

NATIONAL COMMISSION FOR THE FORENSIC USE OF DNA

2016-2017 ACTIVITIES REPORT



Secretariat of the CNUFADN

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Cover image:

National Institute of Toxicology and Forensic Sciences. Madrid Office. Headquarters of the National Commission for the Forensic Use of DNA

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Chromosome and DNA molecule

Source: Office of Biological and Environmental Research of the U.S. Department of Energy Office of Science. science.energy.gov/ber/. Preparado por: The Biological and Environmental Research Information System, Oak Ridge National Laboratory. genomicscience.energy.gov/ y genomics.energy.gov/

Published by:

Ministry of Justice. General Technical Office

Formatting:

Sub-Directorate General of Documents and Publications

NIPO:

051-18-035-6

ISSN:

2530-3104

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1. THE FULL BOARD OF THE NATIONAL COMMISSION FOR THE FORENSIC USE OF DNA (CNUFADN)

1.1. COMPONENTS

The following members of the National Commission for the Forensic Use of DNA (CNUFADN) attended the Plenary Sessions in 2016 (14/07/2016) and 2017 (25/07/2017):

PRESIDENTES:

Ricardo Gonzalo Conde Díez (Director General de Relaciones con la Administración de Justicia)

Joaquín Delgado Martín (Director General de Relaciones con la Administración de Justicia)

VICEPRESIDENTES:

María Dolores Moreno Raymundo (Directora del Instituto Nacional de Toxicología y Ciencias Forenses)

VOCALES:

Ignacio Acón Ortego (Magistrado. Dirección General de Relaciones con la Administración de Justicia)

Carmen Rodríguez-Medel Nieto (Magistrada. Dirección General de Relaciones con la Administración de Justicia)

Juan Manuel Fernández Martínez (Magistrado. Consejo General del Poder Judicial)

Gema García Hernández (Fiscal de la Secretaría técnica de la Fiscalía General del Estado)

Patricia Rodríguez Lastras (Fiscal. Dirección General de Relaciones con la Administración de Justicia)

María Casado González (Catedrática de Filosofía del Derecho. Universidad de Barcelona)

José Luis Herráez (Coronel de la Guardia Civil. Servicio de Criminalística)

Víctor José Esteban Ramos (Comandante de la Guardia Civil. Servicio de Criminalística)

José Juan Fernández Serrano (Capitán de la Guardia Civil. Servicio de Criminalística)

Gemma Barroso Villarreal (Comisaría General de Policía Científica)

Pedro Sogo (Comisaría General de Policía Científica)

Josu Mayor Irabien (Comisario Jefe de la Policía Científica Ertzainza)

Jokin Alfageme García (Policía Científica Ertzainza)

Rocío Rubio Mojarro (Cap de la Divisió de Policía Científica Mossos d'Esquadra)

Daniel Martínez Ortega (SubJefe de la Divisió de Policía Científica Mossos d'Esquadra)

Carmen Conejero Guillen (Médico Forense del Servicio de Información Toxicológica del Instituto Nacional de Toxicología y de Ciencias Forenses.)

José Luis Miguel Pedrero (Médico Forense del Servicio de Información Toxicológica del Instituto Nacional de Toxicología y de Ciencias Forenses.)

José Antonio Lorente (Laboratorio de Identificación Genética. Universidad de Granada)

Pilar Madero (Experto en genética designado por el Ministro de Ciencia e Innovación)

SECRETARIO:

Antonio Alonso Alonso (Facultativo del Servicio de Biología del Departamento de Madrid del Instituto Nacional de Toxicología y de Ciencias Forenses)

1.2. ACTIVITIES

Over these two years, the CNUFADN continued with one of its fundamental tasks, as mandated by Article 5 of Organic Law 10/2007 of October 8, regulating the police database on identifiers obtained from DNA, that is, the specific task of accrediting all those laboratories that perform DNA analyses and provide genetic profiles to the police database on identifiers obtained from DNA. According to this requirement, only those laboratories accredited by the National Commission for the Forensic Use of DNA that pass the required periodic quality controls are allowed to perform DNA analyses for genetic identification in the situations considered in said law. Both in 2016 (**Annex I**) and 2017 (**Annex II**), the CNUFADN approved lists of accredited laboratories based on the proposal made by the Permanent Technical Commission (PTC) following its review of the annual quality assurance and accreditation documents submitted by the laboratories of forensic genetics in Spain. This list was published on the CNUFADN website and reported to the Prosecutor General's Office and the General Council of the Judiciary.

Also in keeping with this task of ensuring the quality and reliability of DNA testing in Spain, in 2016 the full board of the CNUFADN approved the reports written by both the Legal and Bioethical Group (LBG) and the PTC on the academic qualifications required to forensic genetics experts in response to a question asked to the CNUFADN by a lawyer. The CNUFADN reached the conclusion, without prejudice to the designation of the Judicial Expert that corresponds to the competent Judge, that for the purposes of the National Commission for the Forensic Use of DNA's accreditation of laboratories, the Expert in Forensic Genetics that conducts DNA testing and defends it in court must have at least a bachelor's degree, as well as continuous training and experience suited to the specialized tasks performed, pursuant to national and international standards applicable to the area of forensic genetics. These scientific standards were identified in the report written by the PTC (**Annex III**).

The years 2016 and 2017 saw the CNUFADN continue with one of its functions, as specified in Royal Decree 1977/2008 of November 28, which regulates the composition and functions of the National Commission for the Forensic Use of DNA, which is to prepare and approve the official technical protocols for obtaining, preserving and analyzing samples (Article 3c). In this regard, progress was made in standardizing an informed consent form for police to use in obtaining DNA profiles from victims, which lays out two informed consent cases:

- The ordinary or usual case: when samples are taken and analyzed for the sole purpose of comparing them with a trace sample, without the need to incorporate the genetic profile obtained into the database.
- The exceptional case: when incorporating the victim's genetic profile into the DNA database is necessary for purposes of the investigation.

In 2017, the differences in the informed consent forms used by various police forces to obtain DNA profiles from victims were identified in an effort to achieve consensus on standardizing a single form.

As part of the board's activities, the CNUFADN also presented and discussed the Report of the National Institute of Toxicology and Forensic Sciences (INTCF) on DNA testing in irregular adoptions and abductions of newborns (on the occasion of the visit to Madrid of the European Parliament's Petition Committee (**Annex IV**)). The data in the report indicate that most of the cases analyzed by the INTCF using DNA techniques do not correspond to cases of abduction of newborns (since the newborn's identification was able to be verified in 90% of the cases by means of DNA tests with their families), but rather to the (justified and reasonable) uncertainty of the parents before the death of their newborn, after a hospital procedure with possible deficiencies regarding the transparency of the information and the care of the patient.

A proposal was made to assess current hospital procedures with regard to the identification of newborns to ensure that in the future these situations of uncertainty do not occur. Reference was made in this regard to the recommendation of the Spanish Society of Neonatology, recently published in the *Annals of Pediatrics*, which recommends: "A combination of the neonatal coder (bracelets for the mother and newborn and cord clip with the same number and with an identical and exclusive bar code for each newborn) and the taking of a sample of maternal blood and another blood sample of the umbilical cord (for DNA analysis solely in the case of questions of identity) is currently the most reliable method for identifying the newborn". Also noted were the regulation and procedures for identifying newborns, as laid out by the healthcare systems of the Basque Country, Andalusia and Murcia.

Lastly, with regard to this issue, it was discussed how the national implementation of the recommendation put forth by the Spanish Society of Neonatology will require the development of various protocols (informed consent forms, technical questions on the most suitable formats and devices for storing blood stains, standards for storing samples, etc.), to which the CNUFADN could contribute by helping to develop the specific standards.

The objectives and preliminary results obtained in two recent European projects on the applications of the new mass sequencing technology to forensic genetics were also presented to the CNUFADN board: the DNASEQEX project (<https://www.researchgate.net/project/DNASEQEX>) and the VISAGE project (<http://www.visage-h2020.eu/>). Finally, the initiative to make a Spanish version of the popular scientific document *Making Sense in Forensic Genetics* (<http://senseaboutscience.org/wp-content/uploads/2017/01/making-sense-of-forensic-genetics.pdf>) was presented.

