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GENETIC TESTING AND BIOETHICS

Samir Noureddine DERDOUR[1*]

University Center of Naâma– Algeria-

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Abstract: The research article discusses the scientific revolution in the field of biology and medicine based on genetic tests, which have proven their real contribution to the prevention of diseases and the limitation of their negative effects on humans, and highlights the ethical concerns and legal issues that arise from genetic testing, such as privacy, confidentiality and the risk of eugenics and racial or social discrimination. It stresses the need for an ethical charter to establish rules for the use of genetic tests.

This document also highlights the importance of taking into account the ethical aspect in the treatment with the human genome and mentions the various declarations and agreements prohibiting any form of discrimination against any person on the basis of his genetic heritage.

To control the mechanisms of processing genetic tests, the scientific elite, cultural and intellectual in Algeria must establish a legal and ethical framework that protects society from the consequences of abnormal intellectual speculation that threatens humanity under the guise of scientific and technological development.

Key words:genetic testing, bioethics, heredity, eugenics, human values, law

الاختبارات الجينية وأخلاقيات علم الأحياء

ملخص: تناقش الورقة البحثية الثورة العلمية في مجال البيولوجيا والطب القائمة على الاختبارات الجينية، والتي أثبتت مساهمتها الفعلية في الوقاية من الأمراض والحد من آثارها السلبية على الإنسان، وتبرز المخاوف الأخلاقية والمشاكل القانونية التي تنشأ من الاختبارات الجينية، مثل الخصوصية والسرية وخطر تحسين النسل والتمييز العنصري أو الاجتماعي. وتؤكد على ضرورة وجود ميثاق أخلاقي لوضع قواعد لاستخدام الاختبارات الجينية. كما تشير هذه الوثيقة إلى أهمية مراعاة الجانب الأخلاقي في التعامل مع الجينوم البشري، وتذكر مختلف الإعلانات والاتفاقيات التي تحظر أي شكل من أشكال التمييز ضد أي شخص على أساس تراثه الجيني.

ولضبط آليات التعامل مع الاختبارات الجينية، تحتاج النخبة العلمية والثقافية والفكرية في الجزائر إلى إرساء إطار قانوني وأخلاقي يحمي المجتمع من عواقب المضاربات الفكرية غير الطبيعية التي تهدد الإنسان تحت غطاء التطور العلمي والتكنولوجي.

الكلمات المفتاحية: اختبارات جينية،أخلاقيات علم الأحياء، وراثة، تحسين النسل، قيم إنسانية، قانون.

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Tests génétiques et bioéthique

Résumé: Le document de recherche évoque la révolution scientifique dans le domaine de la biologie et de la médecine basée sur les tests génétiques, qui ont prouvé leur réelle contribution dans la prévention des maladies et à la limitation de leurs effets négatifs sur l'homme, et relate les préoccupations éthiques et les problèmes juridiques qui découlent des tests génétiques, tels que la vie privée, la confidentialité et le risque d'eugénisme et de discrimination raciale ou sociale. Il invoque, ausssi, la nécessité d'une charte éthique pour établir des règles d'utilisation des tests génétiques.

Ce document souligne également l'importance de prendre en compte l'aspect éthique dans le traitement avec le génome humain et mentionne les différentes déclarations et accords interdisant toute forme de discrimination à l'égard de toute personne sur la base de son patrimoine génétique.

Pour contrôler les mécanismes de gestion des tests génétiques, les élites scientifiques, culturelles et intellectuelles algériennes doivent établir un cadre juridique et éthique qui protège la société des conséquences des spéculations intellectuelles anormales qui menacent l'être humain sous couvert du développement scientifique et technologique.

Mots clés : tests génétiques, bioéthique, hérédité, eugénisme, valeurs humaines, droit

Introduction:

Predictive medicine, with its probabilistic vocation, aims to detect diseases before symptoms appear, and to predict the risk of developing a disease linked to a genetic anomaly. It is important to distinguish between prediction and prevention.

Prevention, or prophylaxis, is an anticipatory concept in medicine, illustrated by the famous adage "prevention is better than cure". It involves raising awareness of risk factors and early detection, enabling a disease to be discovered in its early stages, when the chances of recovery are much greater. This is currently the case for breast cancer, whose prognosis has improved considerably since most of these cancers are discovered at a primary stage.

