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Over the counter genetic tests and pharmacogenetics: Which are the individual and collective challenges in Europe?

PRESS BOOK

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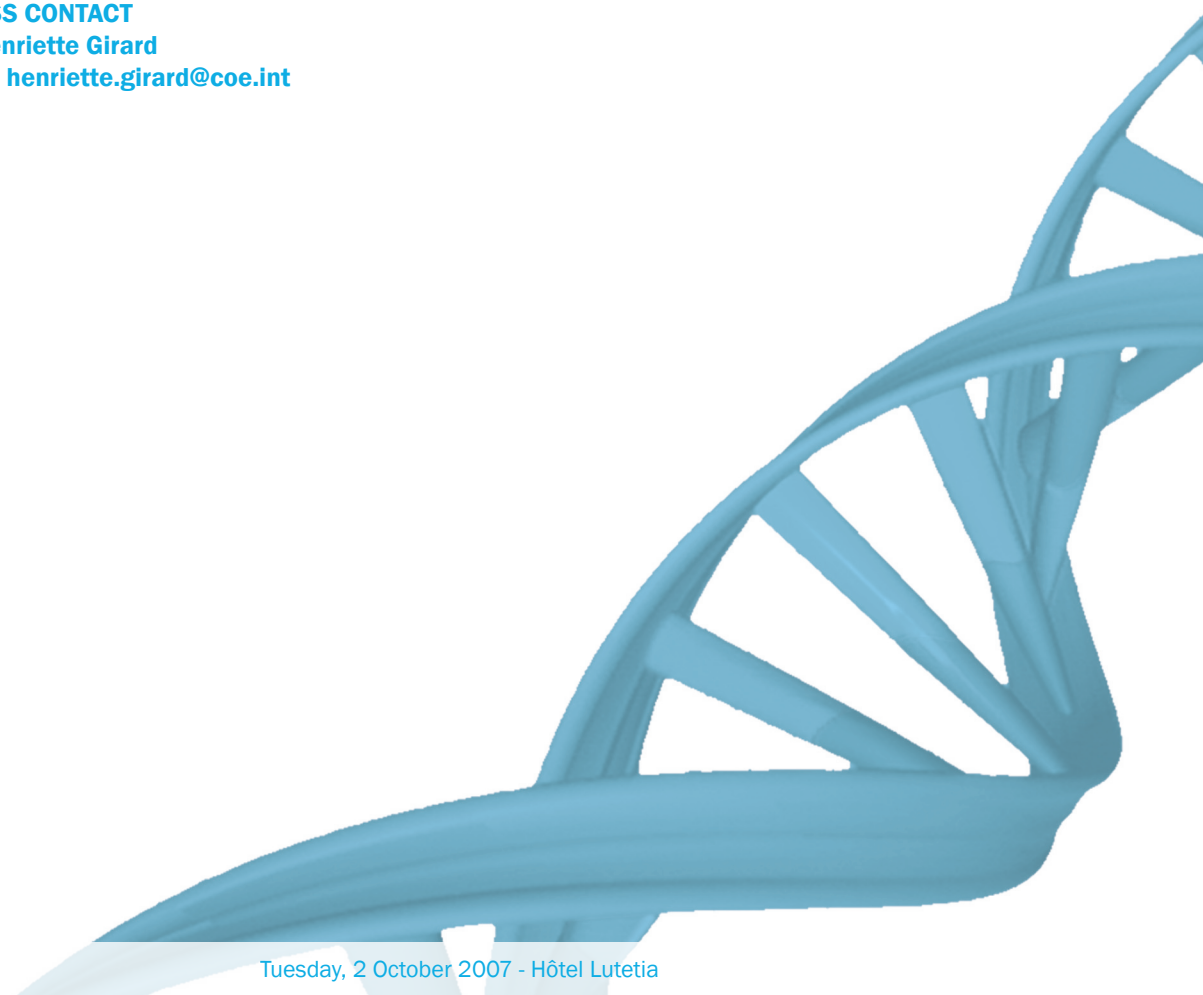

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Part 1 : GENETIC TESTING

I - GENETIC TESTING: DEFINITIONS[2]

1) Directly accessible genetic tests and pharmacogenetics: specific situations

a - Access to genetic testing

Peter, aged 55, has found a website that offers a genetic test to determine the risk of having a cardiovascular accident, in other words of thrombosis (obstruction of the veins). He has decided to do the test and orders the kit. It is easy to use: he needs simply to scrape the inside of his cheek with a spatula and return the sample to the address indicated. Three weeks later the results arrive by e-mail:
"Risk of developing thrombosis four times higher than in the population at large."

