats. Database security includes protecting the database itself, the data it contains, its database management system, and the various applications that access it. Organizations must secure databases from deliberate attacks such as cyber security threats, as well as the misuse of data and databases from those who can access them.

Security concerns for internet-based attacks are some of the most persistent challenges to database security. Hackers devise new ways to infiltrate databases and steal data almost daily. Organizations must ensure their database security measures are strong enough to withstand these attacks.

Databases are very attractive targets for hackers because they contain valuable and sensitive information. This can range from financial or intellectual property to corporate data and personal user data. Cybercriminals can profit by breaching the servers of companies and damaging the databases in the process. Thus, database security testing is a must.

### **Protection of Genetics database under Egyptian Law:**

Accordingly, Egypt issued a **new Law No.175 of the year 2018** concerning Anti-cyber and Information Technology Crimes

law. Such Law consists of four Parts, the first part consists of general provisions, the second one is provisions and the rules of procedures, the third part is crimes and penalties and the last one is concluding provisions.

Hacking the personal information and databases are one of the crimes stated by the law.

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2. Personal data: Any data relating to an identified or identifiable natural person, directly or indirectly by linking them to other data.

**Article 77 of the Labor Law no. 12/2003** upholds the confidentiality of the employee's file information including punishment and assessment.

**Article 13 of the Egyptian Civil Status Law no. 143/1994** provides for the confidentiality of data on the civil status of citizens.

The new Cyber security Law, which provides that service providers are under a duty to maintain the privacy of the data stored and not disclose it without a reasoned order from a relevant judicial authority (Article 2).

This duty includes personal data belonging to one of the consumers or any data or information on the websites and personal accounts used by the consumers or the persons or bodies with whom they communicate. The Labor Law, which protects employee personal data (such as name, job, professional skills, workplace, domicile, marital status, salary, employment starting date, holiday leave, workplace sanctions, and employee reports) and states that employers must keep employee personal data for at least one year from the end-date of the employment relationship; and only authorized individuals should have access to personal employee data. (Article 77)

Tort liability under the Egyptian Civil Code, which grants general protection against the infringement of private data, if the data subject suffers damages. ,,

The Penal Code, which provides sanctions for disclosing, facilitating the disclosure of, or using a recording or document obtained by any of the following methods: recording or transmitting via private conversations or telephone by any method; or shooting, taking, or transmitting a picture of anyone in a private place by any means, without the consent of the photographed party. (Article 309).

### **Protection of Genetics database under U.S. Law:**

**Accordingly US cyber security law 2020**, Hacking (unauthorized access) it happens in national security information imprisonment up to 10 years obtaining information imprisonment up to 1 year or 5 if aggravating factors apply government computers imprisonment up to one year accessing to defraud imprisonment up to five years.

**Accordingly US data protection 2019**, Personal information in the United States not uniform across all states or regulations in addition certain data may be considered personal information for one purpose but not for another.

The Genetic Information Nondiscrimination Act (GINA), which prohibits U.S. insurance companies and employers from discriminating on the basis of information derived from genetic tests. It forbids insurance companies from discriminating through reduced coverage or pricing and prohibits employers from making adverse employment decisions based on a person's genetic code. In addition, insurers and employers are not allowed under the law to request or demand a genetic test.

The Genetic Information Nondiscrimination Act restricted the access of issuers of health insurance and employers to individuals' genetic information, as well as to prohibit genetic discrimination. Concerns remain as to the use of genomic information to discriminate against applicants for life long-term care and disability insurance. In addition to GINA, HIPAA protects patient privacy by restricting the sharing of patients' medical information.

### **Conclusion**

Genetic information is so important so not all knowing it's vital and there are no laws that provide for protection of this information on the individual's right, so those laws must be stipulated to provide protection and apply laws from the criminal side as well to protect genetic information and also the genetic data banks that stored results of the individual's sample and when hacking this data it leads to threatened of the individuals of their



right to have that information confidential and no one may access it. When the protection is not available, it is possible for government or non –governmental entities to access to that information and start knowing everything about the individual and starts to misuse of this information and threatened them with it and such access in unauthorized.

At the end the government should regulate specific law to protect the genetic field of genetics individuals from any discrimination from insurance companies to refuse al life insurance of someone or at the work labor or banks.

**At the end the government should regulate specific law to:**

- Protect genetic information from employer companies' discrimination as they could use this information for hiring or firing for employees.

- Protect genetic information from insurance companies' abuseas allowing or not giving life insurance to someone because of the medical history.

- Protect genetic information from bank discrimination for not using this information for refusing to give loans or credit.

- Hacking through electronic crimes in the genetics information the hackers threaten and disclose the sensitive information when the individual refuse to pay money.

To protect databanks from using, damaging, erasing, editing, distortion, switch or disclosure from unauthorized access of government or non-governmental entities.

## References

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