

IPA Guidelines on Ethical aspects of genetic studies

Progress in medical science and technique provides new possibilities and facilities for doctors. However, the very same progress brings greater responsibility as well. Newly available knowledge and facilities can successfully be used for the sake of patients, or – can be easily misused, too.

An outstanding field of medicine where a rapid progress was achieved during the last few decades is *clinical genetics*, especially *molecular genetics*. The Human Genom Project by sequencing the whole human genom revolutioned both science and clinical practice, having a profound impact on health care services. Already the increasing knowledge in human genetics has led to a better understanding of the molecular basis of disease, and consequently, has resulted in improved clinical diagnosis and novel approaches in the prevention and treatment of genetic diseases. New molecular genetic methods (polymerase chain reaction, and its variations, FISH methods, micro-array techniques etc.) made it possible to verify presumed genetic diagnoses, to learn about their pathogenesis, recognize the genetic heterogeneity of clinically/pathologically identical disorders, study genetic alterations predisposing individuals to certain diseases (e.g. malignant tumors etc). The above mentioned modern methods and two further ones – namely cloning and gene therapy – opened new therapeutic perspectives. The accompanying public awareness of these developmental milestones has raised higher expectations concerning a more accurate assessment of the genetic risk of individuals within families and treatment of genetic diseases. As a consequence of our ever growing knowledge, genetics is not a privilage of specialists any more but rather a global principle of medicine.

1. The burden of recent knowledge and new genetic facilities raised new ethical problems in the everyday pediatric practice in the fields of genetic diagnosis, screening, therapy and prevention. The ethical aspects of genetic studies summarized in „genetic laws” in almost all countries are of paramount importance due to the lifelong, predictive, transgenerational results of genetic findings.

The goal of genetic studies is to recognize genetic alterations leading to certain inherited or acquired diseases or to a predisposition to them, finding a way to treat and prevent reoccurrence.. The following methods associated with special ethical issues are used:

- 1.1. Genetic counseling
- 1.2. Genetic diagnostic tests
- 1.3. Genetic screening methods
- 1.4. Genetic therapy

1.1. Ethical aspects of genetic counseling:

Definition of genetic counseling: it must precede and follow genetic tests and/or genetic screening. This is a consultation process provided by a well skilled expert in order to give information about the risk of occurrence of a genetic disorder in a family, about advantages and/or risks of human genetic tests, highlight the possible consequences of negative and positive results and give help in understanding the nature of the disease in question.

Cave! The geneticist gives individually suited information, answer the questions of the patient/parents/ relatives, still offering the decision to be brought by the affected family. This is the so called: „information-directed counseling”.

1.2. Ethical questions related to genetic diagnostic tests:

Definition: A genetic test is the examination of chromosomes, human DNA, RNA, proteins and other metabolites or any clinical examination in order to diagnose a heritable disorder or to determine genetic characteristics related to it.

1.2.1. Performance of any genetic test must be preceded and followed by a detailed information delivery on advantages and limitations of genetic tests to be carried out and on possible consequences of the positive or negative tests.

Cave! Genetic diagnostic tests can be performed in laboratories only where a clinical geneticist is available to give reliable interpretation of the tests.

1.2.2. Genetic tests may be performed only based on informed consent given by the patient, parents or guardians. Written informed consent must be provided by the patient (in case of legal capacity to act) or by his caregiver. Before agreeing, the patient must declare that he has received the necessary information to make a decision, understood it and has received answers to all his questions. This announcement along with the written consent must be signed by the patient and saved in the laboratory.

1.2.3. A well trained geneticist has to select the proper genetic test.

Since each genetic method has its advantages and limitations, certain genetic disorders can be best clarified by using adequate genetic tests.

- to recognize chromosome abnormalities, traditional chromosome analysis has to be performed completed by FISH, multicolor-FISH methods or Comparative Genomic Hybridisation. (CGH).
- to diagnose monogenic disorders, molecular genetic methods (PCR, sequencing etc.) have to be applied.