- Will individuals soon be offered the means of determining, themselves, their predisposition to a large number of diseases and thus "predicting" their future health?
- Which are the quality and reliability of the tests on offer?
- How can one ensure that the test results are properly interpreted and understood, given that no account is taken of the person's history?
- What information do individuals receive when a test is carried out without individualised medical supervision?
- How can the confidentiality of the personal data obtained be guaranteed?
- What are the implications of such practices for the health system and the economics of health?
- In what way do such practices need to be regulated?

b - Access to treatment via pharmacogenetics

Clara has breast cancer. Several types of treatment can be envisaged, including the administration of various drugs. The doctors carry out a genetic test to identify the genetic characteristics of her tumour in order to find out which is the most effective drug to administer to her.

- Will a pharmacogenetic test be necessary prior to any medical treatment?
- Will the benefits of this practice really be shared by all, or will some patients be "neglected" because of the cost of developing suitable treatment?
- How effective and reliable are the available tests?
- How independent and free are the patient and doctor when it comes to deciding whether or not to go ahead with a test?
- What ethical and social challenges are related to pharmacogenetics?

[2] *The press kit fact sheets are based on a Council of Europe document: "Bioethical Issues - Educational fact sheets". (Strasbourg, French version published by Belin, 2006)*

2) Revolutionary knowledge: analysis of a person's genome

Genetic testing entails the analysis of a person's genetic characteristics and makes it possible to identify an abnormality (mutation, deletion, chromosomal abnormality) that could be responsible for a disease or be a factor predisposing the person in question to a disease if it is combined with other (genetic, environmental or other) factors. The information resulting from these tests makes it possible to confirm the **diagnosis**[3] of a genetic disease in an individual showing **symptoms** of that disease.
It can also serve a **predictive** purpose by indicating the risk of developing a disease.
The advantage of identifying genetic diseases is that one can control the transmission of the disease within the family, and particularly its transmission to descendants.

Depending on the case, the results of genetic testing may make it possible to adapt treatment to the disease identified or take preventive measures to limit the symptoms or prevent the onset of the disease, particularly through regular monitoring of the appearance of symptoms.

3) Different types of genetic disease

Genetic diseases are divided in two groups, corresponding to different forms of transmission and different investigation techniques:

- Diseases diagnosed by cytogenetics (examination of the chromosomes)

These are characterised by a change in the number of chromosomes or their structure. They are known as *chromosomal diseases*. For instance, Down's syndrome is an abnormality caused by the presence of a third 21st chromosome.

- Diseases diagnosed by molecular genetics (study of the DNA)

These are characterised by a change (known as a mutation) in one or more genes (a change at molecular level in the DNA structure). They are known as genic diseases and may be *monogenic* or *multigenic*. For instance, sickle cell anaemia, a disease of the blood due to a mutation of a gene on the 11th chromosome, is a monogenic disease.

Most genetic diseases are caused by a combination of genetic and environmental factors. They are known as *multifactorial diseases*. For instance, certain forms of insulin-dependent (type I) diabetes have environmental causes that are still poorly understood, but they seem, in some people, to be associated with a genetic susceptibility to mutations of the genes on the 6th chromosome.

4) Different types of genetic test

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- A *diagnostic test* makes it possible to confirm the genetic origin of an existing disease. For instance, a test revealing a mutation of the DMD gene confirms the existence of Duchenne muscular dystrophy rather than another type of muscular dystrophy.

- A *presymptomatic test* makes it possible to establish that the person tested has a genetic mutation linked to a disease of which the symptoms are not apparent and, on that basis, determine the likelihood of his or her developing the disease, before the first symptoms appear. An example is Huntington's chorea, the onset of which does not usually occur before the age of 40.

[3] *The words in bold are defined in a glossary.*

- A *predisposition test* provides information about the genetic component of a multifactorial disorder. For instance, if there is the mutation on one of the BRCA genes, the risk of developing breast cancer before the age of 50 would appear to be between 20% (BRCA2) and 40 % (BRCA1). Non-genetic factors are also involved, however, in the development of the disease.

- A healthy carrier *identification test* makes it possible to determine whether a healthy person is a carrier, in other words has a genetic abnormality linked to a disease that will not occur in that person (as in the case of a disease transmitted in the recessive mode) but may be passed on to his or her children and is likely, in certain circumstances, to affect their health. For instance, beta-thalassaemia can cause serious anaemia. It occurs in a child only if both parents pass on the mutated gene.

Some figures

- There are about 30,000 genes in the genome.
- Some 5,000 genetic diseases responsible for total of some 30,000 new cases a year have been identified.
- In France, about 3% of newborn children have a genetic abnormality of varying severity that can be identified clinically or by a diagnostic (genetic or other) test. About 800,000 children a year are born in France.
- 25 to 30 million people in Europe are concerned by a genetic disease.