2. THE LEGAL AND BIOETHICAL GROUP

2.1. COMPONENTS

The following members of the Legal and Bioethical Group attended the work meetings in 2016 (meeting date 05/05/2016) and 2017 (meeting date 27/06/2017):

COORDINADORES:

Ignacio Acón (Magistrado. Dirección General de Relaciones con la Administración de Justicia)

Carmen Rodríguez-Medel Nieto (Magistrada. Dirección General de Relaciones con la Administración de Justicia)

VOCALES:

Noelia González Garrote (Fiscal, Dirección General de Relaciones con la Administración de Justicia)

María Casado (Catedrática de Filosofía del Derecho. Universidad de Barcelona)

Margarita Guillén (Magistrada)

Juan Mejica (Consejo General de la Abogacía Española)

Dolores Moreno (Directora Instituto Nacional de Toxicología y Ciencias Forenses)

José Andradas (Secretaría Estado Seguridad)

Pedro Sogo (Comisaría General de Policía Científica)

Gemma Barroso (Comisaría General de Policía Científica)

José María de las Cuevas Carretero (Guardia Civil)

Víctor José Esteban Ramos (Guardia Civil)

José Juan Fernández (Guardia Civil)

José Aquilino Serrano (Guardia Civil)

M.^a Pau Martí (Mossos d'esquadra)

Jokin Alfageme (Ertzaintza)

Javier Bueno Ocariz (Policía Foral de Navarra)

Carmen Conejero (Médico Forense, Instituto Nacional de Toxicología y Ciencias Forenses)

Marta Grijalba Mazo (Médico Forense, Dirección General de Relaciones con la Administración de Justicia)

Antonio Alonso (Facultativo del Servicio de Biología del Departamento de Madrid del Instituto Nacional de Toxicología y de Ciencias Forenses)

2.2. ACTIVITIES:

2.2.1. INFORMED CONSENT FORMS TO OBTAIN DNA PROFILE FROM VICTIMS

At the 2016 meeting, it was agreed to resume the work for preparing an informed consent form to obtain victim profiles.

Police forces expressed problems in preparing a single form, for formal reasons, and it was considered more appropriate to prepare different forms, but with the same criteria that were adopted in previous meetings - establish two informed consent cases:

- 1.° The normal or usual case: when samples are taken and analyzed for the sole purpose of comparing them with a trace sample, without the need to incorporate the genetic profile obtained into the database.
- 2.° The exceptional case: when incorporating the victim's genetic profile into the database is necessary for purposes of the investigation.

It was agreed to send to the LBG the National Police form that has already been adapted to this criterion so that it could be validated by the Group and the Commission. The forms from the remaining police forces will also be provided so they can likewise be validated before the next Commission's meeting.

In 2017, in order to standardize the forms of the various police forces, these were reviewed by the Coordinator of the LBG, who identified the differences between them in order to make a proposal on the fields to be provided in all the models.

2.2.2. ACADEMIC DEGREES REQUIRED FOR EXPERTS IN FORENSIC GENETICS

The questions raised regarding the degrees of experts in forensic genetics were evaluated by the LBG. In general, Article 356 of the Criminal Procedure Law establishes that "the chemical analysis operations required by the conduct of criminal proceedings shall be carried out by Doctors of Medicine, Pharmacy, Physical-Chemical Sciences, or by Engineers who have worked in chemistry specialties. If there are no doctors in those sciences, bachelor's degree holders who have sufficient knowledge and experience to perform said operations may be appointed. From among those listed in the above paragraph, the investigating judges shall designate the experts who will analyze the substances required in each case for the administration of justice. (...).

According to this procedural regulation, a minimum degree with "sufficient knowledge and experience" is required to act as an expert, although it is up to the competent investigating judge to assess the concurrence of these requirements and appoint an expert who satisfies them.

As regards the conduct of DNA testing, we must bear in mind that this is not an individual task; rather, it is the result of a whole technical process primarily involving one accredited laboratory, in which various professionals may intervene. What the Law on Criminal Procedure requires is only that the Expert who signs and defends the report at trial have, in the opinion of the competent judicial authority, "sufficient knowledge and experience". The Law does not require that all technicians or assistants who may intervene in the process of writing the report have specific qualification or experience requirements.

Taking the above into account, the purview of the National Commission for the Forensic Use of DNA involves the accreditation of the laboratories tasked with carrying out forensic DNA tests. To this end, among the various elements evaluated, the CNUFADN verifies that the DNA tests are done by professionals who satisfy the minimum training and experience requirements, as per the national and international standards (see Section 3.3.2).

The CNUFADN thus reached the conclusion, without prejudice to the right of the judge in question to appoint a legal expert, that for the purposes of the National Commission for the Forensic Use of DNA's accreditation of laboratories, the Expert in Forensic Genetics who conducts DNA testing and defends it in court must have at least a bachelor's degree, as well as continuous training and experience appropriate to the specialized tasks performed, in keeping with the national and international standards applicable to the area of forensic genetics. This requirement is satisfied in all of the laboratories accredited by the National Commission for the Forensic Use of DNA.

2.2.3. OTHER ISSUES ADDRESSED BY THE LBG

Other topics discussed at the LBG meetings in 2016 and 2017 were the following:

- Criteria of Judicial Police for taking DNA samples
- Problems associated with samples from felons
- Study of the legislative reforms needed in procedural law and in matters of international criminal cooperation
- Study of the preparation (in collaboration with the CGPJ) of a practical guide for judges and magistrates involving how to obtain and use DNA

3. THE PERMANENT TECHNICAL COMMISSION

3.1. COMPONENTS

The following members of the Permanent Technical Commission (PTC) attended the work meetings in 2016 (meeting dates 21/04/2016 and 08/06/2016) and 2017 (meeting dates: 15/06/2017 and 06/07/2017):

- Comisaría General de Policía Científica:
 - Pedro Sogo Sánchez
 - Emilio García
 - Ángeles Lozano
 - Isabel Martínez

- Laboratorio Central de Criminalística de la Guardia Civil:
 - José Juan Fernández
 - Jesús Martínez
 - Carlos M. López Cubría
 - María Cano López
 - José Antonio Cano
 - Miguel Ángel García
 - Víctor Esteban
- Unidad de Policía Científica de la Ertzaintza:
 - Oscar García Fernández
- División de Policía Científica de los Mossos d'Esquadra
 - Josep Carreras
 - María José Jiménez
 - Alejandro Barros
 - Ana Donate
- Instituto Nacional de Toxicología y Ciencias Forenses
 - Antonio Alonso Alonso (Secretario)
 - María Dolores Moreno (Presidenta)
 - Amparo Fernández
 - Manuel Crespillo Márquez
- Policía Foral de Navarra y Laboratorio asociado (Nasertic)
 - Javier de Miguel Zurbano
 - Susana Pedrosa

3.2. ACTIVITIES:

3.2.1. ACREDITATION OF LABORATORIES

In 2016, the PTC evaluated the documents received from 21 laboratories, by analyzing the results obtained by the various laboratories as part of the GHEP-ISFG and GEDNAP external quality controls done in 2015, as well as the accreditation status of the laboratories as per the ISO 17025 standard. The evaluation of the 21 laboratories concluded with the results shown in **Annex I** in terms of their accreditation status.

In 2017, the PTC evaluated the documents received from 21 laboratories, by analyzing the results obtained by the various laboratories as part of the GHEP-ISFG and GEDNAP external quality controls done in 2016, as well as the accreditation status of the laboratories as per the ISO 17025 standard. The evaluation of the 21 laboratories concluded with the results shown in **Annex II** in terms of their accreditation status.

In 2017, the PTC also reviewed the documents on non-human forensic genetics (received from two laboratories). In this regard, the Secretary draws the attention of the members to have this review made based on the recommendations of the ISFG regarding the use of non-human DNA in forensic genetic research (Linacre A, Gusmão L, Hecht W, Hellmann AP, Mayr WR, Parson W, Prinz M, Schneider PM, Morling N. ISFG: *Recommendations Regarding the Use of Non-Human (Animal) DNA in Forensic Genetic Investigations*. Forensic Sci Int Genet. 2011 Nov;5(5):501-5.).

It was found that both laboratories (Newbiotechnic and Nasertic) took part in intercomparison exercises involving STR markers for different animal species organized by ISAG and by the Molecular Genetics Laboratory of the Ministry of the Environment, and that both laboratories are certified under the ISO 17025 standard in the area of identification of non-human species.

However, the documentation received from these laboratories contained no data on the application to forensic case studies in the criminal field.

It was also found that these laboratories do not comply with some of the standards laid out by the International Society for Forensic Genetics involving genetic studies of non-human species, and in particular the following:

- The recommendation to preferentially use tetrameric STR markers
- The recommendation to use sequenced ladders and an allelic annotation based on the number of repeating units of STR markers
- The recommendation to make an estimate of allele frequencies in the reference populations

As a result, the PTC thought that before approving a list of laboratories accredited in non-human forensic genetics, it was necessary that the laboratories advance in the implementation of the standards laid out by the ISFG. In this regard, it will send a letter to the two participating laboratories thanking them for their involvement and recommending that they implement the standards established by the ISFG.

3.2.2. ACADEMIC DEGREES REQUIRED FOR EXPERTS IN FORENSIC GENETICS

A review of international and national standards was presented by the Secretary of the PTC, as well as of the requirements established by the different laboratories of the institutions represented in the CNUFADN regarding the academic qualification required to act as an expert in Forensic Genetics (**Annex III**).

As stated in the personnel section included in the different international standards compiled in **Annex III** (both the ISO 17025 standard, as well as the international standards laid out in Europe by the ENFSI DNA Working Group and in the US by the DNA Advisory Board), there is a requirement that the personnel be qualified based on specialized (degreed) education, training and experience appropriate to the tasks performed by forensic genetics experts, including the examination and analysis of the evidence, as well as written testimony (expert report) and verbal testimony (oral hearing) of the results and their interpretation in court.