Non-targeted, inadequate genetic tests are cost-consuming and raise a false sense of security (if negative) or subject patients and families to further unnecessary investigations and stress (if positive).

1.2.4. Genetic tests are allowed to be performed only in well equipped, accredited laboratories where skilled experts and all facilities for protection of patients' data are available.

1.2.5. Genetic tests are indicated only if – based on clinical symptoms, pedigree, laboratory findings etc – the presumed genetic disorder is of devastating consequences, and/or its reoccurrence can be prevented. No tests are allowed to be carried out „for sure” only.

1.2.6. No genetic tests can be performed on a child less than 14 years of age unless the result of the test means immediate therapeutic advantage for him: inhibits the manifestation of the diseases, decreases its severity, prevents complications. Test can also be carried out if the therapy of a close relative cannot be provided without it.

1.2.7. Genetic tests on any other incapable persons can be performed only after getting the informed consent of the legitimate representatives and if the affected individuals will have therapeutic advantage from the test result.

1.2.8. Genetic tests are indicated to be performed on relatives only if the expected diagnosis will directly help the therapy, prevention or delay the manifestation of the disease in other members of the family.

1.2.9. Equitable access of genetic counseling, genetic laboratory tests should be assured for all

who need them.

1.2.10. A further important ethical aspect is who can be informed about the results of genetic tests?

According to the genetic law, information can be given to

- the patient examined (probanda/probandus)
- in case of children (<14 yrs of age): their parents/legal guardians
- to close relatives of the patient if they are at risk of the disease and if there are possibilities to prevent or delay the manifestation of the disease.
- to family doctor who referred the patient to the genetic study

1.2.11. After completing laboratory investigation, the sample must be destroyed or saved in a biobank for further research on the basis of prescribed regulations (see later!)

1.3. Ethical aspects of genetic screening:

Definition of genetic screening tests: comprehensive programmed genetic study carried out on a population or a defined sub-group of population for systematic early detection or exclusion of a genetic disorder, the genetic predisposition or resistance to a disease, or to determine whether a person carries a gene variant which may produce disease in symptom-free individuals.

Types:

- Screening of newborns for inborn errors of metabolism
- *Presymptomatic screening:* genetic test in asymptomatic family members to identify a mutation which may lead to future disease (in late manifested autosomal dominantly inherited diseases)
- *Susceptibility testing* („risk profiling“): testing of one or more genetic markers to assess an increased or decreased susceptibility of individuals in a population (complex multifactorially inherited diseases). The indication to screen is population-based and not individual-based (See 2.2.5.).

1.3.1. A genetic screening is allowed to be performed only in reasonable cases if on the basis of the result therapeutic or preventive measurements become available for those with positive screening result.

1.3.2. *Ethical aspects of screening inborn errors of metabolisms in newborns*

Selection of diseases to be screened (cost/benefit):

The disease in question must be *severe, frequent* in the population (prevalence) and *treatable*

Tests available should be cheap, easily performed with reliable sensitivity and specificity (very few false negative and false positive cases)

Patients with false negative tests will be missed from therapy, while those with false positive tests will be unnecessarily treated (perhaps with side effects!) and stressed.

- In cases of uncertain results, the test must be repeated
- Positive results have to be confirmed by more accurate diagnostic methods
- Using mass spectrometry (instead of classical biochemical tests) many unexpected metabolic abnormalities can also be recognized in addition to those we wanted to screen. Clinical relevance of the abnormal findings is not always known yet. The question arises: shall we or shall we not inform the family about the incidental findings. This is still a question of debate. It can be decided only later on the basis of much more experience regarding the associating clinical symptoms. (These babies seem to be worth following up)

1.3.3. When informing the patient about the result of a screening test the information has to be personal, understandable and genetic counseling must be provided.

1.3.4. *Ethical aspects of presymptomatic screening/diagnosis:*

Presymptomatic genetic testing: predictive genetic testing in minors for genetic conditions for which there is no phenotypic evidence in the considered time of testing and for which there is currently no treatment available to prevent or foestall the development of the condition.