The most common genetic diseases are:
- Cystic fibrosis: one in 3,000 births
- Muscular dystrophy: one in 4,000 births
- The group of diseases characterised by mental retardation: one child in 200

II - GENETIC TESTING: THE STAGES INVOLVED AND THE LIMITATIONS

Genetic testing involves analysing genetic material (generally a chromosome or DNA) in order to identify any genetic abnormality. This type of analysis requires only a small sample of biological material (blood, a few cells obtained by scraping the inside of the cheek, etc). In France it is regulated by law, and the patient must be provided with information beforehand and give his or her consent before the test is prescribed. In France tests of this kind may be prescribed only by a doctor (Article L 1131-1 of the Public Health Code), on the occasion of an individual medical consultation (Article R 1131-5 of the Public Health Code).

1) The different stages of genetic testing

1. Information and genetic counselling: patients must be provided beforehand with appropriate information so that they can take an informed decision as to whether or not to have the test. The information must cover, in particular, the implications for the patient and members of his or her family. Depending on the test, patients may be offered **genetic counselling** to help them, in particular, to understand all the implications and make informed choices.

2. Consent: patients must then give their free and informed consent to the genetic test.

3. Removal of a body sample: a genetic test is carried out on a few cells, usually extracted from blood, but also sometimes from saliva, skin...

4. Genetic analysis: chromosome or **DNA study**
Chromosome *study: preparation of the* ***karyotype***. The division of a cell is stimulated and then blocked at the stage when the chromosomes are fully condensed. The cell is then made to burst. The artificially stained chromosomes are photographed with a microscope and classified.
DNA *study: preparation of the DNA*. The DNA is extracted from cells and purified. The gene to be examined is identified and replicated a large number of times by **PCR**. It is said to be "amplified".
Identification of mutations: gene mutations are revealed by radioactive probes and **electrophoresis**, by comparing the analysed gene with a reference gene. The differences observed indicate genetic abnormalities. New techniques are being developed to enhance analytical capacity.

5. Interpretation of the results: the results of a genetic test may be difficult to interpret: special expertise is required and account must be taken of the patient's history. French regulations specify that only the doctor who prescribed the test may inform the patient of the results (Article R 1131-14 of the Public Health Code).

6. Genetic counselling[4]: genetic counselling helps the patient to understand the implications of the results for his or her own health and the health of family members and to take decisions, including for procreation choices.

[4] *In France genetic counselling is a high-quality service provided to the patient by a doctor with expertise in genetics, during an individual appointment. It is a communication and support process aiming at enabling individuals, and where appropriate, their families to make informed choices concerning a genetic test and its implications.*

2) Difficulties and limitations of genetic testing

Like any biological test, genetic tests must meet proper scientific criteria in terms of reliability. Very little biological material is needed to carry out a genetic test. The difficulty lies in the quality and reliability of the tests proposed and, more particularly, the analysis of the results.

For example, even if a mutation linked to a disease is identified, it is sometimes impossible to predict the time of onset of the disease and its severity. Some people with a particular mutation will have benign symptoms, while others with the same mutation will suffer serious disorders or, in the case of mutations linked to multifactorial diseases, will not develop the disease at all.

Moreover, it is necessary to have information about the genetic abnormalities linked to the disease (gene, chromosome) in order to look for a mutation. At present, genetic knowledge does not always make it possible to look in the right place. Moreover, the presence of a mutation responsible for a multifactorial disease is not always sufficient in itself to cause the disease to develop. One can indicate only the likelihood of developing the disease. With the exception of a few diseases, a positive test result does not necessarily mean that the person will develop the disease.

3) Access to tests on the internet: limitations in the interpretation of the results

Where there is no individualised medical supervision, direct access to genetic testing raises a number of issues, in particular:

- The problem of providing the person concerned with appropriate information
- The problem of taking account of the person's individual situation
- The problem of the quality of the support and, in particular, of any genetic counselling provided.

III - SOME KEY POINTS AND ETHICAL CONSIDERATIONS

The following considerations are based on discussions at European level and on the principles set out in the Convention for the Protection of Human Rights and Dignity of the Human Being with regard to the Application of Biology and Medicine: Convention on Human Rights and Biomedicine (Council of Europe, April 1997).

1) Genetic testing: more information about one's future health but numerous implications

A growing number of tests is available for detecting genetic abnormalities but, at the same time, forms of treatment that effectively slow down the progress of the diseases associated with these abnormalities or prevent their onset are still very limited.

An examination of genetic characteristics, regardless of the result, may have far-reaching consequences for people's lives. The "revelation" of risks to their future health may change their view of life and the way other people and society at large see them.

The situation is paradoxical: genetic testing makes it possible to find out more about someone's future health, but this knowledge may have implications for the life of the person being tested that are difficult to foresee.

2) Genetic information, a special kind of information

The results of genetic tests are different from other types of medical information in that:

- they may concern other family members
- they may reveal something inevitable
- they usually concern a likelihood and not a certainty.

The use of personal genetic information raises major ethical, legal and social issues.