As for prediction, this is not divination, but rather a statistical assessment of the risk of developing certain pathologies. Let's take the example of oncogenetics, which makes it possible to determine the risk of an unaffected parent developing the disease. If this risk is high, the alternative is as follows: either submits to very strict monitoring, which will not prevent the onset of the disease, but will enable it to be detected very early; or proceed with prophylactic removal of the organ. And it is in the second alternative that the problem arises, pitting the medical status of the surgical reliable treatment and risk reduction, if not elimination, are medical objectives whose legal and ethical value has been lost in the course of certain genetic investigations.

Today, research continues unabated to extend the scope of genetic analysis to other variants of the human genome, putting the integrity of ethical values to the test. It is therefore necessary to highlight these scientific and technical innovations and to confront them with legal and ethical aspects.

Under the influence of biomedical technology and with the development of examinations focused primarily on genetic characteristics and the excessive race for economic profit and exclusivity by firms and academic researchers, fears of a eugenic and discriminatory drift through the trivialization of recourse, for example, to the medical termination of pregnancy in the event of early diagnosis of a mental deficiency are constantly evolving.

Faced with the innovative thrust of medicine, which is increasingly focusing its efforts on research into genetic characteristics, this article is intended as a reflection on maintaining and safeguarding the moral, legal and social character of genetic testing, and on the prohibition of any action or intervention against the ethical requirement that refuses to "mutilate" a human being; but what are the limits of medical and technological innovations that can guarantee the protection of the individual and the security of the human genetic heritage ?

In Algeria, the health law defines bioethics as all measures relating to the transplantation and grafting of organs, tissues and cells, the donation and use of human blood and its derivatives, medically assisted procreation and biomedical research. Genetic testing will make it possible to diagnose congenital and hereditary diseases, to assess the risk of contracting the disease in individuals or families not yet affected, to take measures to try to attenuate the clinical signs of this disease, to reduce the risk of contracting it and to try to prevent it, to assess the risk of birth to children carrying a genetic disease. The decision concerning the fate of a fetus in the context of a voluntary termination of pregnancy remains a moral and ethical question, compared with the search for a solution to avoid conception in the first place.

To illustrate and clarify all these meanings, the subject has been divided into two chapters: the first deals with the ethical principles of information, confidentiality, autonomy and privacy. In the second one, we will address the fields of application of genetic testing where ethical risks are strongly present in prenatal, postnatal, preimplantation, and oncology diagnoses, as well as in diseases related to psychiatry and occupational medicine.

First topic: Ethical principles

While predictive medicine is seen as a revolution in the world of healthcare, and consequently offers advantages in the diagnosis of disease, it also raises moral concerns and raises legal and ethical issues concerning the expected results of genetic testing and the appropriate course of action. The identification of genetic sequences involved in many hereditary diseases (Huntington's disease, myopathy, cystic fibrosis, sickle cell anemia, familial polyposis coli, familial forms of breast cancer, etc.) or spontaneous diseases (Down's syndrome 21) has led to a better understanding of the mechanisms responsible for the development of these diseases, to diagnostic or predictive tests; and, in some cases, to therapeutic measures for prevention or cure.

Genetic testing raises ethical issues that generally concern human health, privacy and confidentiality, and can give rise to problems of eugenics and racial or social discrimination. It is worth recalling the eugenic measures of forced sterilization of alcoholics, Roma women and the mentally deficient in several states around the world. Genetic testing not only concerns the genetic heritage of the person being tested, but also extends to related persons through family relationships.

In many countries, social security funds and employers have already begun to demand genetic tests of job applicants or candidates for recruitment, with all the risks this entails in terms of maintaining professional secrecy, This is why an ethical charter needs to be drawn up to identify the rules for the use of genetic testing. "This is all the more intriguing because the threat information is so sensitive and the companies so problematic that an ethical duty on which addicts, carers and public

health decision-makers could agree would be one more element towards a beginning of understanding and responsible communication."[1]

Declarations by universal bodies have not failed to draw the attention of member states to the need to observe the moral and ethical aspect of any manipulation of the human genome. The Declaration of Human Rights, adopted on November 11, 1997 and ratified on December 9 1998 by the General Assembly of the United Nations, affirms in Article 1 that the human genome expresses the abecedarian concomitance of all members of the mortal family, as well as the recognition of their prestigious quality and diversity, and affirms in Article 4 that "the human genome in its natural state shall not give rise to pecuniary gains" through the prohibition of any economic advantage in the processing of genes.

