Issue n°4, March '04

Bulletin of the European network on GENetic DEAFness: pathogenic mechanisms, clinical and molecular diagnosis, social impact.
Published with the support of European Commission, Fifth Framework Programme, Quality of Life and Management of Living Resources programme.

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SECTION 1 - RESEARCH CORNER

DIAGNOSIS OF HEREDITARY NON SYNDROMIC HEARING IMPAIRMENT: THE NEED TO COORDINATE EFFORTS

Manuela Mazzoli, Agnete Parving

Introduction.
Over the last decade, we have seen a tremendous growth in the localisation and identification of genes for non syndromic hereditary hearing impairment (NSHHI). It has become clear that this condition is extremely genetically heterogeneous. Near 100 different DNA loci associated with non syndromic hearing impairment have been identified. A locus is a large DNA sequence on a chromosome containing one or more genes as well as non coding regions. After a locus is identified as being associated with a disorder, geneticists start to search for the responsible mutated gene within that locus. Presently, among NSHHI, have been identified 37 disorders associated with autosomal dominant mode of inheritance, 33 with autosomal recessive, 6 with X-linked and 2 mithocondrial. Of these, 20 genes have been cloned for autosomal dominant (DFNA), 21 for autosomal recessive- (DFNB) and 1 for X-linked (DFN) disorders. Knowing the gene and the function of its product helps understanding the fine mechanisms of hearing and how hearing impairment results in presence of a mutating gene. A continuously updated overview of the field can be found in the Hereditary Hearing loss Homepage (http://www.uia.ac.be/dnalab/hhh/). Even when the hearing impairment is not associated with other symptoms that may characterize the genetic disorder, clinical subtypes exist, and several genotype-phenotype correlations between specific (sub)phenotypes and certain loci, genes or mutations are being described. However, the delineation of these correlations is hampered by the lack of information observed in papers reporting gene localisations or identifications. In addition, the terminology used to describe phenotypes is sometimes ambiguous and not uniform, yielding to difficulties in making comparisons. Another problem that we have noted several times is the use of incorrect nomenclature for gene loci, genes or mutations, sometimes leading to confusion.
For each gene various disease causing mutations have been described, exhibiting significant genotype and phenotype heterogeneity. Even when the inheritance of the trait in a family is evident, the substantial genotype-phenotype heterogeneity does not allow screening for a genetic condition that might be associated with a certain audiometric configuration, unless the subject pertains to a large familial group so that a linkage study might be feasible. In the audiological clinics, diagnostic methods to reveal carriers of genes causing HHI would be appropriate, however all audiometric tests available, have been found to have poor sensitivity and specificity (Mazzoli et al, 2004). Clinicians would also like to know the exact carrier frequency of specific gene mutations in the population in question, as carrier frequencies of various mutations have been shown to differ between countries. For example, the mutation 35delG is most prevalent in southern Europe (apparently 4,0%), whereas apparently it only accounts for 1,7-2,5% in Northern Europe and North America. However, the samples tested are small and further studies based on larger populations are needed. Although it may be unrealistic, the audiological physician would like the possibility that a specific audiometric configuration points to a specific gene mutation- improving and facilitating the diagnostic process. In other words, the clinician would like to know how a specific gene mutation affects the hearing i.e. correlate the genetic disorder to its clinical presentation and possibly prospect future treatment or prevention of HI.

For these reasons, it has been extreemely important the effort conducted in the last decade by the European network (projects: HEAR and GENDEAF) to coordinate the work of geneticists with that of clinicians in order to increase the number of individuals and families investigated, make comparisons between different countries, joining forces to improve diagnosis and counseling, etc.

Within the GENDEAF project a series of guidelines and reccomendations have been produced to further improve the understanding in the field. Following a summary of these publications.
*Recommendations for the description of genetic and audiological data for families with nonsyndromic hereditary hearing impairment (*Mazzoli M, Van Camp G, Newton V, Giarbini N, Declau F, Parving A., 2004) are intended for researchers, including audiologists and geneticist, who report families with nonsyndromic deafness, in order to help them making appropriate descriptions of both genetic and audiological aspects of hearing impairment. Terminology and definitions have been briefly outlined, and a checklist (table 1) has been provided for the authors to make sure that the description is as complete as possible.
Providing thorough descriptions of both genetical aspects and clinical presentation of the different disorders will allow to be more accurate in correlating the genotype with the clinical presentation, helping the diagnostic process.