3) Basic principles

The dignity and identity of human beings must be protected

- Everyone must be guaranteed respect for their integrity and other rights and fundamental freedoms with regard to the application of biology and medicine (Article 1 of the Convention).
- Tests which are predictive of genetic diseases or which serve 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 be performed only for health purposes or for scientific research linked to health purposes, and subject to appropriate genetic counselling (Article 12 of the Convention).
- Any form of discrimination against a person on grounds of his or her genetic heritage is prohibited (Article 11 of the Convention). Improper use of the results of a genetic test could lead to discrimination in access to work or insurance and be a source of stigmatisation for the person concerned.

Legal reference
"Convention for the Protection of Human Rights and Dignity of the Human Being with regard to the Application of Biology and Medicine: Convention on Human Rights and Biomedicine" (Council of Europe, April 1997)

4) Informed consent

- An intervention in the health field may only be carried out after the person concerned has given free and informed consent to it (Article 5 of the Convention).

- The person concerned may freely withdraw consent at any time.

- The person undergoing genetic testing must clearly understand the nature of the examination, the significance of the results for himself or herself and, where appropriate, for members of his or her biological family, and be aware of the existence of means of prevention or treatment and the constraints attached to them so as to be able to take an informed decision. This is all the more important as the information is genetic and therefore makes it possible to know, at least to some extent, the future health of the person concerned.

- Special attention must be paid to persons whom the law does not consider capable of giving their consent, such as minors and certain adults suffering from mental disabilities (Article 6 of the Convention).

5) Informing the person concerned and family members

Anyone undergoing genetic testing is entitled to know the information about his or her health resulting from the test. Some people, however, prefer not to know that they could develop the disease when there is as yet no treatment available, in which case the wish of the person concerned not to be informed must be respected.
Everyone is entitled to respect for his or her privacy and may refuse to inform others of the results of genetic tests. The results may, however, also concern the health of other members of the family. It is therefore important to make the person concerned aware of this.

6) Good medical practice

The medical personnel must inform the person concerned of the potential risks and benefits of the genetic test. In particular, when the implications may be important, as in the case of predictive tests, genetic counselling must be offered.
All information must be treated confidentially. The doctor must observe medical secrecy, which is the basis for the patient's trust. Health personnel must be trained in the issues arising in connection with genetic testing, including ethical aspects.

7) Psychological problems in response to the results

The results of a genetic test may have far-reaching effects on the lives of the person concerned and of his or her family.
The knowledge that one carries a genetic disease may induce psychological disorders. It can affect the decision to have children. Parents may feel guilty for passing on a genetic abnormality to their children. Knowing that one does not carry a genetic abnormality may be a relief but some people may, on the contrary, feel guilty if other family members carry the genetic abnormality.

8) Privacy and misuse of information by third parties

The information resulting from genetic testing constitute personal data. This raises the issue of confidentiality and a breach of privacy in the event of their use by third parties.

IV - SITUATION AS REGARDS GENETIC TESTING IN SOME EUROPEAN COUNTRIES

1) Regulation of the examination of the genetic characteristics of an individual for health purposes under French law

Regulation by the legislation on bioethics

The first legislation on bioethics dates from 1994. **The examination of the genetic characteristics** of an individual is now governed mainly by provisions incorporated, under the **Bioethics Act of 6 August 2004,** into the **Civil Code** and the **Public Health Code**.

- Article 16-10 of the Civil Code specifies the purposes for which such examinations may be carried out and the conditions attached to the consent required:

> *"Examination of the genetic characteristics of an individual may be undertaken only for health or scientific research purposes.*
> *The person's express written consent must be obtained before the examination is carried out, once he or she has been duly informed of the nature and purpose of the examination. The consent shall indicate the purpose of the examination. It may be withdrawn, without any formalities, at any time."*

- **Articles L 11131-1 ff of the Public Health Code**, after referring to the provisions of the Civil Code in respect of the conditions under which consent must be obtained (prior, express, written) and the person concerned must be informed, provide that the **Biomedicine Agency** is responsible for delivering accreditation to practitioners authorised to carry out genetic investigations.

Different ministries are currently liaising in connection with an implementing decree.

The rules will concern authorisation conditions, the organisation and operation of the bodies involved in examining genetic characteristics for health purposes and the conditions under which the practitioners concerned are accredited. Among other things, the decree will determine the new division of responsibilities between the Regional Hospitalisation Agency (ARH), which it is planned to make responsible for issuing accreditation to health establishments and laboratories (instead of the Prefect for the region), and the Biomedicine Agency, which will be responsible for accrediting practitioners.

2) Use of genetic medicine for non-medical purposes: the Patients' Rights Act of 4 March 2002

Consideration has been given in French law to the specific human rights issues that may arise in connection with genetic medicine, particularly the predictive aspect, when there are plans to use it for non-medical purposes. These issues have been taken into account in the Patients' Rights Act of 4 March 2002.

- The inclusion in the **Civil Code** of **Article 16-13,** according to which "*No one may be discriminated against on the grounds of his or her genetic characteristics*", reflects a desire of the drafters of the law to set limits to the use of genetic testing.