The 1947 Nuremberg Code can be considered the founding text of bioethics. The discovery of the crimes committed by the Nazis led to a worldwide awareness of the need to control experimentation on human beings. This is the hidden face of eugenics, which has led to natural selection being replaced by selection driven by the criminal desire to eliminate human races.

The Convention for the Protection of Human Rights and Dignity of the Human Being with regard to Human Biology and Medicine also constitutes a means of international coercion. "It prohibits all forms of discrimination against a person on the grounds of his or her genetic heritage, and authorizes predictive tests for genetic diseases for medical purposes only " [2]

Like other European countries, France adopted bioethics laws in 1994, stipulating that genetic character tests may only be carried out in a legal, medical or scientific research context, and that they may not be performed without the consent of the "index" or "related" person, and with due respect for his or her dignity and autonomy. The purpose of this examination is to diagnose a disease on the basis of newly acquired scientific data.

To comply with universal patient rights, genetic testing must respect four values, detailed below in four requirements.

First requirement: information: When a genetic test is recommended, the patient concerned must be given clear information adapted to his or her level of understanding. The prescribing geneticist must provide the patient with fair information on his or her state of health and on the effectiveness of the test in the diagnosis envisaged for him or her and all family members, and must accompany the patient throughout the test, ensuring in particular that the results relating to his or her

1 Eytan Ellenberg, *Hospital Danger!*, Armand Colin, Paris, 2005, p.143

2 Borrillo D, Bioethics, Editions Dalloz, Paris, 2011, P.11.

genetic status are not withheld. Information on the purpose and progress of the research, and even on the risks and benefits of genetic testing, must be clear and comprehensible. It must be recorded in such a way as to respect the individual's right to information. Article 7 of the Universal Declaration on the Human Genome and Human Rights states Algerian law stipulates that the confidentiality of genetic information associated with an identifiable person, processed for research purposes, must be protected by law.

In this context, Algerian law specifies in article 43 of Executive Decree no. 92-276 dated July 6, 1992, on medical ethics, that "the physician must endeavor to enlighten his patient by intelligible and loyal practice on the reasons for any medical act". In this sense, it is imperative that clinical explorations comply admirably with the moral, scientific, ethical and deontological principles governing medical practice". art. 378 [1]

Second requirement: consent

Under French law, patient consent must be obtained after the patient has been informed of the nature of the genetic tests and their purpose. To this end, consent must be free of any constraint, and cannot be given to persons incapable of consenting. It must also specify the nature of the test, its indication and the attitude to adopt in the event of results other than those sought beforehand. If genetic material is to be stored, the patient's consent must also be obtained, while maintaining professional confidentiality. Continuity of genetic testing is revocable at any time and without formality.

The prescribing geneticist must make the person concerned by the test aware of the need to pass on information to his or her family. The criteria for informing the family are the seriousness of the disease and the possibility of avoiding it through prophylaxis and therapy. French law specifies that information must be passed on by the patient, and in the event of incapacity, he or she can mandate the geneticist or prescribing physician to inform family members.

"Consent must be free and renewed for all subsequent medical acts. It must be informed, i.e. the patient must have been previously informed of the procedures he or she is about to undergo, the risks normally foreseeable in the current state state of scientific knowledge, and of the consequences that these couldentail." [3]

1 Decree n° 92-276, dated July 6, 1992 concerning the Code of medical deontology, *Official Journal* No. 52 of July 8, 1992.