More specifically, for experts in forensic genetics, both the international SWGDAM standard and the GHEP-ISFG guide establish the requirement to have a bachelor's degree, in addition to having accredited experience (of at least 2 years in the case of the GHEP-ISFG Guide) and accredited knowledge in areas such as genetics, molecular biology and biostatistics.

All of the institutions represented in the CNUFADN include in their quality assurance guidelines the requirement to have a bachelor's degree in experimental and health sciences and, in the case of the INTCF (leading body in Toxicology and Forensic Sciences), said requirement is also included in Article 475 of Organic Law 19/2003, as well as in the INTCF job listing.

As a result of this, the Permanent Technical Commission concluded that Forensic Genetics Experts must have at least a bachelor's degree, as well as continuous training and experience appropriate to the specialized tasks they perform, in accordance with national and international standards that apply to the area of forensic genetics

3.2.3. DNA TESTING IN IRREGULAR ADOPTIONS AND ABDUCTIONS OF NEWBORNS

The Secretary of the PTC presented the REPORT OF THE EXPERT AND SCIENTIFIC ACTIVITY CARRIED OUT BY THE BIOLOGY SERVICES OF THE INTCF WITH RESPECT TO DNA TESTING IN THE INVESTIGATION OF IRREGULAR ADOPTIONS AND ABDUCTIONS OF NEWBORNS IN SPAIN (**Annex IV**) (on the occasion of the visit of the European Parliament's Petitions Committee to Madrid).

The report includes, first of all, the overall results obtained from DNA studies of exhumed bone remains and other post-mortem tissues (hospital biopsies) of newborns in a total of 128 investigations in which there were indications that a newborn had been abducted, in response to 76 DNA investigation requests from the Public Prosecutor's Office and 52 requests from Investigating Courts from 2011 to 2017.

The report also presents the quality and interpretation criteria of the DNA tests carried out in this area by the National Institute of Toxicology and Forensic Sciences, the Ministry of Justice and the National Commission for the Forensic Use of DNA (CNUFADN), including the action protocol of the National Institute of Toxicology and Forensic Sciences for genetic identification in cases of irregular adoptions and abductions of newborns and the recommendations for genetic identification studies in cases of irregular adoptions and abductions of newborns approved by the CNUFADN.

Finally, the other investigative aspect offered by the DNA test is addressed, which is the search for compatibilities between affected living parties (mainly parents looking for their biological children and adopted children seeking their parents) by constructing databases with DNA profiles.

The main results and conclusions of the report regarding the DNA study of the exhumed remains of newborns were as follows:

- In 97% of the cases, bone remains from the newborns were recovered (117 from a total of 120 exhumations). In only 3% were no bone remains identified in the burial site, and in these three cases, it could not be ruled out that the bone remains had fully degraded (see explanation in **Annex IV**).
- The percentage of success in recovering DNA from the bone remains of newborns was 67%.
- Most of the cases analyzed by the INTCF using DNA techniques (81 out of a total of 90 cases in which the DNA test could be carried out) do not correspond to cases of abduction of newborns, since the newborn was able to be identified in 90% of the cases through DNA testing of relatives; rather, they involve the uncertainty (justified and reasonable) of parents before the death of their newborn following a hospital procedure with potential deficiencies involving the transparency of information and the treatment of the patient.

3.2.4. EUROPEAN PROJECTS IN FORENSIC GENETICS: DNASEQEX and VISAGE

The Chairperson and Secretary of the CNUFADN gave a presentation on two European projects on the applications of the massive sequencing methodology to forensic genetics.

On the one hand is the DNASEQEX project (<https://www.researchgate.net/project/DNASEQEX>), whose main objective is to validate massive sequencing techniques for STR marker analysis with applications in forensic genetics, and on the other is the VISAGE project (<http://www.visage-h2020.eu/>), whose objective is to develop massive sequencing systems for analyzing ancestral markers, phenotypic markers (eye, hair and skin color) and age markers.

3.2.5. SCIENTIFIC DISSEMINATION OF FORENSIC GENETICS: SPANISH VERSION OF THE DOCUMENT "MAKING SENSE IN FORENSIC GENETICS"

The English original of the popular scientific document *MAKING SENSE IN FORENSIC GENETICS* was presented, along with the *Sense of Science* and Euroforegen initiative, subsidized by ISFG, to produce a Spanish version in which the Ministry of Justice will collaborate with an initial translation of the document to be done by the translation service of the Directorate General for International Judicial Cooperation and Relations with Religious Groups.

The first draft in Spanish will be reviewed by Ángel Carracedo, Lourdes Prieto and Antonio Alonso. The Spanish version of the document will also include case examples from our country.

4. ANNEX I: LIST OF LABORATORIES THAT COMPLY WITH THE AGREEMENT OF THE NATIONAL COMMISSION FOR THE FORENSIC USE OF DNA (CNUFADN) ON THE ACCREDITATION AND QUALITY CONTROL OF LABORATORIES (2016)

The Permanent Technical Commission (PTC) led the seventh annual request for documentation on quality assurance and accreditation, as required by:

- Article 8 of ROYAL DECREE 1977/2008, which governs the procedure for evaluating DNA analysis laboratories.
- The CNUFADN agreement on the accreditation and quality control of laboratories, as approved by the full CNUFADN board on 21/07/2009.
- COUNCIL FRAMEWORK DECISION 2009/905/JHA on accreditation of forensic service providers carrying out laboratory activities.

In this annual survey, laboratory identification data, areas of application, certificates of participation in the official quality controls for 2015 and the ENAC accreditation status of forensic genetics laboratories that provide services in Spain were requested in order to ascertain the laboratories' degree of compliance with respect to the CNUFADN agreement on accreditation and quality control.

Documents were received from 21 laboratories, which were evaluated by the PTC in a meeting in which all the results obtained by the various laboratories in the external quality controls done in 2015 were analyzed, along with the ENAC accreditation status of the laboratories as per the ISO 17025 standard.

After studying the documents provided by the various laboratories, it was concluded that there were currently 19 laboratories that satisfied the CNUFADN agreement that year, since in addition to participating in the official GHEP or GEDNAP controls, they had a valid ENAC Accreditation Certificate.

The Permanent Technical Commission thus decided to submit to the full board of the National Commission for the Forensic Use of DNA, for its approval, the annual list of laboratories that comply with the CNUFADN agreement on accreditation and quality control, and to issue a certificate noting said compliance to each of the 18 laboratories that are shown in ANNEX I.

This resolution may be appealed within one month to the State Secretary for Justice, pursuant to Article 8.4 of Royal Decree 1977/2008 of November 28, which governs the composition and duties of the National Commission for the Forensic Use of DNA, and Article 114ff of Law 30/1002 of November 26, on the Legal Regime of Public Administrations and the Common Administrative Procedure.

List of laboratories that satisfy the CNUFADN agreement on accreditation and quality control

- Laboratorio de ADN de la Comisaría General de Policía Científica (Madrid)
- Laboratorio Territorial de Biología / ADN de la Jefatura Superior de Policía de Andalucía Occidental (Sevilla)

- Laboratorio Territorial de Biología / ADN de la Jefatura Superior de Policía de Andalucía Oriental (Granada)
- Laboratorio Territorial de Biología / ADN de la Jefatura Superior de Policía de Cataluña (Barcelona)
- Laboratorio Territorial de ADN de la Jefatura Superior de Policía de la Comunidad Valenciana (Valencia)
- Laboratorio Territorial de ADN de la Jefatura Superior de Policía de Galicia (A Coruña)
- Servicio de Criminalística de la Guardia Civil. Departamento de Biología (Madrid)
- Laboratorio de Genética Forense. Unidad de Policía Científica de la Ertzaintza. (Erandio, Vizcaya)
- Laboratorio de Análisis de la División de Policía Científica. Mossos de Esquadra (Sabadell, Barcelona)
- Instituto Nacional de Toxicología y Ciencias Forenses. Servicio de Biología. Departamento de Madrid
- Instituto Nacional de Toxicología y Ciencias Forenses. Servicio de Biología. Departamento de Barcelona
- Instituto Nacional de Toxicología y Ciencias Forenses. Servicio de Biología. Departamento de Sevilla.
- Instituto Nacional de Toxicología y Ciencias Forenses. . Sección de Biología. Delegación de La Laguna.
- Instituto Universitario de Medicina Legal. Servicio de Genética Forense. Universidad de Santiago de Compostela (A Coruña)
- Navarra de Servicios y Tecnologías, S.A. (NASERTIC) (Villaba, Navarra)
- Citogen S.L. (Zaragoza)
- Genomica S.A.U. (Madrid)
- Neodiagnostica S.L. (Lleida)
- Unidad de Secuenciación y Genotipado de la UPV/EHU

Approved in Madrid by the National Commission for the Forensic Use of DNA

14 July 2016

Antonio Alonso Alonso
Secretary of the PTC
Secretary of the CNU-
FADN

Ricardo Conde Díez
President of the CNU-
FADN

Dolores Moreno Raymundo
President of the PTC
Vice-President of the CNU-
FADN

5. ANNEX II: LIST OF LABORATORIES THAT COMPLY WITH THE NATIONAL COMMISSION FOR THE FORENSIC USE OF DNA (CNUFADN) AGREEMENT ON THE ACCREDITATION AND QUALITY CONTROL OF LABORATORIES (2017)

The Permanent Technical Commission (PTC) led the eighth annual request for documentation on quality assurance and accreditation, as required by:

- Article 8 of ROYAL DECREE 1977/2008, which governs the procedure for evaluating DNA analysis laboratories.
- The CNUFADN agreement on the accreditation and quality control of laboratories, as approved by the full CNUFADN board on 21/07/2009.
- COUNCIL FRAMEWORK DECISION 2009/905/JHA on accreditation of forensic service providers carrying out laboratory activities.