Table 1: Checklist for description of genetic hearing impairment

Genetic aspects	Audiological aspects
1. Nomenclature and localisation Locus name Chromosomal localization Gene name (if identified) Gene product name (if gene identified)	5. Type of hearing impairment
2. Mutations and function Mutations Gene protein function (if known) Function change introduced by the mutation (if known)	6. Severity of hearing impairment
Origin of family Geographical origin of the family Ethnicity of family	7. Audiometric configuration
4. Pedigree and inheritance Pedigree figure Pattern of inheritance Penetrance Complicating factors	8. Frequency ranges
	9. Unilateral/bilateral
	10. Estimated age of onset
	11. Progression
	12. Tinnitus
	13. Vestibular symptoms and function
	14. Intrafamilial/interfamilial variability

Phenotype –genotype correlations- can we expect to find them? (Mazzoli M, Parving A., *in press*) : Indeed, there are only few cases in which a consistent genotype-phenotype correlation has been found. Although it cannot be expected that a certain classification of hearing impairment, configuration of the audiogram and involvement of specific frequencies will correlate 100% to a specific mutation in a gene, it has never been discussed and agreed upon what ‘correlation’ means

(Cremers CWRJ and Smith RJH, 2002). In 90% of the subjects homozygous for the 35delG mutation in Connexin 26 will have profound HI. But this is not always the case, and other gene mutations can result in profound HI (Cryns K et al., 2004).
From recent publications (Yasunaga S and Petit, 2000, Migliosi V et al, 2002, Rodrigues-Ballesteros M et al, 2003, Van Camp and Schmidt, 2004, Varga R et al, 2003, Van Camp and Schmidt, 2003), it may be cautiously stated that auditory neuropathy may be related to various mutations in the otoferlin gene, however the resulting phenotype may vary from mild to profound and the site of lesion may vary from preserved outer hair cells to affected inner hair cells and/or a combination of affection of the inner hair cells and auditory nerve/ pathways. Stating that there is a phenotype-genotype correlation - i.e. auditory neuropathy with various degrees of HI is the result of various otoferlin mutations- is far too unspecific and is impossible based on the available knowledge.
Results from a few studies seem to indicate a correlation between low frequency sensorineural hearing impairment (LFSNHI) and mutations in the WFS1 gene (also causing Walfram disease)(Bespalova et al, 2001,Cryns K et al, 2002, Young et al, 2001). Thus it may be stated that LFSNHI which has many different phenotypes (Parving et al, 2000) may be caused by many different genes with various types of mutations and no genotype/phenotype correlation within LFSNHI exists –so far. However does it mean that the audiologist should refer subjects with LFSNHI to genotype testing of the WFS1 gene?

*Guidelines and recommendations for testing of cx26 mutations and interpretation of result (*Mazzoli M, Newton V, Murgia A, Bitner-Glindzicz M, Gasparini P, Read A, Parving A, 2004*)* Hearing impairment due to Cx26 mutations is a prevalent disorder. Different mutations are known to be responsible for different phenotypes (Cryns et al. 2004), however clinicians working within ENT and Audiology are often unaware of the difficulties related to interpretation of results of Cx26 testing. In addition there are shortcomings in the genotype testing procedures and often the genotypes and the phenotypes are insufficiently described (Mazzoli et al., 2003).
Guidelines and recommendations trying to comply with problems concerning genotype-phenotype correlations and clinical interpretation of genetic results have been suggested since there are still no standardised procedures for testing of mutations in the Cx26 gene, addressing either sample selection or laboratory testing procedures.
Initial genetic testing could check for 35delG (also known as 30delG or c.35_36delG) and/or the other most frequent mutations in the background population. Unless the first screening identifies mutations on both alleles, testing should go on to screening the entire coding region and splice sites for mutations, and in addition the presence of GJB6/CX30 deletions should be checked.
If no Cx26 mutations are detected a genetic origin for the patient's hearing impairment cannot be excluded and further diagnostic evaluation may be needed.