There are diseases inherited in an autosomal dominant manner that are manifested only in adulthood, after having already founded a family and passed the abnormal gene to his/her offspring (e.g. Huntington chorea, adult type polycystic kidney disease etc.). If the responsible gene is known, the mutation can be identified very early preceding the onset of clinical symptoms of the disease (presymptomatic diagnosis). Since the knowledge of an impending severe disease fundamentally determines the quality of life of the person with positive result we have to consider the ethical aspects of the procedure, the pro and contra arguments:

- Presymptomatic diagnosis is recommended to perform only in treatable diseases
- Getting an informed consent: the position of voluntary choices and autonomous and informed decision-making in a context of open communication is more important in presymptomatic diagnostics than in any other cases:.
- Special considerations are needed in case of children:
If the diagnosis is not urgent, it is better to wait until the child can decide him/herself whether the test should be performed; but if the early diagnosis offers incontrovertible advantages, the parents' informed consent is needed.

1.3.5. There are non-medical benefits and harms related to this type of testing: the potential provision of good news if a test is performed, the unbearability of knowing the positive result, identity and adjustment, parental anxiety and uncertainty .

1.3.6. From an ethical point of view it is crucial to protect the person with a positive result from all negative discriminations in various fields of life: job, family founding, health and life insurance, bank credit etc.

1.3.7. After completing the laboratory investigation the sample must be destroyed or saved in a biobank for further research on the basis of prescribed regulations (see below!)

2. In different stages of ontogenesis both the practical application of genetic results and the related ethical problems are different:

2.1. Preconceptional and prenatal genetic diagnosis

The goal of prenatal diagnosis is to prevent the birth of an affected offspring in families at high risk of genetic disorders. In vitro fertilization along with preimplantational genetic diagnosis can be considered as the earliest form of prenatal diagnosis. It can be carried out in couples who are at risk of chromosome abnormalities or monogenic disorders but who – in case of spontaneous pregnancy with an affected fetus diagnosed via prenatal diagnosis –do not undergo the termination of pregnancy (e.g. from religious reasons). Due to a higher frequency of genetic changes associated with in vitro fertilization, it would be worth performing preimplantational genetic diagnosis in all preembryos.

2.1.1. To provide the chance of healthy reproduction, *in vitro fertilization along with preimplantational genetic diagnosis* using genetic tests on preembryos are available.

This is a single-cell genetic analysis with improving accuracy and efficiency used e.g. in genetic cancer syndromes, monogenic disorders etc.

Method used: multiplex polymerase chain reaction (PCR), and post-PCR diagnostic methods, whole genome amplification (WGA) and multiple displacement amplification (MDA) (3)

Only the healthy preembryos will be implantated (very expensive method, it is not available in routine).

Note: In these cases the fate of the non-implanted preembryos can be considered as a topic for further ethical consideration.

2.1.2. *Clinicians should be able to identify patients within their practice who are candidates for genetic testing. Candidates include patients who are pregnant or considering pregnancy and are at risk of giving birth to affected children.*

2.1.3. *Prenatal screening – independently from maternal age – can be used for the whole pregnant population to prevent the birth of the first affected offspring or re-occurrence of a certain inherited disease in the family.*

2.1.4. *Reliable prenatal tests should be accessible for every pregnant woman performed by well trained experts in accredited laboratories including the use of ultrasonography, maternal biochemical markers during the first and second trimesters.*

2.1.5. *Prenatal genetic diagnosis*

Based on the results of screening tests a risk ratio can be calculated, upon which *prenatal genetic diagnosis might be indicated*. To identify or exclude chromosome aneuploidy prenatal chromosome analysis has to be performed on chorion villi (between 11-13 gestational weeks) or amniotic cells obtained via amniocentesis (between 16-18 weeks); in monogenic disorders gene mutation analysis is necessary.

▪ Genetic counseling must precede the invasive prenatal diagnostic tests:

It is important to let the patients know that

- the invasive intervention carries a risk of spontaneous abortion (CVS:1%, amniocentesis: 0,5-1.5%). That is why the prenatal diagnosis is indicated only if the risk of a genetic disorder is higher than the risk of abortion (usually >1:250)
- there is no prenatal screening test in existence that would identify a genetic disease with a 100% reliability.