- Moreover, the inclusion in the **Public Health Code** of **Article L 1141-1** gives effect to this non-discrimination principle by stipulating that companies and other bodies offering death and disability insurance are prohibited from taking account of the results of genetic testing, even at the request or with the consent of the person concerned. Nor may insurance companies require someone to undergo such tests before a contract is signed or in the course of a contract.

V - OVERVIEW OF THE LEGAL SITUATION AS REGARDS GENETIC TESTING IN EUROPE

1) Genetic testing: an increasing offer

In the wake of improved knowledge, technical progress and the development of expertise in recent years, there has been a considerable increase in the number of genetic tests available in Europe (which is estimated to double every three years or so) in both the public and the private sectors. This development has been matched by the expansion of genetic services, and it is likely that in the years to come genetics will increasingly become integral part of medical practice.
While most genetic tests are proposed under national health services, tests that are directly accessible, without going through a doctor (over the counter tests), are beginning to appear in some countries.
In addition, genetic testing is just beginning to be used for the purposes of prescribing medical treatment (pharmacogenetics).

2) An increase in exchanges of biological samples

It is not possible for the same laboratory to carry out all types of tests, given the large number of genetic diseases for which tests have been developed and the special technical means needed to carry them out. Networks of laboratories to which biological samples for testing are sent have therefore been set up at both national and international level. Exchanges among laboratories are particularly common in Belgium, France, Italy, Spain, the United Kingdom and Germany.

3) Legislation varies from country to country

As a result of this development, growing attention has been paid at national and European level to the regulation of genetic services.
There are three main areas of concern:
- the quality of genetic tests
- the conditions under which genetic testing is carried out
- the way in which the results of such tests are used.

At present the situation in terms of legislation varies considerably from country to country in Europe. Very few countries have introduced special legislation, such as the one introduced in Austria and, more recently, Switzerland and Portugal. On the other hand, there are provisions concerning genetic testing in laws covering bioethics in general (e.g. in France), patients' rights (e.g. in Denmark) on data protection (e.g. in Germany). These provisions do not, however, always provide a comprehensive legal framework for genetic testing. In most countries, guidelines have been drawn up in different sectors, in particular by human genetics societies or clinical geneticists societies. Some countries have set up consultative bodies to advise the government on issues connected with genetics (the United Kingdom and Austria, for instance).

It should be remembered that none of the legal instruments in force in the various European countries applies outside national borders or, in particular, covers tests commercially available on the Internet, offered by laboratories located in other countries, mainly the United States.

4) At European level

In the European Union, genetic testing may be considered to be covered by Directive 98/79/EC on in vitro diagnostic medical devices. The Directive mainly concerns the safety and quality aspects and does not cover the conditions under which genetic testing and its results are used. The requirements laid down in the Directive vary according to the degree of risk inherent in the use of the devices concerned. Genetic testing is generally considered to entail only a low risk for which the procedures for assessing its conformity may generally be made under the responsibility of the manufacturer (selfcertification).

Efforts to improve compliance with the minimum quality and safety standards for genetic analysis services have been made at international level, in particular by the European Union and the OECD. Other initiatives have also been taken at European level, for example by Eurogentest (European network of excellence in the area of genetic testing), in order to harmonise and improve the general quality of genetic services in Europe.

The only international legally-binding instrument concerning the ethical aspects of genetic testing is the Council of Europe Convention on Human Rights and Biomedicine (ETS No. 164, 4 April 1997), which lays down a number of fundamental principles applying to the conditions under which genetic testing and its results are used. In particular, it restricts the use of genetic tests predicting a disease to health and medical research purposes and prohibits all forms of discrimination against an individual on the grounds of his or her genetic heritage.

On the basis of these principles, the Council of Europe Steering Committee on Bioethics (CDBI) has just finalised a new legal instrument which will supplement the provisions of the Convention in the specific field of genetic testing for health purposes: the Additional Protocol to the Convention on Human Rights and Biomedicine, concerning genetic testing for health purposes.

Part 2 : Pharmacogenetics: overview of a developing practice

I – PHARMACOGENETICS

2) Introduction

Doctors and pharmacists have long observed that a drug that is effective in one patient is not necessarily effective in another. In some cases, a drug may even be highly toxic, or indeed lethal, as is apparent from the reports submitted every year to the regulatory authorities (Afssaps for France and the EMEA for Europe).

There may be various factors, in particular genetic factors, responsible for these individual variations in the response to drugs. Genetic variation may therefore, depending on the individual (genetic polymorphism), affect the fate of the drug in the body (its metabolism, absorption or elimination) or the choice of treatment, according to the drug's target.

Pharmacogenetics
Pharmacogenetics is the study of genetic factors affecting the body's response to medicines.

Its purpose is to identify new markers that make it possible to predict a patient's response to a drug, so as to avoid giving the patient a drug that will be ineffective or toxic in his or her case.