3 Isabelle Gallay, *Patient Guide,Your rights and your procedures*, Edition Eyrolles, Paris, 2005,p.17.

Article 50 of the Council of Europe Convention of April 4, 1997 reaffirms the principle that "an intervention in the field of health may only be carried out after the person concerned has given his or her free and informed consent. Beforehand, he or she receives adequate information on the purpose and nature of the intervention, as well as on its consequences and risks. The person concerned may freely withdraw his or her consent at any time". [1]

Confidentiality is the very essence of the doctor-patient relationship, and must not suffer from ethical abuses. This obligation seems to suffer from a lack of reasoning as to its presence in the field of genetics, as soon as we move from a personal matter for the patient to a family or social matter. The problem essentially lies in the legal nature of the transmission of the genetic anomaly to other family members. Is he obliged to pass it on, given that he is potentially concerned by this information?

Who has the right to pass it on? Do all family members have the right to receive this type of information? Who is entitled to compensation for damage caused by the transmission or failure to transmit information ? Questions relating to the obligations and responsibilities that may arise, and which the law must designate through special regulations, are often absent in many countries.

Legislators in the countries that have taken the initiative have managed to strike a balance between maintaining the principle of medical secrecy, respecting the rights of people potentially affected by genetic disorders, and respecting privacy.

Third requirement:confidentiality: Thus, the Hugo-Elsi Committee emphasized the confidentiality of genetic testing, announcing that "respect for privacy and protection against unauthorized access must be ensured by the confidentiality of genetic information. Coding of this information, controlled access procedures and sample and information transfer and retention policies must be developed and implemented prior to sampling.
Particular attention must be paid to the actual or potential interests of family members. [2]

The French legislator based his decision on the provisions of the Civil Code. The French legislature based its decision on the provisions of the Civil Code, which stipulates in articles 16 to 10 that: "The examination of a person's genetic characteristics may only be undertaken for medical or scientific research purposes".

1 Borrillo D, *Id*., p. 22

2 Godard.B., "Ethics", Research Center in Public Law, University of Montreal, in *adsp* n° 34, March 2001, pp 45-57.

The European Convention on Human Rights and Biomedicine stipulates that "an intervention in the field of health may only be carried out after the person concerned has given his or her free and informed consent. He or she must receive adequate prior information on the purpose and nature of the intervention as well as on its consequences and risks, and may freely withdraw consent at any time", according to the European Convention on Human Rights and Biomedicine.

Article 24 of the Declaration of Helsinki, Ethical Principles for Medical Research Involving Human Beings, amended by the 64th WMA General Assembly, Fortaleza, Brazil, October 2013, states that genetic testing involves access to a person's privacy, namely their bodily intimacy and the meanings they associate with it regarding their psychic identity. For this reason, the protection of the person by medical secrecy is necessary.[1]

Fourth requirement: autonomy: Respect for autonomy means maintaining a space of freedom where the individual can enjoy his or her right to exist. Any measure that imposes excessive restrictions on patients undergoing genetic testing is regarded as excessive paternalism. However, individual autonomy must be respected as a legally recognized human value in terms of the right to clear and fair education on the use of genetic testing.

Second topic: Scope of Application

Genetic testing involves analyzing a chromosome, or DNA, to identify genetic abnormalities. It is carried out on blood samples or cells taken from the patient's mouth, as the case may be. By investigating a person's biological predisposition to certain diseases, the aim of these tests is to find solutions to delay or avoid the onset of disease, by interpreting the data contained in the genes.

The preventive aspect, with its ability to predict the future, is therefore the very essence of genetic testing research. Historically, the first tests appeared in 1959, thanks to the research carried out by Dr Jérôme Lejeune and his colleagues, who for the first time were able to justify the link between a disease and a genetic abnormality in the DNA. Indeed, "they discovered that people with mongolism carry an extra chromosome in the nucleus of their cells. This discovery marked the beginning of the identification of a long series of chromosomal abnormalities and the appearance of the first genetic tests " [2]

1 Ossoukine Abdelhafid,*Biomedical Ethics*, Edition Dar El Gharb, Oran, Algeria, 2000, p.126.

2 Marie Junker, Lucile de la Bretesche, and Constance du Bus, Ethical issues, "Genetic tests" (consulted on 08/08/2023/20:00), https://www.ieb-eib.org/fr/

Genetic testing is generally used in four areas, as follows: Prenatal diagnosis: PND, post-natal diagnosis, pre-implantation diagnosis, insurance diagnosis and diagnosis of mental illness:

First requirement: prenatal diagnosis PND: The fear that women of childbearing age may have a disabled child has led to an increase in requests for prenatal genetic testing. Despite the probabilistic nature of the occurrence of a serious genetic malformation, the decision to end the life of an embryo or fetus by voluntary termination of pregnancy, or not, must be defended and considered.