*Guidelines and recommendations for identifying mitochondrial hereditary hearing impairment (submitted) (*Jacobs H, Zeviani M, Pikko I, Del Castillo I, Mazzoli M) both syndromic and non syndromic hearing impairment can also be caused by mutations of mitochondrial DNA. These disorders present a matrilinear inheritance but in small pedigree the pattern of inheritance many not be so clear. Furthermore, in some of these disorders, the mutation makes the subjecs susceptible to damage from ototoxic drugs (aminoglicosides). Therefore the hearing may deteriorate only after exposure to the antibiotics as in subjects with the A1555G mutation. The prevalence of mitochondrial mutations associated with hearing impairment vary between countries but may be significantly high. In Italy and UK these mutations collectively are found at quite significant frequencies: between 5-10% of all cases of postlingual familial or sporadic non syndromal HI. An obvious discrepancy in this pattern was found for the mutation A1555G which frequency in Spain is much higher (about 30% of all familial cases) than in any other European population (about 3%).

This has important clinical implications, since avoiding aminoglicosides can prevent the hearing loss, it might be important to test for these mutation before giving aminoglicosides.

Conclusions
It is still difficult to establish definite genotype-phenotype correlations. Selection bias is often found in even extensive reports on HHI, because most often the subjects with severe/profound HI are predominantly included in these studies being the patients mostly referred to the clinics and attracting major attention. On the other hand, subjects with mild to moderate hearing impairment or late onset hearing impairment are often misdiagnosed and the clinical traits are more easily confused with phenocopies of non genetic origin. In other reports the limited number of subjects/families included represent a limitation to understanding genotype-phenotype correlation. Finally, knowledge on the function of the gene in the ear, i.e. the function of the specific protein coded by the gene, as well as the effect that the various kind of mutations have on the protein function is incomplete. The answers remain in the future but can only be answered by filling the gaps between audiology and genetics, and only extensive collaborations will give the possibility to improve the knowledge in the field. The research task is enormous but may ultimately result in causal treatment of hereditary hearing impairment.

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SECTION 2 - LATEST NEWS

One of the tasks for the deafblind Usher-group was to present some guidelines concerning early visual balance and hearing testing.

VESTIBULAR TEST PROTOCOL

Group 3: C Aimoni, G Calabrese, P. Huygen, L. Luxon, C Moller, D. Monzoni, L. Odkvist, F Wuyts

IDENTIFICATION: Patient ID_____ Examination Centre_____

ANAMNESIS

Date of test _____d/mos/yr
Date of Birth _____d/mos/yr
Sex m/f
When was the child able to **walk** without help
_____months

Problems with

Walking in darkness	yes/ no/ unknown
Walking on uneven surface or in sand	yes/ no/ unknown
Gymnastics and sport activities	yes/ no/ unknown
Motion sickness	yes/ no/ unknown
Reading (visual fixation) during walking	yes/ no/ unknown
Age of onset of vestibular problems	_____yr

Vestibular symptoms

Acute attacks of vertigo
Character : rotational , linear , other_____
Duration of symptoms (1: < 1 months, 2: < 6 months, 3: < 1 year, 4: > 1 year)
____
Length of an attack (1: < 5 min, 2: < 20 min, 3: < 2 hrs, 4: < 12 hrs; 5: < 24 hrs; 6: > 24 Hrs) _____
Frequency of attack (1: once a year; 2 : twice a year; 3: once a month; 4 : once a week; 5 : more freq) _____
Associated **symptoms** : tinnitus , fluctuating hearing loss **,** nausea **,** other _____
Prolonged imbalance

Lateropulsion (tendency to fall sideways)	yes/ no/ unknown
Lightheadedness / faintness	yes/ no/ unknown
Unsteadiness / drunken feeling	yes/ no/ unknown
Oscillopsia (*unsteady visual image/field*)	
Unassociated with head movement	yes/ no/ unknown
Head movement induced	yes/ no/ unknown

History

Trauma including Whiplash	yes/ no/ unknown
Infection (e.g. Meningitis)	yes/ no/ unknown
Ototoxic drugs	yes/ no/ unknown

Perinatal problems (> 48 hrs in SCBU-Incubator) yes/ no/ unknown

Family History: Family members with balance dysfunction yes/ no/ unknown
Specify who, and what _____