In this annual survey, laboratory identification data, areas of application, certificates of participation in the official quality controls for 2016 and the ENAC accreditation status of forensic genetics laboratories that provide services in Spain were requested in order to ascertain the laboratories' degree of compliance with respect to the CNUFADN agreement on accreditation and quality control.

Documents were received from 21 laboratories, which were evaluated by the PTC in two meetings in which all the results obtained by the various laboratories in the external quality controls done in 2016 were analyzed, along with the ENAC accreditation status of the laboratories as per the ISO 17025 standard.

After studying the documents provided by the various laboratories, it was concluded that there were currently 19 laboratories that satisfied the CNUFADN agreement that year, since in addition to participating in the official GHEP or GEDNAP controls, they had a valid ENAC Accreditation Certificate.

The Permanent Technical Commission thus decided to submit to the full board of the National Commission for the Forensic Use of DNA, for its approval, the annual list of laboratories that comply with the CNUFADN agreement on accreditation and quality control, and to issue a certificate noting said compliance to each of the 19 laboratories that are shown in ANNEX I.

This resolution may be appealed within one month to the State Secretary for Justice, pursuant to Article 8.4 of Royal Decree 1977/2008 of November 28, which governs the composition and duties of the National Commission for the Forensic Use of DNA, and Article 114ff of Law 30/1002 of November 26, on the Legal Regime of Public Administrations and the Common Administrative Procedure.

List of laboratories that satisfy the CNUFADN agreement on accreditation and quality control

- Laboratorio de ADN de la Comisaría General de Policía Científica (Madrid)
- Laboratorio Territorial de Biología / ADN de la Jefatura Superior de Policía de Andalucía Occidental (Sevilla)

- Laboratorio Territorial de Biología / ADN de la Jefatura Superior de Policía de Andalucía Oriental (Granada)
- Laboratorio Territorial de Biología / ADN de la Jefatura Superior de Policía de Cataluña (Barcelona)
- Laboratorio Territorial de ADN de la Jefatura Superior de Policía de la Comunidad Valenciana (Valencia)
- Laboratorio Territorial de ADN de la Jefatura Superior de Policía de Galicia (A Coruña)
- Servicio de Criminalística de la Guardia Civil. Departamento de Biología (Madrid)
- Laboratorio de Genética Forense. Unidad de Policía Científica de la Ertzaintza. (Erandio, Vizcaya)
- Laboratorio de Análisis de la División de Policía Científica. Mossos de Esquadra (Sabadell, Barcelona)
- Instituto Nacional de Toxicología y Ciencias Forenses. Servicio de Biología. Departamento de Madrid
- Instituto Nacional de Toxicología y Ciencias Forenses. Servicio de Biología. Departamento de Barcelona
- Instituto Nacional de Toxicología y Ciencias Forenses. Servicio de Biología. Departamento de Sevilla.
- Instituto Nacional de Toxicología y Ciencias Forenses. . Sección de Biología. Delegación de La Laguna.
- Instituto Universitario de Medicina Legal. Servicio de Genética Forense. Universidad de Santiago de Compostela (A Coruña)
- Navarra de Servicios y Tecnologías, S.A. (NASERTIC) (Villaba, Navarra)
- Citogen S.L. (Zaragoza)
- Genomica S.A.U. (Madrid)
- Neodiagnostica S.L. (Lleida)
- Unidad de Secuenciación y Genotipado de la UPV/EHU

25 July 2017

Antonio Alonso Alonso
Secretary of the PTC
Secretary of the CNU-
FADN

Joaquín Delgado Martín
President of the CNUFADN

Dolores Moreno Raymundo
President of the PTC
Vice-President of the CNU-
FADN

6. ANNEX III: REPORT OF THE LEGAL AND BIOETHICAL GROUP (LBG) AND OF THE PERMANENT TECHNICAL COMMITTEE (PTC) OF THE NATIONAL COMMISSION FOR THE FORENSIC USE OF DNA (CNUFADN) ON THE QUALIFICATIONS REQUIRED IN FORENSIC GENETICS

The academic training and experience of the staff of forensic genetics laboratories are fundamental elements included in the general standard on the quality assurance and accreditation of testing laboratories [1] and, in particular, in the most specific standard required to forensic genetics laboratories [2-4]. Adequate training and experience have a direct impact on the quality of the expertise, and are essential elements for evaluating the very admissibility of the DNA test (and the experts) in a court of law. The LBG and the PTC have addressed this issue of the academic qualification required to work as an expert in forensic genetics in our country. As a result of this analysis, the joint conclusions obtained by both working groups (LBG and PTC) on the minimum academic qualification required to work as an expert in forensic genetics are specified first. Also included in this report, as an annex, is a compilation made by the PTC of the national and international standards on the academic qualification requirements for experts in the specialty of forensic genetics.

(Document presented to the full board of the CNUFADN on 14 July 2016)

In general, Article 356 of the Criminal Procedure Law specifies that “the chemical analysis operations required in the conduct of criminal proceedings shall be carried out by Doctors of Medicine, Pharmacy, Physical-Chemical Sciences, or by Engineers who have worked in chemistry specialties. If there are no doctors in those sciences, bachelor’s degree holders who have sufficient knowledge and experience to perform said operations may be appointed. From among those listed in the above paragraph, the investigating judges shall designate the experts who will analyze the substances required in each case for the administration of justice. (...).

According to this procedural regulation, a minimum degree with “sufficient knowledge and experience” is required to act as an expert, although it is up to the competent investigating judge to assess the concurrence of these requirements and appoint an expert who satisfies them.

As regards the conduct of DNA testing, we must bear in mind that this is not an individual task; rather, it is the result of a whole technical process primarily involving one accredited laboratory, in which various professionals may intervene. What the Law on Criminal Procedure requires is only that the Expert who signs and defends the report at trial have, in the opinion of the competent judicial authority, “sufficient knowledge and experience”. The Law does not require that all technicians or assistants who may intervene in the process of writing the report have specific qualification or experience requirements.

Taking the above into account, the purview of the National Commission for the Forensic Use of DNA refers to the accreditation of the laboratories tasked with carrying out forensic DNA tests. To this end, among the various elements that are considered, the CNUFADN verifies that DNA tests are carried out by professionals who satisfy the minimum training and experience requirements. In this regard, as is specified in the section on personnel contained in the different international standards (both the ISO 17025 standard, as well as the international standards laid out in Europe by the ENFSI DNA Working Group and in the US by the DNA Advisory Board), there is a requirement that the personnel be qualified based on specialized (degreed) education, training and experience appropriate to the tasks performed by forensic genetics experts, including the examination and analysis of the evidence, as well as written testimony (expert report) and verbal testimony (oral hearing) of the results and their interpretation in court.

More specifically, for experts in forensic genetics, both the international SWGDAM standard and the GHEP-ISFG guide establish the requirement to have a bachelor's degree, in addition to having accredited experience (of at least 2 years in the case of the GHEP-ISFG Guide) and accredited knowledge in areas such as genetics, molecular biology and biostatistics.

All of the institutions represented in the CNUFADN include in their quality assurance guidelines the requirement to have a bachelor's degree in experimental and health sciences and, in the case of the INTCF (leading body in Toxicology and Forensic Sciences), said requirement is also included in Article 475 of the Organic Law on Judicial Power, as well as in the INTCF job listing.

The CNUFADN thus reached the conclusion, without prejudice to the right of the judge in question to appoint a legal expert, that for the purposes of the National Commission for the Forensic Use of DNA's accreditation of laboratories, the Expert in Forensic Genetics who conducts DNA testing and defends it in court must have at least a bachelor's degree, as well as continuous training and experience appropriate to the specialized tasks performed, in keeping with the national and international standards applicable to the area of forensic genetics. This requirement is satisfied in all of the laboratories accredited by the National Commission for the Forensic Use of DNA.