Let's take the case of a gynecologist who explains to a 38-year-old patient, because of the mother's advanced age, the high probability of having a child with Dawn syndrome. Should we keep it and wait until it's born? The other problem in this context is that genetic testing is carried out by amniocentesis, which generally carries the risk of causing a miscarriage.

Abortion, defined as the expiry of a fetus before the normal due date of 180 days after conception [1] , has become an increasingly important social issue. Religious beliefs, morality, legal provisions and personal convictions are all factors influencing the decision to have an abortion

The Montpellier trial court ruling of December 15, 1989 states that the child's incapacity is a fact of nature and can in no way be linked to the error in karyotype qualification; the parents cannot substitute themselves for the child in asserting his right not to be born. [2]

In France, since the law of January 17, 1975, abortion or termination of pregnancy for medical reasons has been tolerated at any time during pregnancy in cases where "there is a strong probability that the unborn child will suffer from a particularly serious condition recognized as incurable at the time of diagnosis". Voluntary termination of pregnancy is also recommended in Italy when a genetic disease, such as thalassemia major, is detected at an early stage.

In Algeria, exemption is only granted if the mother's life is in danger. "Anyone who, through food, drink, medication, maneuvering, violence or any other means, has procured or attempted to procure the abortion of a pregnant or supposedly pregnant woman, whether she has consented to it or not, is punishable by imprisonment of between one (1) and five (5) years and a fine of between five hundred (500) and ten thousand (10,000) DA. If death results, the penalty is ten (10) to twenty (20) years' imprisonment. In all cases, the guilty party may also be subject to a residence ban. Article 304 of Ordinance no. 66-166 of June 8, 1966 on the Penal Code has been,

1 Fournier, E., *Médecine légale*, Edition Flammarion, Paris, 1976, p.142.

2 Rehmann-Sutter, C., "Bioethics", interview with the magazine Horizons, *Horizons Review*, Swiss National Science Foundation. 2004, p.15

amended and supplemented.[1] As for article 308, abortion is not punishable when it constitutes an essential measure to save the life of the mother in danger and is performed openly by a doctor or surgeon after advice has been given.

Second requirement: post-natal diagnosis: The aim is to inform parents of the likelihood of their child contracting a disease at a given age. The question of the psychological impact of these predictive genetic tests is commonly raised in the context of screening for cancer or Huntington's disease. In the case of breast cancer, for example, frequent mammograms are recommended instead of extreme preventive mastectomy. It should be noted that this disease is the second leading cause of death in women aged 35 to 54. In Western countries, one woman in ten develops breast cancer during her lifetime. Eighty percent of people with breast cancer are over 50. 3by him/her to the administrative authority.[2]

Pr. Munnich.A[3] reveals his testimony on the right to know if a child is a carrier of a genetic disease. The mother of a young nursing student who became blind at the age of 20 due to a form of recessive retinitis pigmentosa (Stargardt's disease) came to see him and asked him to check whether her 17-year-old son would also be affected by the disease. He was astonished by her impatience and wondered about the foreseeable benefits of this test for the young man. She replies that they paid for three years of nursing school for their daughter, and now she's blind; she can't even see the patients' veins and can't read the graduations on the syringes. Everything has to be redone! Today, their son wants to become an electrical engineer, a profession that requires excellent eyesight. He has to work on printed circuits. "If he's going to go blind too, I'd rather know about it and steer him straight into another course: physiotherapy or switchboard operator".[4]

1 Ordinance No. 66-166, dated June 8, 1966, related to penal code, *Official Journal* No. 49, amended and supplemented by Ordinance No. 20-06 of April 28, 2020, *Official Journal* No. 25 of April 29, 2020.