• The result of a prenatal genetic test must be interpreted to the couple by a genetic counselor: his duty is to explain the nature and severity of the disease in cases of positive tests, but the decision regarding the ongoing pregnancy is in the hands of the couple.

2.2. Postnatal genetic screening and diagnosis

2.2.1. Screening metabolic disorders in newborns

See ethical issues: 1.3.1.

2.2.2. Cytogenetic and/or molecular genetic diagnosis in newborns and children is indicated to identify the genetic cause of the disease, clarify the genetic status of parents and relatives, prevent the reoccurrence of the disease in the family.

The possibility to on-demand communication with a clinical geneticist is essential (interpretation of the genetic results, patients' follow up of early development in collaboration with other specialists, cure of intercurrent diseases etc.)

2.2.3. Presymptomatic diagnosis of family members at risk of a late manifesting disorder inherited in the family (see 1.3.2.).

2.2.4. *Confidentiality , right to information:* „Patients and their close families have the right to information on the results of genetic tests if they are of consequences

regarding their health. Doctors, referring the patient to the geneticist who may be involved in the therapy are also to be informed about the test result.

Genetic and genomic test information in electronic health records are recent points To consider from aspect of confidentiality, privacy and security: genetic/genomic test information should be treated differently from other medical information for purpose of data access and permissible use: „genetic exceptionalism”

2.2.5. *Study of genetic factors predisposing to complex common diseases of population („Susceptibility testing)(hypertension, cardiovascular diseases, obesity, hypercholesterinaemia, neurodegenerative disorders, Alzheimer-, Parkinson diseases etc.).* Since the above mentioned diseases are of multifactorial origin (genetic predisposition + environmental provoking factors), in the knowledge of genetic predisposition the provoking environmental factors can theoretically be eliminated, thus decreasing the frequency of the disease.

2.2.6. In the future fetal cell isolation from maternal blood may be an alternative of chorion villus sampling or amniotic fluid analysis.

3. Ethical aspects of genetic therapy

Goal of genetic therapy is to repair (correct) the genetic mistakes leading to inherited or acquired genetic disorders by introducing well functioning genes.

There are several methods attempted and used with various success:

- *Bone marrow/ stem cell transplantation (collected from umbilical cord or peripheral blood of adults)*
- *Enzyme substitution in lysosomal disorders*
- *Gene transfer*
- *Therapy of infertility using assisted reproduction techniques*
- *Embryonic stem cell research*
- *Therapeutic cloning (non-reproductive cloning for the benefit of humanity are ethically acceptable)*

3.1. Ethical approaches for embryo research (assisted reproductive technology as therapeutic tool for infertility and embryonic stem cells)

Reproductive therapeutic procedures include in vitro fertilization (IVF)- embryo transfer, spermatozoa, oocytes, embryo donation, cryopreservation of genetic material, surrogacy, posthumous reproduction, gender preselection and reproductive and therapeutic cloning.

Assisted reproductive technology is widely practised around the world for the treatment of virtually all forms of infertility.

Ethical aspects of some of these methods are discussed:

3.1.1 Assisted reproduction: in vitro fertilization

Medical artificial reproduction is a widely used method for the therapy of infertility. Using selected donors, however, the method can be considered as a strategy for positive eugenic improvement, means of squaring a eugenic circle by separating paternity from love relationships and so allowing eugenic improvement without inhibiting individual choice in marriage. In reality, it found very little favour with those who might use it because of a *couple's desire to have their own children has always seemed stronger than any eugenic inspirations.*

3.1. 2. Ethical considerations of embryonic stem cells (ESC)

Stem cells with certain characteristics have become promising tools for molecular medicine, for studies of self-renewal, commitment, differentiation, maturation and cell-cell interaction.

They have the potential to self-regenerate and to differentiate into specific tissue. There is considerable hope that stem cells will lead to new therapies: either by themselves, through cell replacement strategies, or by generating results assisting other fields of research to reach clinical results. The potential medical benefits that may result from embryonic stem cell research support a continued development in this area. However, some opponents argue that this research offends the (relative or absolute) moral status of an unborn human.