PTC REPORT ON ACADEMIC QUALIFICATION REQUIREMENTS FOR EXPERTS IN THE SPECIALTY OF FORENSIC GENETICS

We present a review of the international and national standards, as well as of the requirements laid down by the laboratories of the various institutions represented in the CNUFADN, with respect to the academic qualifications required to work as an expert in Forensic Genetics.

1. International Standards

1.1. ISO 17025 Standard

“5.2. Personnel

5.2.1. Laboratory management must ensure the competence of all those who operate specific equipment, perform tests or calibrations, evaluate results and sign test reports and calibration certificates. When personnel in training are employed, they must be appropriately supervised. Personnel performing specific tasks must be qualified on the basis of their education, training, suitable experience and proven skills, as required.

NOTE 1. In some technical areas (for example, non-destructive testing), personnel performing certain tasks may be required to have a personnel certification. The laboratory is responsible for complying with the personnel certification requirements. The personnel certification requirements may be regulatory, be included in the standards for the specific technical field, or be required by the client.

NOTE 2. In addition to the appropriate qualifications, training, experience and knowledge of the test carried out, the personnel responsible for the opinions and interpretations included in the test reports should have:

- knowledge of the technology used to manufacture the objects, materials, products, etc. tested, or of their actual or intended use, as well as of the defects or degradations that may occur while in use; an awareness of the general requirements contained in laws and standards; and
- an understanding of the importance of the deviations found with respect to the normal use of objects, materials, products, etc. considered.

5.2.2. Laboratory management should formulate goals with respect to the education, training and skills of laboratory personnel. The laboratory should have a policy and procedures to identify the training needs of the staff and to provide that training. The training program must be relevant to the present and future tasks of the laboratory. The effectiveness of any training actions implemented must be evaluated.

5.2.3. The laboratory must have personnel who are employed by the laboratory or who are under contract to it. When using key technical and support personnel, whether under contract or on a supplementary basis, the laboratory must ensure that said personnel are supervised, competent, and work in accordance with the laboratory's management system.

5.2.4. The laboratory must keep updated job descriptions for the managerial, technical and key support positions involved in the tests or calibrations.

NOTE - The job descriptions can be defined in many ways. At a minimum, the following should be defined:

- the responsibilities with respect to the performance of the tests or the calibrations;
- the responsibilities with regard to planning the tests or calibrations and evaluating the results;
- the responsibilities for reporting opinions and interpretations;
- responsibilities regarding the modification of methods and the development and validation of new methods;
- the specialization and experience required;
- the qualifications and training programs;
- management's obligations.

5.2.5. Management must authorize specific staff members to perform particular types of sampling, testing or calibrations, to issue test reports and calibration certificates, to issue opinions and interpretations and to operate certain types of equipment. The laboratory must maintain records of the relevant authorizations, competence, educational level and professional qualifications, training, skills and experience of all technical personnel, including contracted personnel. This information must be readily available and must include the date on which the authorization or skill was confirmed.”

1.2. ENFSI DNA Working Group: Quality Assurance Program for DNA Laboratories

“7.2. Personnel - (ref 17025 2005, 5.2)

7.2.1. The laboratory management must ensure that all personnel who perform any aspect of the testing procedures are competent.

7.2.2. The laboratory must have up to date job descriptions for all staff which include responsibilities, duties and skills.

7.2.3. The management of the laboratory must have a documented training programme for qualifying all technical laboratory personnel.

7.2.4. The laboratory must have a documented program for continuous professional development and will ensure technical qualifications are maintained through continuing competence assessment. This can be achieved through monitoring of routine analytical work.

7.2.5. The laboratory must maintain records on the relevant qualifications, training, skills and experience of the technical personnel.

7.3. Qualifications - (ref 17025 2005, 5.2.2)

7.3.1. Technical Manager/DNA managers/Reporting Officers must have a degree or an equivalent qualification in the specialist area. For those individuals who do not have academic qualifications then relevant equivalent experience is required. All individuals who fulfil these roles must demonstrate competence.

7.3.2. Technicians/Analysts/Laboratory Support personnel must have either a technical qualification or equivalent to provide a basis for understanding forensic DNA testing and demonstrate competence.

7.4. Competency testing - (ref 17025 2005, 5.2.1 -.5.2.2)

7.4.1. The laboratory must ensure that the competence of its staff is regularly assessed for all relevant aspects of DNA testing, against documented criteria. See Appendix 1 for a model competency assessment program.

7.4.2. Each analyst will, at the end of their training period, undertake a competency assessment/test which has to be successfully completed before they can analyze casework samples. Thereafter the work of each analyst will be monitored to ensure continuing competence.

7.4.3. Reporting Officers should be assessed during and at the end of their training via competency exercises, and thereafter audits and monitoring of case files will be undertaken”.

1.3. SWGDAM & DNA ADVISORY BOARD (FBI): QUALITY ASSURANCE STANDARDS FOR FORENSIC DNA TESTING LABORATORIES

“5.MPersonnel

Standard 5.1

Laboratory personnel shall have the education, training and experience commensurate with the examination and testimony provided. The laboratory shall:

5.1.1. have a written job description for personnel to include responsibilities, duties and skills.

5.1.2. have a documented training program for qualifying all technical laboratory personnel.

5.1.3. have a documented program to ensure technical qualifications are maintained through continuing education.

5.1.3.1. Continuing education - the technical manager or leader and examiner/analyst(s) must stay abreast of developments within the field of DNA typing by reading current scientific literature and by attending seminars, courses, professional meetings or documented training sessions/classes in relevant subject areas at least once a year.

5.1.4. maintain records on the relevant qualifications, training, skills and experience of the technical personnel.

5.2. The technical manager or leader shall have the following:

5.2.1. Degree requirements: The technical manager or leader of a laboratory shall have at a minimum a Master's degree in biology-, chemistry- or forensic science-related area and successfully completed a minimum of 12 semester or equivalent credit hours of a combination of undergraduate and graduate course work covering the subject areas of biochemistry, genetics and molecular biology (molecular genetics, recombinant DNA technology), or other subjects which provide a basic understanding of the foundation of forensic DNA analysis as well as statistics and/or population genetics as it applies to forensic DNA analysis.

5.2.1.1. The degree requirements of section 5.2.1 may be waived by the American Society of Crime Laboratory Directors (ASCLD) or by the Director of the FBI in accordance with criteria approved by the Director of the FBI. This waiver shall be available for a period of two years from the effective date of these standards. The waiver shall be permanent and portable.

5.2.2. Experience requirements: A technical manager or leader of a laboratory must have a minimum of three years of forensic DNA laboratory experience.

5.2.3. Duty requirements:

5.2.3.1. General: manages the technical operations of the laboratory.

5.2.3.2. Specific duties

a) Is responsible for evaluating all methods used by the laboratory and for proposing new or modified analytical procedures to be used by examiners. (b) Is responsible for technical problem solving of analytical methods and for the oversight of training, quality assurance, safety and proficiency testing in the laboratory.

5.2.3.3. The technical manager or leader shall be accessible to the laboratory to provide onsite, telephone or electronic consultation as needed.

5.3. Examiner/analyst shall have:

5.3.1. at a minimum a BA/BS degree or its equivalent degree in biology-, chemistry- or forensic science- related area and must have successfully completed college course work (graduate or undergraduate level) covering the subject areas of biochemistry, genetics and molecular biology (molecular genetics, recombinant DNA technology) or other subjects which provide a basic understanding of the foundation of forensic DNA analysis, as well as course work and/or training in statistics and population genetics as it applies to forensic DNA analysis.

5.3.2. a minimum of six (6) months of forensic DNA laboratory experience, including the successful analysis of a range of samples typically encountered in forensic casework prior to independent casework analysis using DNA technology.

5.3.3. successfully completed a qualifying test before beginning independent casework responsibilities.

5.4. Technician shall have:

5.4.1. On the job training specific to their job function(s).

5.4.2. successfully completed a qualifying test before participating in forensic DNA typing responsibilities.

5.5. Laboratory support personnel shall have:

5.5.1. training, education and experience commensurate with their responsibilities as outlined in their job description”

2. National Standards

2.1. GHEP-ISFG: GUIDE FOR IMPLEMENTING A QUALITY SYSTEM IN FORENSIC GENETICS LABORATORIES

“5.2. Personnel

The laboratory must ensure that the staff has the proper qualifications based on the training and experience suitable to the work being done. The training of all those personnel whose area of activity may influence the quality of the results must be tracked.

The laboratory will have a staff training program that will include at least the following documents:

- Description of jobs in the laboratory that includes the qualifications, knowledge and experience required, as well as responsibilities.

- A training program for the qualifications of all the technical personnel in the laboratory. Acceptance criteria will be established, for example by analyzing control samples or by having a qualified individual analyze the same sample.
- A continuing staff training program.
- An updated record of the relevant qualifications, training and
- experience of the technical staff.
- Those individuals who can express opinions or interpretations of the results must be qualified to do so, from both a technical and legal point of view.

The Scientific Coordinator must have at least a Bachelor's degree and have worked continuously in Forensic Biology for at least three years, with accredited knowledge in the areas of biochemistry, genetics, molecular biology, biostatistics, population genetics and guarantee assurance.