2 Thévoz J-M., "The announcement of a tragic destiny at the heart of a cloudless life", *Laval Theological and Philosophical*, University of Laval, Volume 54, Number 2, 1998. P.255

3 Pr.Arnold Munnich, is a French pediatric geneticist. He is the creator of the medical genetics department at the Necker "Sick Children" hospital in Paris.

4 Ameise.J.C, Munnich.A and other experts, genetic tests, scientific, medical and societal questions, INSERM, 2008, hal-open science : 01572050, Paris, p.27.

Second requirement: pre-implantation diagnosis PGD: PGD is a prenatal diagnosis method used to detect the risk of having a child with a genetic disease. It involves performing a biological diagnosis on cells taken from the embryo in vitro. It offers the possibility of distinguishing, from a batch of embryos, those that can be selected and cultivated in the uterus to give birth to a child. It is this embryonic selection that poses a moral problem and calls for ethical reflection. Thus, we note the prohibition of selection in Algerian law in Article 436 of Law 18-11 of July 2, 2018: "Anyone who contravenes the prohibition set out in the provisions of Article 375 of this law, relating to the reproduction of living organisms, genetically identical and sex selection, shall be punished by imprisonment of ten (10) to twenty (20) years and a fine of DA 1,000,000 to DA 2,000,000. " [1]

It is clear that the prohibition of pre-implantation diagnosis, even if its objective is limited to the detection of a particularly serious genetic disease recognized as incurable, will ultimately lead to the modification of the components of the human species. If the development of this diagnosis makes it possible to eliminate all embryos carrying the mutated gene, the result will necessarily be a modification of the human species, since, thanks to this technique, subjects carrying the disease will disappear. " [2]

In oncogenetics, and as an early detection tool, genetic tests are carried out on individuals with the same family history who present a risk of hereditary origin. Generally speaking, if the test on the first "index" family member reveals that the patient is a carrier of an abnormality, a research proposal will be examined in the other family members known as "relatives".

An alteration in the BRCA1 and BRCA2 genes implies a predisposition to breast cancer. According to the medical literature, there are no genes for cancer, myopathy or Alzheimer's disease; it is the altered genes that predispose to disease.

Thus, "the detection of diseases such as Ducherne's myopathy or cystic fibrosis can lead to the voluntary termination of pregnancies in subjects who die at the end of a veritable ordeal around the age of twenty or thirty, depending on the case " [3].

1 Law No.18-11, dated July 2, 2018, concerning health, Official Journal No. 46, issued on July 29, 2018, amended and supplemented by Ordinance No. 20-02 of August 30, 2020, Official Journal No. 50 of August 30,2020.

2 Annick Dorsner-Dolivet, *The Responsibility of the Doctor*, Economica Edition, Paris, 2006, p.369.

3 Ossoukine Abdelhafid, *Biomedical Ethics*, Edition Dar El Gharb, Oran, Algeria. 2000, p.127

Fourth condition: oncology diagnosis: This diagnosis involves detecting genetic predisposition to an occupational disease. In 2000, a complaint was filed in federal court in Iowa, calling for an immediate halt to genetic testing of employees by the Northern Santa Fe Railroad.

The U.S. government's Equal Employment Opportunity Commission (EEOC), which initiated the lawsuit, brought heavy charges against the company for conducting genetic testing on its employees.

The EEOC claims that the company required the tests to detect a genetic predisposition to carpal tunnel syndrome. These data show the potential for segregation and exclusion associated with the use of these tests under the guise of increased medical leave. The predictive aspect of genetic counseling may lead employers to dismiss healthy employees at risk of illness. In Germany, a teacher was denied tenure because she refused a genetic test that would have revealed whether she had Huntington's disease.[1]

In France, bioethics law 94-653 of July 1994 and opinion no. 46 of October 30, 1995 of the National Consultative Ethics Committee n°46 of October 30, 1995, rule out any use of genetic testing for selection purposes in the workplace: "under no circumstances should such screening have the effect of reducing the prevention of occupational risks by giving priority to eliminating the most genetically exposed employees rather than adapting the work environment".