CLINICAL EXAMINATION

Ear-nose and throat examination Normal/ Abnormal
Specify if abnormal _____
Cranial nerve examination Normal/ Abnormal
Specify if abnormal _____
Wide based gait *(eyes closed)* yes/ no

Nystagmus detection
Spontaneous nystagmus (on direct observation) yes/ no
Patient seated looking in primary gaze position
Spontaneous nystagmus (using Frenzel or goggles) yes/ no
Gaze-evoked nystagmus (*30 degrees left-right from mid position - naked eye*)yes/ no
Positional nystagmus (*lateral horizontal position*) yes/ no
Head-shaking nystagmus (using Frenzel or goggles) yes/ no
Fistula test (pressure in the ear canal) yes/ no / unknown

3. **TESTING**

Spontaneous nystagmus present in darkness : yes/ no
left - right beating ; slow phase velocity _____(deg/s)

Positional nystagmus (*lateral horizontal position*) in darkness : yes/ no
left - right beating ; slow phase velocity _____(deg/s)

Caloric testing (Bithermal-Binaural (250cc)) by preference and **for age > 4 years**
In darkness yes/ no
Right 30 °C (Maximal slow phase velocity) _____deg/s
Left 30 °C _____deg/s
Left 44 °C _____deg/s
Right 44 °C _____deg/s

Bilateral hyperactivity yes/ no

Bilateral hypoactivity yes/ no
(If total sum of 4 irrigations < 40 deg/sec in the dark, or if response is below own normative limits)

If hypoactive : is the patient bilateral areflexive yes/ no
(choose one of the following)
Tap water calorics (____ °C) during 60 seconds irrigation
Nystagmus present ? yes/ no
Ice water calorics (20 seconds)
Nystagmus present ? yes/ no

Labyrinthine asymmetry :
[(LW+LC)-(RW+RC)]/[LW+RW+LC+RC]*100= _____%

Nystagmus preponderance:
((LW+RC)(LC+RW)]/[LW+RW+LC+RC]*100= _____%

Recording mode of eye movements
Electro-oculography (electro-nystagmography) yes/ no
Video-oculography yes/ no
Other _____

For children < 4 yrs or those not cooperative with the above assessment, the presence or absence of vestibular function should be assessed by a rotational test in the dark, evaluating the nystagmus response.
[*Mark with a vertical line*]
No response |----------!Normal nystagmus

VESTIBULAR DIAGNOSIS

Vestibular Activity :	**Normal**
	Unilateral hypoactive Left
	Unilateral hypoactive Right
	Unilateral Absent Left
	Unilateral Absent Right
	Bilateral hyperactive
	Bilateral hypoactive
	Bilateral Absent
	Central involvement

If more advanced equipment is available a standard ENG/rotational protocol for the individual unit should be carried out and the results, together with normative data, valid for the laboratory should be faxed with the basic vestibular assessment to Claes Moller: fax 46.31.82.9811 Claes.moller@orlss.gu.se or Linda Luxon: fax 44.171.278.8041