Regarding the abortion and embryonic stem cell, research is surrounded by controversy:

The argument „Most abortions are seriously wrong for the same reason: they deprive „an individual” of a future of valuable experiences and activities, a „future like ours” is outweighed by the another one saying that „ human embryonic stem cell research is the enormous potential to save people’s lives and to improve their quality of life.”

Furthermore, the research would probably prove to be a both time-consuming and very expensive method for treating disease.

Stem cell research is an area that has given rise to much debate internationally, within science, law, politics as well as within philosophy and ethics.

Legal questions studied are as follows:

- *Terminology*: where are the attributes characterizing an embryo in the legal sense?
- *Time factor*: which stages of development must have taken place after fertilization of an eggcell by a sperm cell?
- *Method of genesis itself*: aside from conception, which other methods are used to generate embryos?
- Legal study of the *status and protection of extracorporeal embryos*
- The extent to which in vitro embryos can be created and/or used for research purposes (especially for stem cell research)

Ethical attitudes related to embryonic stem cell therapy divide over three important distinctions:

- *Reproductive versus therapeutic cloning*:
Briefly we can say: While therapeutic cloning is widely approved, reproductive cloning is prohibited.
Therapeutic cloning: „one small step from man, one giant leap for mankind”
(e.g. Prevention of mitochondrial disorders using ooplasmic and nuclear transfer)
- *Using already existing embryos versus producing new embryos for research purposes*
The use of human embryonic stem cells is ethically problematic because their isolation involves the destruction of human embryos in order to derive embryonic stem cells. A related question: When „personhood” begins in the embryo?
Recently developed methods are able to generate pluripotent stem cells from fibroblasts. Alternatives for ESC are adult stem cells derived from bone marrow, cord blood, amniotic fluid and other tissues.
- *Production of embryos from eggs and sperm versus through somatic cell nuclear transfer* (ongoing studies: deriving embryonic germ cells and male gametes from embryonic stem cells; studying mechanism regulating epigenetic reprogramming after somatic cell nuclear transfer and nuclear transfer techniques to derive disease-specific human embryonic stem cell lines from diabetic and Parkinson disease patients;)

A number of questions remains which will need addressing as the law tries to keep up with science:

- Does stem cell research demand a global rather than a local approach, by way of an international Covenant?
- Does the legal status of a cloned embryo need further examination?
- Will the embryo have a separate legal standing recognized by law?

3.1.3. Umbilical cord blood stem cells – an ethical source for regeneration medicine

Umbilical cord blood stem cells can be kept for the entire life in blood banks and used for „regenerative medicine”. Cord blood is collected after birth with no harm to mother or baby and contains stem cells with an incredible potential to form tissues including neural, liver and pancreatic tissues in laboratory. With ongoing clinical trials and research predicting new avenues the future seems to be assured for this stem cell source. This, however, predicts technical, medical as well as ethical issues for cord blood banking.

3.1.4. Ethical aspects for therapeutic and reproductive cloning

Primate embryonic stem cells were first derived by somatic cellular nuclear transfer, also known as *therapeutic cloning* successfully in 2007. The first embryo transfer for human reproductive cloning purposes was also attempted in 2006, albeit with negative results. The possibility of human cloning is now much closer to becoming a reality. There are ethical arguments in favour and against human cloning.

Human reproductive cloning provides the possibility to have *genetically related* children for persons for whom present technologies are ineffective. The method is considered and assessed with some common objections: Various versions of the argument that reproductive cloning is an affront to human dignity have been made; most focusing on the dignity of the child produced by cloning. Further problems can be expected at the level of policy and regulation that might either implement human reproductive cloning or make its accessibility restricted in a way that could become difficult to justify on moral grounds. *Clear directives on legitimate application of human reproductive cloning are needed on the basis of solid arguments, coherent moral principles, and extensive public consultation.*

Therapeutic cloning as means to improve and save lives has uncontroversial moral value. One of the areas of therapeutic cloning is ooplasmic and nuclear transfer to prevent mitochondrial DNA disorders.

