

About TARGEAR

TARGEAR is a Marie Curie Industry-Academia Partnerships and Pathways action supported by the FP7-PEOPLE program (2014-2017).

Our consortium is constituted by experienced research groups in complementary fields ranging from the molecular to the clinical aspects of age-related hearing loss. Our main objectives are to develop a collaborative strategy between public research institutes and private companies, based in transfer of knowledge, to design and implement preclinical studies

for presbycusis as well as to contribute to the formation of early-stage researchers in the field of hearing loss. In December 2016's newsletter you will find an update on the project's scientific research, our latest activities, an agenda with upcoming events, a series of biographical sketches by TARGEAR members, and much more.

Prevention and treatment of hearing loss

- ➔ Worldwide, 360 million people are estimated to have moderate to profound hearing loss.
- ➔ Some inherited and acquired forms of deafness can be considered as rare diseases.
- ➔ Age-related hearing loss affects 40% of the population over 65 year-old and 70% of those in their 80s.
- ➔ There are no restorative treatments for deafness. Current treatments under research include pharmacological, genetic and stem cell therapies.

PREVENTION
AND TREATMENT
OF HEARING LOSS
IS AN UNMET
MEDICAL NEED

Innovative integrated strategies for the healing of age-related hearing loss

We recommend

Video on dissection and culture of chicken otocysts
repositorio.uam.es

Video on Auditory Brainstem Response (ABR) test
dropbox.com

TARGEAR Info YouTube Channel
youtube.com

MSCA Facebook:
Meet our fellow of the week!
facebook.com/Marie.Curie.Actions/

Midwinter meeting ARO 2017
www.aro.org

Asociación Española de Audiología (AEDA)
aedaweb.com

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Seventh Framework Programme (FP7) - PEOPLE Industry-Academia Partnerships and Pathways (IAPP) - Marie Curie Actions.
Call: FP7-PEOPLE-2013-IAPP.

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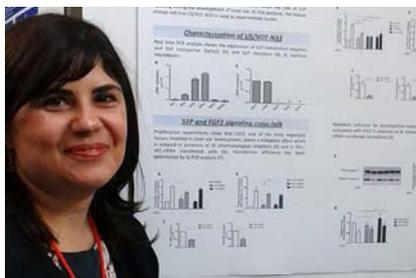
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'Hearing Across the Lifespan' Conference

Cernobbio (Italy), 2–4 June, 2016 · By **Ilaria Rizzo** (UNIFI)

The HEAL 2016 was held in Cernobbio, in the wonderful atmosphere of Lake Como. Ilaria Rizzo (TARGEAR secondee) participated in HEAL 2016 with a poster presentation about the role of sphingosine kinase/sphingosine 1-phosphate axis in FGF2-induced proliferation and survival of neuroblasts derived from the otic vesicle. The conference program included a broad spectrum of topics, such as the importance of the methods and the time of screening and hearing loss prevention, the development of hearing devices and cochlear implants, the basic research on hearing loss and the impact of hearing disorders in communicative, psychological and family issues. Furthermore, during the poster session time was dedicated to interactive discussions among participants. Ilaria



told us that she had the opportunity to meet the greatest experts in hearing care attending this event. She considers that attending HEAL 2016 conference has been a fruitful experience to increase her knowledge about the aetiology of hearing loss in children and adults, and about the research of new methodologies regarding hearing care across the lifespan.

9th International Symposium on Objective Measures in Auditory Implants

Szeged (Hungary), 15–18 June 2016



The 9th International Symposium on Objective Measures in Auditory Implants (OMAI) was held on 15–18 June 2016 in Szeged, Hungary, a city situated on the banks of River Tisza with a very pleasant climate which is therefore often called the city of sunshine. The Symposium was hosted by the Department of Audiology, University of Szeged. Many outstanding professors have been working at the

university, including Nobel Prize winner Albert Szent-Györgyi. Dr. Giacomo Mandruzzato (TARGEAR secondee from MED-EL to CSIC) gave an oral talk and presented a poster on this Symposium about the acquisition and analysis of ABR data in noise-exposed *Bhmt* null mice with the goal to study the effect of the deprivation of the BHMT enzyme (betaine homocysteine S-methyltransferase) in hearing,

Upcoming activities

ICT4AWE 2017

Porto (Portugal), 28–29 April, 2017

3rd International Conference on Information and Communication Technologies for Ageing Well and e-Health 2017 aims at a strong multilateral involvement of all the scientific community in all conference's topic areas, and we therefore encourage TARGEAR to submit a proposal for a 'European Project Space'. This space will provide an opportunity for EU funded R&D projects which deal with the emerging areas of ICT for Ageing Well and e-Health and Novel Approaches to Software Engineering, to present their current results and future plans and goals in the informal setting of demos, posters and panels at the same venue and simultaneously with several related conferences. The space has the purpose to provide EU projects several possibilities to connect with each other and engage in discussions about their respective research and development, establish opportunities for knowledge and technology sharing, and identify complementary activities and goals which can form the basis for future collaborations, researcher exchange or joint participant at events or in initiatives. Proposals are accepted until March 2. Registration to ICT4AWE allows free access to the **ICEIS 2017** conference (as a non-speaker).