SECTION 3 - ASSOCIATION CORNER

FACILITATING HEARING AND LISTENING DEVICES

Stefania Passi

Spring 2004 – an airport in Italy.
I'm waiting for my flight in what looks like a recently built airport with my hard-of-hearing friend (she wears a hearing aid and can speak very well). We are surrounded by a multitude of sounds – voices, the various sounds from travellers' mobile phones etc. The Easter holidays are approaching and we have to wait. Sitting comfortably on one of the airport couches, I notice the entrance to the "Sala Amica", a room where those with difficulty walking can find staff and equipment to help them. I see that on the well-cleaned floor there is a raised strip to help those who can't see get to the check-in. I hear an announcement that our flight has been delayed by one hour. In front of us there is a huge screen showing videos of the most famous popular singers – all very pleasant. My friend tells me that she understood almost nothing of what was said in the announcement because of the volume of sounds and voices and because of the poor audio quality and over-fast delivery of the announcement. She points out that if the video screen had shown the message as it was being announced, she could have easily understood it. She's right, what a waste of that giant screen! She is a keen traveller and she tells me that in Scandinavia, FM (radio microphone) systems are legally required in those offices where there is glass between the client and the clerk so that the hard-of-hearing can understand and that these systems are also present in the majority of churches. I am curious and ask for information from one of the major Italian and European suppliers about these systems to help the hard-of-hearing. When I ask how many systems have been sold in total and how many are being sold at the moment, they tell me that up until 15 years ago, they provided about 1500 individual FM systems every year but that in the last ten years there has been a drop in demand and now they sell less than a hundred a year. This firm has also installed group systems in some of Italy's theatres (for example the Teatro dell'Opera in Rome), but these had never been used and indeed the cards informing those wearing hearing aids that the system was available had never been put up. Our conversation finished with the information that the same firm had offered to install FM systems free in public places, but that this offer had been refused.
I then asked another famous Italian firm the same questions and got the same answers: that in the last three years, they had provided less than 50 units a year.
When I asked both firms for their comments on this, they both said that these aids are not regarded as important by the specialists, even though people with hearing difficulties think differently. But how well informed are the potential users?
When I did some research on a number of families and teachers through the Italian Association for Research on Deafness, I found that the vast majority of them had never heard of these systems. Others had heard they were very complicated to use and still others that they were too expensive. FM systems are one of the provisions given free, but, so my friend tells me, while in the Nordic countries different systems in different places are all compatible and therefore easy to use, in Italy she has found that her system is often not compatible with other makes. FM systems make things markedly easier for wearers of hearing aids in situations which are usually difficult because they completely eliminate background noise and distortions and make the incoming signal clear and therefore much more comprehensible. Imagine how useful they could be for a child at school, in canteens, in theatres, at the cinema etc.
Browsing on internet I find that the National Theatre in London has a page on its website dedicated exclusively to its hard-of-hearing audience and informs them that it has the following services: a service for looking after "hearing dogs" during the performance (www.hearing-dogs.co.uk) - that is dogs which are trained to tell their masters when there are noises; an interpreter service for deaf

people who use sign language; an infrared system built in to every seat, both for those who use hearing aids and those who don't; a system to guide people to bars, the buffet and other places or offices inside the theatre; a written text of the performance to facilitate understanding; captions during the performance which also show noises on stage and sound effects. These services should be available everywhere. However, even in England, not everything seems to work so well. In England (where there are about 9 million people with hearing problems) the RNID (Royal National Institute for Deaf people) conducted research by sending a profoundly deaf person to 23 tourist spots in London. It found that only 14% of theatres have sign language facilities, 4% have captioning and only rarely do cinemas provide English subtitles. Even when some services were available, there were no staff capable of operating the systems or no indication that the services were available. The Italian Association for Research on Deafness will conduct the same experiment in Italy and the results will be used to distinguish true structural barriers.
What are structural barriers? According to D.P.R. No. 503 of 24 July 1996, the regulation regarding the norms for eliminating structural barriers in public buildings, spaces and services, structural barriers means: a) any physical obstacles which restrict people's mobility, particularly those people who for whatever reason, have reduced or restricted mobility on a permanent or temporary basis; b) obstacles which limit or impede anyone from safe, comfortable use of spaces, equipment or components; c) lack of notices or signals which permit orientation and recognition of places or sources of danger for anyone and particularly for the blind, partially sighted and deaf.
These barriers may be of a *cultural* type (where things are denied rather than accepted, or where there is a tendency towards exclusion rather than acceptance of differences), but more obviously they are *physical barriers to communication and mobility*.
Let us not forget that cultural and physical barriers are connected in some way. Firstly, physical barriers are not there naturally, they are produced in the mind of the designer of a building, space or service before they ever appear in reality. Secondly, a stairway in a building, a separate service entrance, domestic appliances which are difficult for disabled people to use are not just technical hitches, they say : "this is not for you". On the contrary a space or an object which is accessible and aesthetically pleasing or a barrier which has been removed by an intelligent use of technology says: "come in, you're one of us".

The law goes on to say:

4. Offices, meeting rooms, conferences or shows, public telephones or other equipment such as lifts or telephones for deaf people, must bear, in a place which is easily visible, the international symbol of communication for the deaf as shown in appendix C.