The example of anticoagulants, used to prevent thrombosis
To be effective, an anticoagulant must be broken down in the body by a molecule known as an enzyme. About 1% of the population will, for genetic reasons, produce an inactive enzyme, i.e. one that will be unable to break the anticoagulant down properly.
If, therefore, such a patient takes an anticoagulant, he or she is liable to suffer bleeding. The drug is too effective in that patient.

A recent example of toxicity caused by a medicine
A woman gives birth and breastfeeds her baby. After the birth, she is prescribed codeine. Shortly after she takes the medicine, the baby begins to behave strangely and dies very quickly. The woman metabolised codeine ultra-rapidly, in other words broke it down much faster than normal. The codeine, having been transformed into morphine, passed into the mother's milk. The doses of morphine present in her milk had increased too suddenly for the baby, and were responsible for the infant's death.

Example of the adaptation of treatment to the genetics of a tumour
A woman suffering from breast cancer may be treated in several ways, including the administration of various drugs. The doctors carry out a genetic test to identify the genetic characteristics of her tumour in order to determine which drug will be most effective in her case.

For a long time now, doctors have, without the help of genetic testing, been adapting certain forms of treatment in the light of biological or clinical symptoms in the patient which reveal a genetic sensitivity to particular drugs.

2) Therapeutic prospects: what future is there for pharmacogenetics?

Genetic polymorphism studies are now being carried out for several existing drugs, in particular those with a narrow therapeutic window, i.e. those for which the effective dose is not very different from the dose that is toxic (as in the case of certain cancer drugs).

Pharmacogenetics is not, however, a routine practice as yet. It is mainly the subject of research, even though certain University hospital laboratories offer to carry out genetic tests on doctors' patients for various classes of drugs: oral anticoagulants, cancer drugs, immunosuppressants, antiretroviral drugs and psychotropic drugs (source: Georges Pompidou European Hospital, Paris).

Some areas seem promising, for example the choice of drug for the treatment of certain forms of cancer, for genetics now makes it possible to identify the genetic characteristics of tumours. It is conceivable that, in the future, it will be possible to adapt cancer treatment to the patient in the light of the genetic characteristics of the tumour.

3) Some ethical issues raised by pharmacogenetics

While pharmacogenetics may be of real medical benefit to patients, it does raise numerous ethical and policy issues that have still to be debated[5]:

- What are the financial consequences of using pharmacogenetics, for both the production of the drug and its retail price?
- How fair is access to treatment for patients? Pharmacogenetics may mean that certain patients receive better care, but it may also identify a group of patients for whom there will be no treatment, in so far as developing a treatment would entail too great a financial investment if the number of patients is too small or very large.
- To what extent is confidentiality ensured and what conditions should be attached to the consent required of the patient, given that pharmacogenetics, though not a pathology, reveals genetic information about individuals?
- What quality controls should be required for the tests?
- Who should decide whether a patient should undergo a pharmacogenetic test? Should the tests be directly available or only on a medical prescription? Will patients have the same right to drugs even if they do not want to undergo the test associated with them?

II - VIEWS OF VARIOUS PEOPLE INVOLVED IN PHARMACOGENETICS

1) Viewpoint of a member of the pharmaceutical industry: Professor Lindpaintner, Roche

"We see this as a major opportunity to create clinically differentiated medicines which will bring benefit to the patient, and there is no evidence of this approach to have any downside.

We also think that it may be possible to accelerate and increase the likelihood of gaining regulatory approval of such new treatments which will allow us to bring them more rapidly to patients. The approach does, of course, also introduce a new difficulty, namely to develop a diagnostic test simultaneously with a medicine. However, this is a logistic challenge that we know how to manage."

[5] *"Pharmacogenetics: ethical issues" Nuffield Council on Bioethics, 2003.*

2) Viewpoint of a hospital biochemist, Professor Philippe Beaune, biochemistry laboratory, Georges Pompidou European Hospital, Paris

"The development of drugs has been a source of considerable progress in the treatment of numerous diseases. However, their secondary effects and inefficacy in some individuals raise important public health problems. Many factors are involved in the variation in the response to drugs, among which genetic factors play an important role and are the focus of pharmacogenetics. The latter makes it possible to predict the response to certain drugs, toxicity and/or efficacy, in certain individuals; however its development still requires validation studies for it to be used commonly in daily clinical practice."

3) Viewpoint of a clinician, Professor Eric Thervet, Adult Transplantation Department of the Necker Hospital, Paris

"With the use of the new forms of immunosuppressant treatment, organ transplantation has become considerably more successful. The question now is how to personalise such treatment.
Pharmacogenetics has made it possible to establish cases of genetic polymorphism that could explain the differences in the effectiveness of these forms of treatment and in the extent to which they are tolerated. It is now necessary to demonstrate by means of properly conducted clinical studies how these laboratory findings can be used in practice."