His/Her responsibilities will be:

- General: responsible for all technical operations in the laboratory.
- Specific: responsible for evaluating all the methods used by the laboratory, as well as for the introduction and application of new or modified analysis techniques used by the experts. Responsible for solving the technical problems in the analytical methods used, as well as for supervising the training, quality program, safety and reliability of the DNA tests.

The Expert must have a bachelor's degree and have worked continuously in Forensic Biology for at least two years, with accredited knowledge in the areas of biochemistry, genetics, molecular biology, biostatistics and population genetics. He/She must pass an exam before doing casework, which will be supervised initially for a minimum period of six months. He/She will bear technical responsibility for the tests assigned and will supervise the analysis work done by the technicians. He/She will have access to continuing training.

The Technical Personnel will have the appropriate technical qualification to do the work, which will be assigned by the laboratory itself, as well as the suitable accreditation and training for the technique to be performed. He/She will have access to continuing training.

Any other laboratory support personnel must have training and experience commensurate with their obligations, and which will be specified in their job description".

3. Requirements of the Institutions Represented in the CNUFADN

3.1. INTCF

ORGANIC LAW 19/2003 of December 23, which amends Organic Law 6/1985 of 1 July, on Judicial Power,

Art. 475

The Medical Faculty of the National Institute of Toxicology and Forensic Sciences. Admission into this faculty requires a university degree in Experimental and Health Sciences, to be determined by the corresponding entrance exams, depending on the specialty through which access to the faculty is gained.

Royal Decree 63/2015 of February 6, amending Royal Decree 862/1998 of 8 May, which approves the Regulation of the Institute of Toxicology, Royal Decree 386/1996

“Article 12. Institute Personnel.

1. The following official staff shall serve in the Institute:

- a) Doctors of the National Institute of Toxicology and Forensic Sciences.
- b) Forensic doctors.
- c) Specialist Technicians of the National Institute of Toxicology and Forensic Sciences.
- d) Laboratory Assistants of the National Institute of Toxicology and Forensic Sciences.
- e) Official staff at the service of the Justice Department, as well as other government agencies, under the conditions and requirements specified in the relevant job listings”.

“4. Likewise, professionals or other personnel, as appropriate, may also be hired on staff and provide routine or support services at the National Institute of Toxicology and Forensic Sciences”.

ORDER JUS/3773/2007 of December 12, which approves the list of positions at the National Institute of Toxicology and Forensic Sciences.

Article 8. Specialties of the Medical Faculty.

In accordance with the provisions of section b) of Article 475 of the Organic Law on Judicial Power, access to the Medical Faculty of the National Institute of Toxicology and Forensic Sciences will be through the following specialties:

a) Chemistry and Drugs. To join the Faculty through this specialty, one of the following degrees is required:

Bachelor's in Chemistry.

Bachelor's in Pharmacy.

b) Biology - To join the Faculty through this specialty, one of the following degrees is required:

Bachelor's in Biology.

Bachelor's in Pharmacy.

Bachelor's in Veterinary Science. Bachelor's in Medicine.

Bachelor's in Bio-chemistry.

c) Forensics - To join the Faculty through this specialty, one of the following degrees is required:

Bachelor's in Biology.

Bachelor's in Pharmacy.

Bachelor's in Medicine.

Bachelor's in Chemistry.

d) Histopathology -To join the Faculty through this specialty, the following degree is required:
Bachelor's in Medicine.

e) Toxicological Assessment, and Environment - The degree requirements for joining the Faculty through this specialty are:

Bachelor's in Environmental Sciences.

Bachelor's in Biology.

Bachelor's in Pharmacy.

Bachelor's in Chemistry.

f) Toxicological Information - To join the Faculty through this specialty, a Bachelor's of Medicine degree is required.

The quality assurance guidelines of the remaining institutions represented in the CNUFADN contain the requirement to hold a bachelor's degree in experimental and health sciences.

4. Bibliography

[1] UNE-EN ISO/IEC 17025:2005 Standard: General requirements for the competence of testing and calibration laboratories.

[2] Quality Assurance Program for DNA Laboratories. ENFSI DNA Working Group.

[3] Quality assurance standards for forensic DNA testing laboratories

http://media.wix.com/ugd/4344b0_4a22824ce56f43d4b1a4d2486409f95d.pdf

[4] Guide for implementing a quality system in forensic genetics laboratories.

<http://www.gep-isfg.org/archivos/201301/Acreditacion.pdf>

[5] ORGANIC LAW 19/2003 of December 23, which amends Organic Law 6/1985 of July 1, on Judicial Power.

<https://www.boe.es/boe/dias/2003/12/26/pdfs/A46025-46096.pdf>

[6] ORDER JUS/3773/2007 of December 12, which approves the list of positions at the National Institute of Toxicology and Forensic Sciences.

<https://www.boe.es/boe/dias/2007/12/22/pdfs/A53086-53087.pdf>

7. ANNEX IV: REPORT OF THE EXPERT AND SCIENTIFIC ACTIVITY CARRIED OUT BY THE BIOLOGY SERVICES OF THE INTCF WITH RESPECT TO DNA TESTING IN INVESTIGATIONS OF IRREGULAR ADOPTIONS AND ABDUCTIONS OF NEWBORNS IN SPAIN.

National Institute of Toxicology and Forensic Sciences (INTCF). Biology Service of the Madrid Office
 José Echegaray 4. 28232 Las Rozas. Madrid

Biology Service of the Barcelona Office Mercé n.º 1, 08002 Barcelona

Biology Service of the Seville Office Avda. Doctor Fedriani, s/n 41071 Sevilla

Technical report written by the Biology Services of the INTCF on the occasion of the visit by the European Parliament's Petitions Committee.

Madrid, 22-23 May 2017

1. Introduction

This report considers three aspects of the expert and scientific activity carried out by the Biology Services of the Madrid, Barcelona and Seville Offices of the National Institute of Toxicology and Forensic Sciences with respect to DNA testing when investigating irregular adoptions and abductions of newborns.

The report presents, first of all, the overall results obtained from DNA studies of exhumed bone remains and other post-mortem tissues (hospital biopsies) of newborns in a total of 128 investigations in which there were indications that a newborn had been abducted, in response to 76 DNA investigation requests from the Public Prosecutor's Office and 52 requests from Investigating Courts from 2011 to 2017.

Secondly, the report provides the quality and interpretation criteria of the DNA tests carried out in this area by the National Institute of Toxicology and Forensic Sciences, the Ministry of Justice and the National Commission for the Forensic Use of DNA (CNUFADN), including the action protocol of the National Institute of Toxicology and Forensic Sciences for genetic identification in cases of irregular adoptions and abductions of newborns and the recommendations for genetic identification studies in cases of irregular adoptions and abductions of newborns approved by the CNUFADN.

Finally, the other area of investigation offered by the DNA test is addressed, which is the search for compatibilities between affected living relatives by building databases with their DNA profiles (mainly parents looking for their biological children and adopted children looking for their parents). Statistical data are provided regarding the total number of DNA profiles registered in the different family categories of the Ministry of Justice's CODIS DNA database, created pursuant to Order JUS/2146/2012 of October 1, "which creates certain files with data of a personal nature related to cases of possible abductions of newborns and approves the official forms for requesting information".

2. DNA analysis of exhumed bone samples and other post-mortem tissues (biopsies) of newborns

This section presents the results obtained by the different Biology Services of the National Institute of Toxicology and Forensic Sciences when identifying DNA in exhumed skeletal remains and other post-mortem tissues (biopsies) of newborns in a total of 128 cases in which there were indications that a newborn had been abducted, in response to 76 requests for DNA analysis from the Public Prosecutor's Office and 52 requests from Investigative Courts from 2011 to 2017.

Table 1. Shows the total number and type of procedures in which the exhumation was requested, as well as the success/failure rate in recovering bone remains of newborns in the different exhumations.

Table 1. Total number and type of procedures in which the exhumation process was requested, as well as the success/failure rate in recovering bone remains of newborns in the different exhumations.

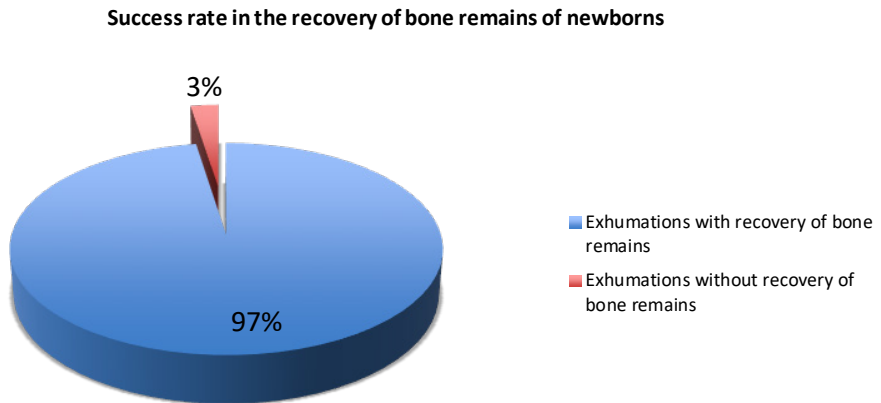
	INTCF Madrid	INTCF Barcelona	INTCF Seville	INTCF Total
No. of cases requested by the Public Prosecutor	12	41	11	64
No. of cases requested by Investigative Court	21	13	16	50
No. of exhumations in which bone remains from a newborn were recovered ^(*)	31	53	33 ^(a)	117
No. of exhumations in which bone remains from a newborn were not recovered	2	1	0	3

(*) Excluded from this section and this study are two cases (one from the INTCF in Barcelona and the other from the INTCF in Seville) in which, following the anthropological analysis, it was shown that the bone remains were from an adult.