Pardon my ignorance, but I've never seen this type of sign anywhere. Please let me know if you see one.
The Law continues to list a series of regulations for making all offices and public places more accessible to people with "reduced motor or sensory capacity". But what about we who work in the field, making use of and advising on what technology and the market can offer us? The example I gave of the London Theatre could be a starting point.
To go back to my questions to the managers of companies who supply aids for the deaf, they were convinced that these systems were seen as rehabilitation systems years ago whereas now they are seen only as aids. But what does "aid" mean? The Latin root "auxilium" shows that "aid" can be used in a wide context. An aid is apparatus, equipment or awareness which allows a disabled person to activate or empower their autonomy to the full with respect to their own needs and to the environment. It is a general term which can refer both to the physical world and to situations and strategies as well as to technical aids. So, "aid" means any product, tool, equipment, or technological system for specialised or common use available to a disabled person to prevent, compensate, alleviate or eliminate an impairment, disability or handicap.

Clinical equipment is not considered an "aid". Here we are interested in looking at technical aids which can be used to help functioning and not aids in the strict sense of those used for rehabilitation, teaching or diagnosis. However, there is a very thin line between rehabilitation or education and an aid when the latter can be the means of facilitating reception of information and making learning possible. I think this is the case specifically with regard to infrared and FM systems, that is devices which filter messages and make them more meaningful when there are difficult noise situations.
On the ENEA website (www.enea.it/Casa Intelligente/access systems for disability.htm) there is a list of current resources available for use at home to facilitate autonomy for the deaf. In essence, they are as follows:
* Visual signals. Their function is to transform simple sound signals into visual information which can be easily understood by a deaf person. There are numerous variations of this type of equipment for use in a domestic situation which are capable of a certain type of output to differentiate system messages (e.g. different colours, different frequencies of transmission and so on). With respect to the use of computers, it is possible to transform various warning signals into visual signs (like for example the 'beep' which indicates a hardware problem).

- Telephone communication systems. These have for a long time been the most important feature in the 'intelligent house'. They allow cable communication using both personal computers and autonomous systems. The equipment required is a telephone and a modem. Autonomous aids are provided with a support which is placed on the telephone receiver for reception/transmission of signals, a keyboard for writing the message to be sent and a screen or digital display for visual representation. These systems have a device which gives a visual signal when a call is received, can send pre-prepared messages to a certain number of users (for example to communicate when there is a dangerous situation), shows a visual signal for "line busy", can memorise some pages of the conversation and differentiate visually between incoming and outgoing messages (for example by using different characters). Almost all aids of this type come with a small inbuilt printer which prints out the conversations held.
- It must be pointed out that the main problem with these systems is that they can be used to communicate only with another user who has an identical or similar system. This is in fact, a severe limitation on the widespread use of the apparatus. However, the same functions can be easily carried out by using a personal computer with a modem. As well as the data processing and support functions which a computer offers (for example speed of communication), the big advantage is the widespread use of computer systems now and in the near future.
- Videophones. Videophones are obviously of great interest to deaf people. However, they have only recently begun to be used and marketed.

Research, early diagnosis of deafness, early intervention, improvements in cochlear implants are without doubt factors which now permit the ear to accomplish its extraordinary tasks of gathering sound information from the environment and constructing oral communication in a way which was impossible in the past. There are enormous challenges which require important commitments in terms of economic and human resources as well as time.
In my opinion, it is our duty, and I am talking to family associations, impaired people and rehabilitation therapists, to not only provide specialist support but also basic information on how to facilitate communication and achieve autonomy.

For more information:
http://voice.jrc.it/explor/explor97v/net97/_net97.htm
http://www.buckscc.gov.uk/care_of_adults/deafblind/index.htm
http://www.nationaltheatre.org.uk/?lid=1652
http://www.deaflympics.com
http://www.rnid.org.uk
http://www.royaldeaf.org.uk/
http://www.aad.org.au

SECTION 4 – MISCELLANEOUS

DESCARTES RESEARCH PRIZE 2004

Howy Jacobs

Our team of European researchers, working on mitochondrial biogenesis, ageing and disease (MBAD), and which includes members of the GENDEAF network, has been awarded the EU's Descartes Research Prize 2004. The prize is given in recognition of outstanding scientific research achieved by trans-national collaboration. MBAD shared this year's prize with a team of physicists, led by Dr Anders Karlsson in Sweden.