Fifth requirement: diagnosis in the context of insurance

In April 1997, the Council of Europe's Convention on Human Rights and Biomedicine confirmed in Article 12 that "tests predictive of a genetic disease or making it possible either to identify the subject as a carrier of a gene responsible for a disease, or to detect a genetic predisposition or susceptibility to a disease may only be carried out for medical purposes or medical research and subject to appropriate genetic counselling".

Beyond the world of work, the use of genetic tests by insurers also reveals a number of abuses. A case in point is that of a woman with the initials Y.Q., who lodged a complaint against a French credit union in 1997, following the latter's request for a genetic examination. As soon as clinical signs of the disease appeared, she had to stop working, and the insurer cancelled the life insurance policy she had taken out to cover her home loans. The company took the view that the insured had provided inaccurate answers to the questionnaire that had to be completed when the policy was taken out.

Although the court ultimately ruled in favor of the patient, this case illustrates the abuses that can result from the use and interpretation of genetic tests. In France, the

1 Rehmann-Sutter. *Op.cit*, p. 13

National Ethics Advisory Committee declared that "the use of genetic information for selection or discrimination purposes in social and economic life would lead to an extremely serious challenge to the principles of equal rights and dignity", and recommended a ban on the use of genetic tests by employers and insurers.

Sixth requirement:diagnosis of mental illness: Over the years, mental health care has become a public health issue. Many psychiatric disabilities are genetic in origin. They have been identified as the result of genetic mutations during the diagnostic process. Obtaining this diagnosis is fundamental for most families, enabling them to access genetic counseling. Schizophrenia is a serious illness that occurs worldwide in all cultures and latitudes. It remains one of psychiatry's most mysterious illnesses.

Although we now know that this mental illness is linked to alterations in the structure and functioning of the brain, the exact causes of the disease are far from being completely elucidated, although the possibility of genetic inheritance has not been ruled out. Schizophrenia, Alzheimer's disease and autism are also diseases more exposed to analysis of family genetic inheritance.

Improved genetic technologies and the implementation of vast international research programs have made it possible to identify the factors involved.

Broadly speaking, two major groups of diseases can be defined according to their genetic or environmental causal factors: "non-genetic diseases, in which the environmental factor is the major or even exclusive factor, and diseases with a genetic influence, in which two sub-groups can be distinguished: Mendelian transmission diseases and complex hereditary diseases.

These genetic and environmental factors only represent "susceptibilities" to developing these diseases, and are neither necessary nor sufficient for these disorders to manifest themselves. " [1]

1 Pierre Alexis Geoffroy, Michael Guetta, Bruno Etain, Neurosciences, *Genetics in Psychiatry: fundamental aspects*, Psychiatric information 2016/4 (V.92), Éditions John Libbey, Paris, 2016.pp.305-315

Conclusion:

Since the publication of Mendel's Laws in 1865, the world of genetics has evolved considerably, presenting many challenges that are both hopeful and frightening. Indeed, with the evolution of genetic testing, the possibility of preventing certain diseases by identifying genetic markers, as in Huntington's disease, myopathies and breast cancer, brings us back to the reality of the search for preventive solutions for chronic pathologies. While this revolution brings benefits for medicine, it also raises ethical and moral concerns. It is necessary to highlight this type of abusive scientific innovation and to confront it with human values in their universal aspects. Humanity must assume its responsibility in the evolution of genetic testing by adopting a fair stance against eugenic and discriminatory aberrations.

Considered as a set of actions whose aim is to avoid the accumulation of "bad" genes in human races, the philosophy of eugenics poses as the guarantor of the selection and promotion of "good" genes in a universe where all racial distinctions would be abolished. It is also part of an abusive trend that jeopardizes the security of the genetic heritage and the integrity and dignity of the human being.

The current challenge must be directed towards the valorization of this threat rather than pouring itself into a frightening promise that presents only the appearance of its beneficence but hides at its bottom a real, inevitable risk to the whole of humanity.

Finally, it has become necessary for all research entities carrying out explorations of the genetic heritage for therapeutic purposes and which expose the human race to eugenic, discriminatory, and racial maneuvers to stop this trend and to comply with the rules of ethics and professional conduct in genetic and biological research. We also urge the international scientific community to establish an international regulation protecting the human gene from any fraudulent manipulation.

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