(a) The number of exhumations in the case of the Seville INTCF is higher than the number of cases since six exhumations were received in one of the judicial proceedings, and a total of 3 exhumations were received in a proceeding from the Office of the Prosecutor.

As Figure 1 shows, the success rate in recovering bone remains from newborns (117/120) was 97%.

Figure 1



One of the first findings that caught the attention of the researchers was the fact that not all the exhumations were able to recover bone remains from the newborn (3 out of a total of 120 exhumations). Although the absence of bone remains could initially be interpreted as proof of the crime of abduction, a correct interpretation of the findings first requires ruling out in each case the possibility that the buried bone remains of a newborn subject to various chemical, physical and biological damages can degrade until they are completely destroyed. The size of the bones in a newborn, as well as the specific molecular structure and composition of the bone tissue (with disordered collagen fibers and a much lower degree of calcification than adult bone tissue), pointed to the possibility of total destruction of the skeletal remains in certain burial conditions. In addition, the characteristics of the exhumation findings in two of these three cases, in which no bone remains were detected but in which fetal hairs and cadaveric fauna were recovered, as well as surgical drapes and cord clamps, were compatible with the previous existence of skeletal remains in the burial site.

The technical report of the Anthropology Laboratory of the INTCF Forensics Service, written at the request of the Provincial Prosecutor's Office of Guipúzcoa, came to support this hypothesis when a study was presented involving a series of 16 exhumations that showed that "the representativity of the skeleton and the degradation of the remains was highly variable, from a newborn buried in 1972 that was practically intact thanks to a process of mummification, to an individual with a similar burial date for which there was no macroscopic evidence of bone remains".

In addition to the exhumation proceedings, in 14 cases a genetic analysis was requested of the post-mortem biopsies of newborns provided by the hospitals where the babies had been born, as per the distribution shown in Table 2.

Table 2. Total number and type of procedure in which a genetic analysis was requested of the hospital post-mortem biopsies of newborns.

	INTCF Madrid	INTCF Barcelona	INTCF Seville	INTCF Total
No. of cases requested by the Prosecutor's Office (genetic analysis of hospital biopsies)	1	9	2	12
No. of cases requested by Investigative Court (genetic analysis of hospital biopsies)	2	0	0	2
Total	3	9	2	14

The standards used in the genetic analyses carried out by the Biology Services of the INTCF were in accordance with COUNCIL FRAMEWORK DECISION 2009/905/JHA on Accreditation of forensic service providers carrying out laboratory activities (need for accreditation through ISO-UNE 17025) [1], as well as the CNUFADN agreement on the Accreditation and Quality Control of Laboratories, approved by the full board of the CNUFADN on 21/07/2009 [2].

In most cases, autosomal DNA STR (Short Tandem Repeat) markers were used. Also studied were STR markers of the Y chromosome (paternal line) and the hypervariable regions of the mitochondrial DNA (maternal line) when required by the characteristics of the case or by the genetic relationship that needed to be investigated.

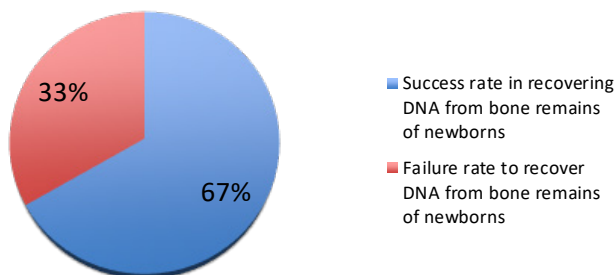
The results of the genetic analyses of the samples of bone remains from newborns recovered in the exhumation process are shown in Table 3.

Table 3. Results of the genetic analysis of samples of bone remains from newborns recovered during the exhumation process.

	INTCF Madrid	INTCF Barcelona	INTCF Seville	INTCF Total
Success rate in recovering DNA from bone remains of newborns	27	35	16	78
Failure rate in recovering DNA from bone remains of newborns	4	18	17	39
Positive identification of bone remains through DNA match with relatives	25	32	14	71
Skeletal remains excluded through non-DNA match with relatives	2	3	2	7

Figure 2

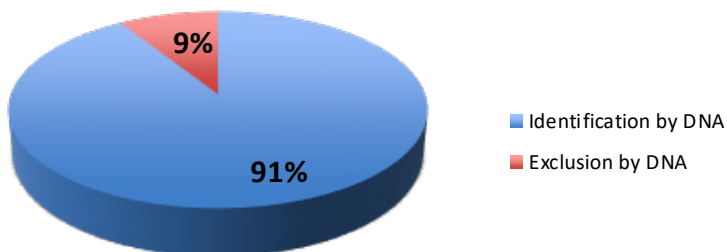
Success rate in recovering DNA from bone remains of newborns



As the DNA recovery success/failure rate shows (Fig. 2), the DNA analyses carried out involved considerable difficulty due to the state of degradation of the DNA and to the low number of DNA copies recovered from the skeletal remains in a large fraction of the cases investigated. The use of validated high-yield systems for extracting DNA from bone remains, of specific systems for analyzing degraded DNA, as well as the implementation of strict measures to minimize and monitor the exogenous contamination of DNA, were essential to overcome the problems observed and provide reliable and reproducible results.

Figure 3

Percentage of Identifications and Exclusions through a comparative study of DNA with Relatives in 78 exhumation procedures.



The comparative study between the DNA profiles obtained from the bone remains of newborns and the DNA profiles of the reference samples from the parents who had filed the case yielded matches in the cadavers of 71 newborns, which is 91% of the total of 78 newborns from which a DNA profile was obtained (Fig. 3). This was thus one of the most relevant findings of the investigation, as it allowed verifying the death of the allegedly abducted newborn and closing the investigation proceedings in 91% of the cases in which a DNA test was able to be performed.

However, it is important to note that in at least six of the seven cases in which there was no DNA match between the bone remains and the complainants, there were doubts as to the location of the burial site, or the background of the case did not allow ruling out problems involving the custody of the samples.

The results of the genetic analyses of the samples from the hospital biopsies of newborns are shown in Table 4.

Table 4. Results of the genetic analysis of the samples from hospital biopsies of newborns.

	INTCF Madrid	INTCF Barcelona	INTCF Seville	INTCF Total
Successful DNA recovery	3	7	2	12
Failed DNA recovery	0	2	0	
Positive identification by DNA match with relatives	3	6	1	10
Exclusion through non-DNA match with relatives	0	1	1	2

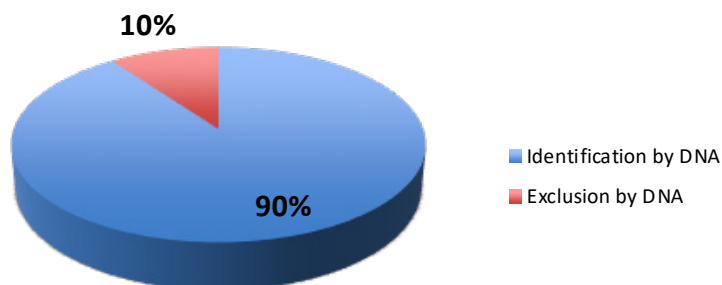
As Table 4 shows, in 83% of the cases (10 out of 12), the genetic compatibility was verified by matching the DNA profiles obtained from the biopsies to those of the family members reporting the abduction.

In one of the cases analyzed by the Barcelona Office of the INTCF, the studies of the Pathological Anatomy Service confirmed that the types of tissues and their characteristics did not correspond to the documentary records, revealing a mistake in the selection and delivery of the samples. Subsequently, a second shipment was received with new biopsies that were identified through paternity tests. This result showed the importance of the complementary diagnosis of other scientific aspects carried out by the INTCF, such as the histopathological study of biopsies and the anthropological study of bone remains when investigating potential abductions of newborns.

The overall results (including the exhumed remains and hospital biopsies) thus made it possible to prove the death of the allegedly abducted newborn and to close the investigation proceedings in 90% of the cases (81 cases out of a total of 90 in which DNA testing was possible) (Fig. 4).