3.1.4.1. Ethical aspects in ooplasmic and nuclear transfer (a technique for creating human stem cells without destroying human embryos) to prevent mitochondrial DNA disorders

In view of the limitations of prenatal and preimplantation genetic diagnoses, alternatives such as ooplasmic transfer (OT) and nuclear transfer (NT) have been proposed to prevent transmission of mtDNA mutations. These methods do not entail genetic selection, but rather genetic intervention to correct the genetic cause of the disease. OT is the transfer of normal mitochondria to a carrier's oocyte containing mutant mtDNA. In case of NT, a donated oocyte is enucleated and replaced with the nuclear DNA from a woman carrying a mtDNA mutation. NT can be performed both before and after in vitro fertilization, respectively, with the nucleus of an unfertilized oocyte, with the pronuclei of the zygote, or with the nucleus of a blastomere of an embryo.

Ethical (conceptual) question:

- Whether these techniques amount to germ-line modification and human cloning?
- What is the significance of intervening in the mtDNA?
- What are the implications of having „three genetic parents”?
- Ethics of oocyte donation
- The health and safety risks for children conceived as a result of one of these techniques

Further interdisciplinary debate and research is needed to determine whether a clinical application of OT and NT can be morally justified and if so, under what condition.

3.1.5. Ethical issues of genetic testing. International regulation.

Obtaining and use of genetic data have several implications on the rights of the patients and their relatives. Practitioners and researchers frequently face new conflicts to which law and ethics try to give an answer. Some countries have enacted national laws concerning genetic analysis. At the international level great efforts have been made to develop a common regulatory framework in the field of genetic diagnosis and research.

Catholic Church

The Catholic Christian tradition and teaching respects human life from the time of conception. Their theory is supported by natural law moral philosophical reasoning, and is in contrast with the ethical views of secular philosophers on human embryo research for therapeutic purposes. The challenges for Catholic health care institutions is to find ethical ways of using suitable pluripotent stem cells for therapies without creating or destroying human embryos.

Islam

Islam encourages family formation and assisted reproduction when indicated within the frame of marriage. Islamic rulings approve the new emerging practices in assisted reproduction, including surrogacy, multifetal pregnancy reduction, cryopreservation, pregnancy in the post-menopausal period, sex selection and embryo implantation following the husband's death.

The moral status of the embryo in Islam is discussed: Organ differentiation and ensoulment are believed to occur at 42 days after fertilization at the earliest. As individuation of the embryo does not occur before 14 days from fertilization, research on surplus embryos during this period is allowed.

Similarly, preimplantation genetic diagnosis, gene therapy and non-reproductive cloning for the benefit of humanity are ethically acceptable.

Iran: National and Regional Committees for Medical Research Ethics

Jewish Law:

Jewish Law has two divisions: the Written and the Oral traditions. The foundation of the Written Law is the Torah. Attitude of Jewish religion to assisted reproduction is still based on the written rules of Torah.

Greek Orthodox position on the ethics of assisted reproduction

In dealing with reproduction, the Church believes that every human being has a beginning but has no end. This is why conception constitutes an event of unique importance. Irrespective to the act of reproduction with or without sexual intercourse, the embryo embodies a human beginning and a human perspective. Along with cellular multiplication, another process takes place: the beginning and development of the soul. Modern technology treats the man as a machine. For this reason, all modern techniques of artificial fertilization have ethical and spiritual parameters that compel the Church to state Her reservations. The Church cannot recommend assisted reproduction as a solution to infertility.

3.2. Rules related to not-human cloning

Labeling of food made from cloned animals is mandatory.

4. Ethical aspects of removing human biological material (biosamples): Biobanks

The last few years have witnessed an important expansion of collection and processing of human biological samples and of the related information data. Biobanks are huge repositories of human biological specimens and have a strategic importance for genetic research, clinical care and future treatments. Genebank is a Specific Targeted Research Project (STREP) founded by the European Commission in the Sixth Framework Program.