The work that has been recognized by the prize includes not only our discovery of disease genes involved in mitochondrial disorders, our demonstration of the role of mitochondrial DNA mutations in ageing, and our work on the replication and expression of the mitochondrial genome, but also the work we have done on mitochondrial DNA and hearing disorders. This includes our recently published results showing that over 5% of cases of postlingual hearing impairment in different European countries are attributable to mitochondrial mutations. GENDEAF, and the contacts established through it, have thus been instrumental in helping us to win the award.

Being awarded the Descartes Prize is of course a huge honour for all of those involved: not only myself as co-ordinator, but also the 4 other team leaders, Dr Massimo Zeviani of the Istituto Nazionale Neurologico 'C. Besta' in Milano, Dr Pierre Rustin of INSERM in Paris, Dr Nils-Göran Larsson of Karolinska Institute, Stockholm and Dr Ian Holt at the MRC in Cambridge. Dr Zeviani and Dr Holt have been heavily involved in the mitochondrial workpackage of GENDEAF, as well as other components of our research on mitochondrial disorders. Even more important than ourselves is the army of graduate students, postdocs and technicians who have done the actual lab work that has led us to be recognized in this way, as well as the many other teams across Europe who participate in our collaboration.

The sum of money involved (€700,000) sounds huge, but considering that it will be split amongst 5 research teams, and is to be used strictly in support of our research, is actually more like an ordinary research grant. Nevertheless, it will be very useful in helping us to recruit the very best postdoctoral scientists from right across Europe and beyond, to join with and contribute to our future research on mitochondrial disorders (including those affecting hearing) and finding ways to arrest disease progression.

We are very grateful to all those who have been associated with our research, and we look forward to future productive 'networking' with patients, clinicians and scientists of all kinds, in a setting like GENDEAF.

SECTION 5 - LETTERS

The "Gendeaf News" bulletin has had a very positive response from readers, particularly those affected by Usher and the deafblind people known to the Lega del Filo d'Oro, who are always interested to know about genetic diseases and to find out what the latest developments are in international research.

Dear Patrizia
I've been struck by the level of knowledge of the topics which have been dealt with. I was particularly interested in no. 2 which contained an article on cochlear implants. I would like to see this topic developed further to include discussion on implants for adults too. If you would like to know something about the experiences of adults who have had implants, please do not hesitate to contact me. Even though the articles in the bulletin are mainly written by experts, I'm sure that they could be enhanced by the inclusion of some of the experiences of the patients themselves. I would also like to know how we can collaborate and what our contribution can be to keeping this publication going.

Silvio

Dear Silvio,
Other readers have also asked us to include more on cochlear implants, so we have decided to include a specific article in section 4 of this issue. However, I think it is very important that people with cochlear implants can communicate with each other or exchange opinions and be available for others who want to have the operation to contact.
On our part we send the bulletin to private people as well as to national and international institutes and associations who work with deaf people.
We are also thinking about producing a collection of all the issues of the bulletin published during the Gendeaf Project in each of the languages of the partners. After this edition, there should be three more. The last one, in particular, will deal with the Gendeaf Project conclusions. Considering the very positive response from readers, we are looking into the possibility of continuing to publish the bulletin even after the end of the project.

Best wishes,

Patrizia

Dear Readers,
I would like to tell you not to hesitate to contact me for further information and/or clarification on the subjects included in the bulletin or any anything of interest to you on genetics and deafness in general.
You can contact me on: ceccarani.p@legadelfiloro.it- cd@legadelfilodoro.it
Telephone: +39 071/72451 (Lega del Filo d'Oro switchboard) +39 071/7245274 (Diagnostic Centre)
Fax: 071/717102

SECTION 6 - MEETINGS AND EVENTS

Final Meeting of the European Network GENetic DEAFnes, Caserta, ITALY 17-19 March 2005

The Vision 2005 Conference, London 4 – 7 April 2005 (www.rnib.org.uk/vision2005)

20th International Congress on the education of the Deaf, ICED2005, Maastricht, The Netherlands 17 – 20 July 2005

6th DbI European Conference on Deafblindness, Presov, Slovakia, 2-agosto 2005

The ICEVI European Conference 2005, Chemnitz, Germany 14-18 August 2005

The 1° International Educational Conference on Batten Disease, hosted by Resource Centre Vision, Orebro, Sweden, May 3 – 6 2006