APPENDIX

APPENDIX 1: **Summary of the Council of Europe's work on directly accessible genetic tests**

APPENDIX 1:

Summary of the Council of Europe's work on directly accessible genetic tests

A new Additional Protocol to the Convention on Human Rights and Biomedicine

The sequencing of the human genome and the development of new technology make human genetics a very dynamic sector. The very rapid progress in this field has prompted the Council of Europe to focus on the ethical and legal issues raised by applications of genetics, in particular genetic testing, and to draw up legal standards to protect fundamental human rights with regard to these applications.

The Council of Europe Convention on Human Rights and Biomedicine[6] (ETS No. 164) sets out a number of principles concerning genetics (Articles 11 to 14), particularly genetic testing and interventions on the human genome.

In order to develop and supplement the principles set forth in the Convention, the Council of Europe Steering Committee on Bioethics (CDBI) has elaborated a new Additional Protocol to the Convention on Human Rights and Biomedicine, concerning genetic testing for health purposes. The Protocol covers all genetic testing carried out for health purposes, except genetic testing concerning the human embryo and foetus and that carried out for research purposes. It lays down principles concerning, in particular, the quality of genetic services, prior information and consent as well as genetic counselling. It also covers the protection of private life and the right to information obtained by means of genetic testing. It addresses the issue of genetic screening.

Tests directly available (over the counter tests)

The Steering Committee was guided by two main concerns in its work on genetic testing: the quality of the prior information given to persons envisaging genetic testing, designed to enable them to take an informed decision, and the support provided to the persons taking such decisions and dealing with the implications of a test and its results. A precise evaluation of the situation of the person concerned, involving direct contact with him or her, appeared crucial in this regard: such an evaluation could not be carried out by means of a mere telephone conversation.

These considerations prompted the Committee to examine specifically the issue of tests that are directly available.

[6] *Convention for the Protection of Human Rights and Dignity of the Human Being with regard to the Application of Biology and Medicine: Convention on Human Rights and Biomedicine (ETS No. 164). This Council of Europe convention was opened for signature on 4 April 1997 and has been signed by most European states. It sets out fundamental principles applicable to routine medicine and those that apply to new technology in the area of human biology and medicine. It also serves as a reference instrument for the European Union and other international organisations, such as UNESCO and the WHO.*

A general rule

In view of concerns about prior information and support for persons undergoing genetic testing for health purposes, the Steering Committee took the view that such testing should be carried out only in response to a specific indication made on the basis of a precise evaluation, by a doctor, of the situation of the person concerned. The Protocol thus lays down the general rule that genetic testing for health purposes may be carried out only under individualised medical supervision.

Possible exceptions ...

The Protocol does, however, provide that states under certain conditions may make exceptions to the general rule, the principal aim being to ensure compliance with the provisions of the Protocol concerning the nature and quality of the prior information, free and informed consent and genetic counselling.
Each state therefore has a degree of discretion, in the decision to allow a test to be carried out without individualised medical supervision, and when it comes to the procedures to be followed and the bodies involved in this process.
As the objective is to protect the person concerned, however, particular account must be taken of the importance of the potential implications of the test in question for the person on whom it is to be carried out or his or her family members, the ease of interpretation of the results and, where appropriate, the treatment possibilities for the disease or disorder concerned.

… save in the case of tests with important implications

The only clear restriction laid down in this respect by the Protocol concerns genetic testing with important implications for the health of the person concerned or his or her family members or for procreation choices. The Protocol prohibits exceptions to the general rule in the case of such tests.
The key concerns here are still the proper interpretation of the tests results and the guarantee of an appropriate genetic counselling to understand its implication. The results of such genetic tests may be particularly complex to interpret and may, for instance, require that additional medical information or information about the family history be taken into account. In the case of many predictive tests, even though the test may reveal a high probability of developing a particularly serious disease, the time of onset of the disease and the severity of the symptoms are often uncertain. Lastly, the problem of understanding the nature of the test and the implications, including the implications for family members, the potential psychological impact of the results on the person concerned and the often important decisions facing that person require that such tests be carried out under individualised medical supervision.

APPENDIX 2

Partners presentation

About the French Biomedicine Agency

The French Biomedicine Agency is a public administrative organisation under State control, overseen by the Minister for Solidarity, Health and Family. This organisation is competent in the domains of organ, tissue and human cell transplantation, procreation, embryology and genetics, and fulfils the following roles:

- Monitoring, evaluating and controlling therapeutic and biological activities relating to its areas of competence and ensuring their transparency;
- Participation in the development of regulations for activities relating to its areas of competence;
- Delivering authorisation for research *in vitro* on embryos and embryonic cells and for the storage of embryonic stem cells for research purposes;
- Authorising the exchange with other countries of reproductive cells or embryonic stem cells for research purposes;
- Delivering authorisations to pluridisciplinary antenatal diagnosis centres and preimplantation diagnosis centres;
- Accrediting practitioners in the fields of medically assisted procreation, antenatal and preimplantation diagnosis and examinations of genetic characteristics;
- Taking over all the activities of the *Etablissement français des Greffes* (the French Transplantation Agency) concerning graft harvesting and transplantation;
- Managing, with all the required guarantees, the information required for the management and monitoring of treatment activities related to its areas of competence;
- Promoting human organ, tissue and cell donation and the donation of gametes (sperm and ovules).