This research project aims to investigate the ethical, legal and social issues of three types of biobanks: classical banking, population banking and forensic databases: www.genebank.eu

Interventions on a human person to remove human biological material for research purposes may either relate to a specific research project wherein the material will be used without being stored („fresh material”), or it is stored until later usage for not yet specified research projects. Both the *Additional Protocol* and the *Recommendation** consider the former intervention as research with a human being.

The regulatory framework of the establishment, management and functioning of biobanks has been developed (GenBanC project, Conferences on Biobanks: „Introduction and next steps” Nov 1-6, 2008; „Harmonised Biobank Research: maximizing value – maximizing use”, Brussels, March 25-27, 2009)”

4.1. After performing the genetic tests from a „fresh material” the biological material (sample) must be destroyed or stored for further diagnostic studies and/or research in a biobank.

If the genetic sample is stored for research purposes, the person involved must be informed about the various ways of sample-storage, about the different possibilities of identification of samples and their further use.

4.1.1. *Storage of biosamples for purpose of further diagnostic tests* (that are not yet specified at the moment of removal and storage) is allowed using codes. The names of donors have to be registered in a separate document. Decoding is allowed only if further diagnostic test become available offering new therapeutic approach for the person studied.

4.1.2. According to *Recommendations*: „An intervention (on a person) should only be carried out to obtain *biological storage materials for research purposes* if it complies with the *Additional Protocol* concerning biomedical research”

Note: It is not clear which articles of the *Additional protocol* are applicable for this situation:

4.1.2.1. *Informed consent for Research Storage*: Information and consent or authorization to obtain biological materials for research should be as specific as possible with regard to any foreseen research uses and the choices available in that respect” (art.10.2 , Recommendation)

Note: „as specific as possible” – a more elegant and user-friendly solution would be welcomed.

Person involved must declare whether she/he agrees with the use of the sample for further diagnostic studies only (according to the prior goal of the sample’s removing), for use of it for any purpose (diagnostic and research) and for research only.

4.1.3. *There are several possibilities for storage*:

Stored samples have to be labelled with codes and - in a separate document – with name. Decoding may be necessary if the results obtained during the course of research are relevant for the health of the source or his/her relatives.

Personal identification can be achieved using biometric and genetic methods. Biometric features: facial recognition, digital prints (flexion folds and dermatoglyphs) surface and texture of the iris. Other biometric techniques analyse behaviours such as walking, signing, typing or speaking etc. Genetic methods to identify the individual: determination of short tandem repeats of 2-5 nucleotids, or microsatellites.(10).

A further possibility for storing biosamples – on the request of the person providing the sample - is to store it anonymously. In this situation the samples are given a number only and there is no possibility for further identification.

4.1.4. *Confidentiality and right to information* refers to unexpected (incidental) findings in archive, identifiable DNA in the course of research that are relevant for the health of the source (and his/her relatives). It is customary to address this issue before the start of the research when consent is requested.

„*Right not to know*” – „*right to know*” goes hand in hand with the „*right not to know*” - there are no details in *Recommendation* and other related documents

4.2. Biobank can be established only in specially equipped accredited laboratories (two -80° refrigerators, computers etc)

* **Council of Europe: Recommendation No. R(92) 3 of the Committee of Ministers to Member States on Genetic Testing and Screening for Health Care Purposes, 1992 Draft Recommendation Rec (2009)**

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Human Genetic Society of Australasia (HGSA): Guidelines for the practice of genetic counselling, 1999

Web address: <http://www.hgsa.com.au/>

Human Genetic Society of Australasia (HGSA): DNA Presymptomatic and predictive testing for genetic disorders, 2002

Web address:

Human Genetic Society of Australasia (HGSA): Child testing policy

Web address: <http://www.hgsa.com.au/>

Related websites

National Center for Biotechnology Information: www.ncbi.nlm.nih.gov

GDB: the Human Genome Database: www.gdb.org

EuroGenetest Network of Excellence: www.eurogentest.org

IPA Ethics Committee

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