Figure 4

Percentage of Identifications and Exclusions through a comparative study of DNA with Relatives in 90 investigative procedures (Exhumations and Biopsies)



3. Scientific protocols and recommendations of the Ministry of Justice

The experience in this area of both forensic doctors throughout Spain and the experts in the various INTCF offices showed the great technical complexity of this type of forensic investigation and the need to develop specific protocols to both guarantee the documentation, recovery and preservation of all exhumed remains, and to guarantee the quality and reliability of the genetic identification analysis and the correct interpretation of the evidentiary weight of the DNA test.

In 2011, the “Action Protocol of the National Institute of Toxicology and Forensic Sciences for Genetic Identification in Cases of Irregular Adoptions and Abductions of Newborns” was implemented [3]. It is a guide aimed at providing information to courts, public prosecutors, forensic institutes and forensic doctors on the technical procedure for sending DNA samples to the National Institute of Toxicology and Forensic Science.

The National Commission for the Forensic Use of DNA (CNUFADN), aware of the technical problems in some of the genetic identification studies in newborn abduction cases, approved at its plenary session of 05/16/2012 the document, “Recommendations for Genetic Identification Studies in Cases of Irregular Adoptions and Abductions of Newborns”, as proposed by the Permanent Technical Commission (PTC) [4]. These are general recommendations to ensure the quality and reliability of genetic identification studies in cases of irregular adoptions and abductions of newborns, both when searching for a match with living individuals through DNA databases, and when analyzing the DNA from the exhumed remains of newborns. The recommendations include the following aspects: selecting and obtaining reference samples, selecting and obtaining samples from the exhumed cadavers of newborns, genetic analysis and accreditation of laboratories, registration and searches of DNA databases, and criteria for interpreting and reporting matches.

Undoubtedly, the expert appraisal by the forensic medical team during the exhumation process is of vital importance to ensure that adequate and sufficient samples are obtained in order to carry out the analyses and investigations that can shed light on the facts in each case. Aware of this

importance, the Ministry of Justice, through the Legal Studies Center, organized a meeting in July 2012 of Directors of Forensic Institutes, in which the problems involved in the exhumations carried out to date were discussed in an effort to decide on common guidelines or action protocols. As a result of this meeting, the “Guide to Recommendations for Exhumations in Cases of Potential Newborn Abductions” [5] was published, which details specific exhumation procedures depending on the characteristics of the location (confined places or ground burials), as well as the objectives of the steps taken by the forensic doctor in the Forensic Institutes, including performing anthropological identification studies of the remains and the rules for sending samples for additional analyses (anthropological and DNA) to the INTCF.

Last but not least, it is important to refer to the work of Spain’s Attorney General (FGE), who, in circular number 2/2012 of December 26 “on standardizing the criteria in cases of newborn child abductions” [6], favored standardizing the procedures used by all Prosecutor’s offices, laid out the general procedure for carrying out exhumations and taking samples for DNA analysis, including the need to involve the competent Forensic Institute in the exhumation process and the INTCF in the DNA analysis, and conducted a review of the legal categorization of the legal criminal offences and their statute of limitations, being particularly mindful of giving maximum protection to the victims.

4. The database of DNA profiles of those affected by alleged cases of newborn abduction

Apart from the investigation requests from courts and the Public Prosecutor’s Office, during the period in question (2011-2017) a large number of extrajudicial investigations were carried out by individuals and various associations of persons affected by alleged newborn abduction cases, as part of a legitimate effort to ascertain the genetic identity of the newborns and of their biological family. Government agencies are committed to these legitimate efforts and as a result, and under the coordination of the Ministry of Justice, it was decided to create a Guidance and Information Service for Victims [7] using the available data and official records on natural filiation, as well as to create a file of DNA profiles of persons affected by the abduction of newborns, all pursuant to Order JUS/2146/2012 of 1 October, “*which creates certain files with data of a personal nature related to cases of possible abductions of newborns and approves the official forms for requesting information*” (BOE 244 of 10/10/2012) [3]. Two types of informed consent forms are included in this order, depending on whether information is desired from the various administrative records or from the different institutions involved, or if the genetic profile is also to be included in the INTCF’s DNA database.

The goal of the database with DNA profiles of persons affected by the abduction of newborns is to centralize the DNA profiles of those affected (which are scattered in the DNA databases of private laboratories) into a single database managed by the National Institute of Toxicology and Forensic Sciences, thus allowing all the people involved to be compared in order to check for the existence of genetic matches that could indicate the existence of biological family relationships. Order JUS/2146/2012 also lays out the need for the INTCF to have a process to validate the genetic profiles before including them in the database, as well as a final verification procedure for compatible candidate relatives by means of complementary DNA analyses.

4.1. PROBLEMS AND FUTURE OUTLOOK

The national survey conducted by the INTCF in December 2012 of all private laboratories that had done DNA analyses of people affected by newborn abductions revealed a total of 2286 DNA profiles in five different laboratories. 72% of these DNA profiles were from parents who were looking for their allegedly abducted or irregularly adopted children, and only 15% were from adopted children who were seeking their biological parents. In addition, 13% of the DNA profiles were from siblings affected by the abduction of newborns. From a technical standpoint, it is also worth noting that the laboratories mainly used three different systems for analyzing the STR regions of DNA, providing an overlap between the different laboratories of 10 to 15 STR regions.

The first problem that arises in a DNA database of these characteristics, with more than 2,000 DNA profiles, is the non-negligible probability that there will be individuals who are not genetically related who are compatible in the 10-15 STR regions, based on what can be expected for the various kinship relationships (parents/children, siblings) investigated when only one relative is available for reference. As a result, the INTCF recommended that it is essential to validate each of the preliminary matches that could exist (obtained through 10-15 STR DNA markers) by means of a complementary analysis of new STR markers, other family members, or an analysis of maternal (mitochondrial DNA) or paternal (Y chromosome STRs) haplotype markers, based on CNUFADN recommendations [4].

Also striking is the large disproportion between the high number of DNA profiles of parents who are seeking their allegedly abducted or irregularly adopted children (72%) and the low number of profiles of adopted children seeking their biological parents (15%), which obviously severely restricts the chances of success when searching for matches in the samples contained in these two categories of relatives.

On 20/04/2017, the total number of profiles registered through the CODIS application in the “DNA profiles of persons affected by the abduction of newborns” database managed by the INTCF was 489 STR profiles, of which 429 came from the Information Office for Victims of Potential Newborn Abductions, and 60 DNA profiles (obtained by the various INTCF offices) were registered through requests from courts or from the Public Prosecutor’s Office.

The distribution of the DNA profiles registered based on the type of kinship is shown in Table 5

Table 5. Distribution of the DNA profiles registered in the “DNA profiles of persons affected by the abduction of newborns” database, according to the type of kinship.

TYPE OF KINSHIP	No. of DNA PROFILES
Mothers looking for their biological children	326
Fathers looking for their biological children	42
Brothers looking for their biological siblings	26
Sisters looking for their biological siblings	32
Adopted sons looking for their biological parents	20
Adopted daughters looking for their biological parents	42
Others (Grandfather)	1

Figure 5

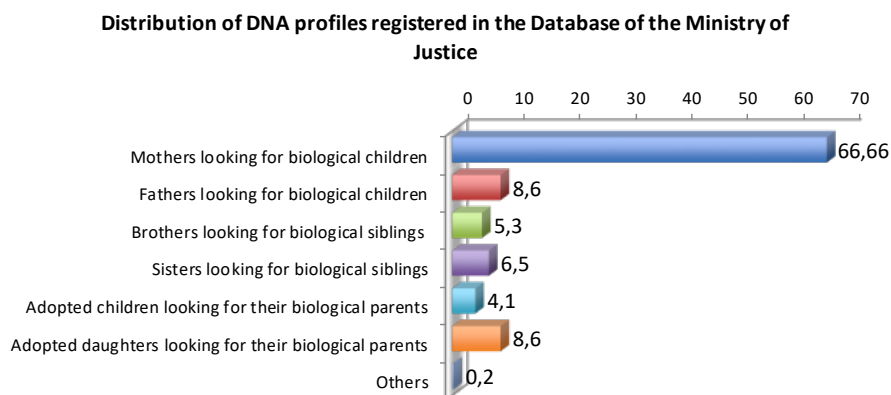


Figure 5 shows the percentage data for the genetic profiles of the various relatives registered in the DNA database of the Ministry of Justice.

The searches of the database carried out to date revealed no confirmed genetic matches between relatives (mothers, fathers and siblings) who are looking for their children or siblings and adoptive children who are looking for their biological relatives. The INTCF also reported (through a circular published on the website of the Guidance and Information Service for Victims) on the limitations of searching for the DNA of siblings based solely on such a low number of STR markers, and made recommendations on the need to carry out complementary DNA analyses in these cases.

We must note that the degree of success in identifying genetic kinship relationships between the complainants registered in the DNA database managed by the INTCF will be determined primarily by the level of participation of the complainants themselves in this project. Success can only be guaranteed if a large majority of those affected provide their consent to have their DNA profiles registered.

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