An organisation providing expert advice and proposals, and the capacity to take decisions

The French Biomedicine Agency is headed by a Director General nominated by decree. It has a management board comprising representatives from various ministries and public health administrations and individuals qualified in the domains of competence of the French Biomedecine Agency.

The French Biomedicine Agency also has an orientation council. It comprises scientific and medical experts, representatives from associations, qualified key figures, members of different institutions (e.g., the French Consultative Committee for Ethics, and the French Consultative Commission for Human Rights), as well as Members of Parliament. The orientation council is responsible for providing advice and taking decisions, which ensures the coherence of the medical and scientific policy of the agency and guarantees that the ethical and legal principles applying to its activities are respected. The French Biomedecine Agency obtains medical and scientific expert advise from a medical and scientific committee and expert groups.

About the Council of Europe

«The aim of the Council of Europe is to achieve a greater unity between its members...» Article 1 - Statute of the Council of Europe

Origins and mission

Founded in 1949, the Council of Europe seeks to develop throughout Europe common and democratic principles based on the European Convention on Human Rights and other reference texts on the protection of individuals.

Member States:

The Council of Europe has a genuine pan-European dimension: - 47 member countries - 1 applicant country: Belarus; Belarus ' special guest status has been suspended due to its lack of respect for human rights and democratic principles.

Observers:

5 observer countries: the Holy See, the United States, Canada, Japan, Mexico.

Aims :

- To protect human rights, pluralist democracy and the rule of law
- To promote awareness and encourage the development of Europe's cultural identity and diversity
- To find common solutions to the challenges facing European society: such as discrimination against minorities, xenophobia, intolerance, bioethics and cloning, terrorism, trafficking in human beings, organised crime and corruption, cybercrime, violence against children
- To consolidate democratic stability in Europe by backing political, legislative and constitutional reform. The current Council of Europe's political mandate was defined by the third Summit of Heads of State and Government, held in Warsaw in May 2005.

How it works:

The main component parts of the Council of Europe are:

- the Committe of Ministers, the Organisation's decision-making body, composed of the 47 Foreign Ministers or their Strasbourg-based deputies (ambassadors/permanent representatives)
- the Parliamentary Assembly, driving force for European co-operation, grouping 636 members (318 representatives and 318 substitutes) from the 47 national parliaments
- the Congress of Local and Regional Authorities, the voice of Europe's regions and municipalities, composed of a Chamber of Local Authorities and a Chamber of Regions
- the 1800 strong secretariat recruited from member states, headed by a Secretary General, elected by the Parliamentary Assembly.

Ordinary budget:

in 2007, 197 214 100 euros.

Official languages:

English and French are the Council of Europe's two official languages. German, Italian and Russian are also working languages.

APPENDIX 3 :

GLOSSARY

Chromosome: a long threadlike strand of DNA visible in the form of rods when cells divide. The number of chromosomes varies from one species to another: in human beings each cell contains 23 pairs of chromosomes (including one pair of sex chromosomes), one chromosome in each pair being inherited from the mother and the other from the father.

Diagnosis: identification of an illness by its symptoms.

Discrimination: treating a person differently without proper justification or in a manner out of proportion with the intended result.

DNA (abbreviation of deoxyribonucleic acid): a long molecule that contains all the genetic information of a living being. It is found in almost every cell. Its form is a double helix (like a twisted rope ladder), composed of two long chains of nucleotides (A,T,G,C), linked by bars forming chemical links. The structure of DNA is the same in all species.

Electrophoresis: technique for separating and identifying the components of a mixture (here, DNA fragments) by making them migrate under the effect of an applied electric field.

Gene: a DNA sequence which determines a particular hereditary characteristic. Each gene occupies a specific place on a chromosome.

Genome: the entire complement of DNA contained in a cell.

Hereditary characteristic: a characteristic transmitted by parents to their children.

Karyotype: map of the chromosomes contained in the nucleus of a cell, arranged in pairs according to size, shape and the position of their centre.

PCR (*polymerase chain reaction*): a technique for obtaining large quantities of a specific DNA sequence from a small sample (at a rate of about a million copies in a few hours).

Predictive test: a test using genetic characteristics to determine the probability of developing a disease or disorder.

Presymptomatic: occurring before symptoms appear.

Stigmatisation: negative reaction or judgment of a group or of society in respect of a person or group of people.

Symptom: a manifestation of a disease or disorder.

Syndrome: a set of signs and symptoms that characterise a disease or disorder.