7th Executive Committee Meeting and Workshop on Transference

Toulouse (France), May 2017

The 7th Executive Committee Meeting and the workshop 'How to transfer the knowledge into productive and commercial results, patenting, creation of spin-offs and intellectual property rights' will be organized during May by Affichem (exact dates and venue are to be confirmed). The workshop will focus on how to carry out the effective collaboration and transference between basic researchers and companies. All Members of TARGEAR are invited to attend this event.

Auditory Neuroscience Summer School

Madrid (Spain), 6–8 July, 2016 · By **Dr. Esperanza Bas**
(co-organiser and member of the University of Miami, USA)

The Auditory Neuroscience Summer School took place in the School of Medicine of the Autonomous University of Madrid ([visit website](#)). The workshop was organized by TARGEAR in collaboration with UAM-IdiPAZ (La Paz Hospital), CIBERER (Biomedical Research Center of Rare Diseases) and SEORL (Spanish Society of Otolaryngology). More than 30 international scientists and physicians interested in the field of otolaryngology participated in this event directed by Professors Avendaño and Varela-Nieto and Drs Bas, Murillo-Cuesta and Lassaletta. This practical oriented workshop was conducted in a casual environment, where professors and students interacted at all times, and networking between all participants was encouraged. The morning lectures as well as the afternoon laboratory practices were taught by a selected group of distinguished professors from national and international universities and research centers: Professor Avendaño and Drs. Lassaletta, Magarinos, Leon and Frago from UAM, Professor Varela-Nieto (TARGEAR) and Dr Murillo-Cuesta from CSIC, Professors Alvarado and Fuentes from University of Castilla La Mancha (UCLM), Dr. Milo from University of Sheffield (UK) and Dr. Bas from University of Miami (USA). During the morning lectures the students learned about the inner ear anatomy and physiology,



development, techniques and animal models as well as human auditory implants. The laboratory practices took place in the new and modern dissection room that the Department of Anatomy, Histology and Neuroscience has at the medical campus of the UAM. Each pair of students was assigned dissection tools and one of the latest models of Zeiss dissection microscopes which included a screen to monitor their practice. During the wet-lab practices the students learned first-hand and performed the dissection of the chicken otocyst and organ of Corti from rat pups, transtympanic drug administration in an adult rat, electrophysiological recordings and computational analysis of gene expression. All the participants were invited to the closing ceremony that included an exquisite dinner offered at the magnificent '[Residencia de Estudiantes](#)', a heritage place that hosted illustrated minds from the fields of arts and sciences, such as Garcia Lorca, Dali, Ochoa and Buñuel, to name a few.

Upcoming activities

13th EFAS Congress

Interlaken (Switzerland), 7–10 June, 2017

The European Federation of Audiology Societies (EFAS) is a non-profit organization, formed as a federation of national audiology societies in the European countries founded about 20 years ago. The EFA's Congress is held biennially and it is one of the significant events on genetics, cochlear implants, audiology, Tinnitus, psychoacoustics, audiology diagnostics, audiological rehabilitation and hearing areas. The program of the [EFAS 2017](#) includes oral and poster presentations plus free papers covering the most current topics in audiology, as well as excellent plenary sessions and lectures with distinguished international scientists. TARGEAR Profs. Isabel Varela-Nieto (CSIC) and Josef Syka (BIOMED) will chair a structured sessions of the congress. This year more than 800 colleagues will meet up at Interlaken for EFAS 2017. We look forward to seeing you in Switzerland!

Mediterranean Neuroscience Society 2017

Saint Julians (Malta), 12–15 June, 2017

The MNS meetings have proved to be highly beneficial, not only for the scientific exchanges, but also in terms of training opportunities for students and young researchers. Research on brain function in health and disease is among the priorities for today's societies, and several indicators put the Mediterranean research area among strategic issues for the European Union (EU). Many South-North collaborations and networks have emerged in recent years through bilateral and multi-lateral actions, supported by the EU or by international and national actions, whether for setting up teaching curricula (Tempus programs), or by building human potential (H2020 programs). TARGEAR will organise a symposium titled 'Understanding and protecting progressive hearing loss'. For more information, [check the website](#).



6th Executive Committee Meeting

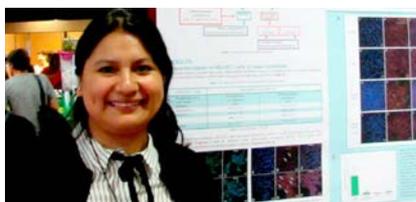
Montpellier (France), 21 September, 2016

The 6th Executive Committee Meeting was organised by the Affichem team and it was chaired by Dr. Nicolas Caron (AFFICHEM). The event took place in the Crowne Plaza Montpellier Corum Hotel.

53rd Inner Ear Biology Workshop

Montpellier (France), 17–21 September, 2016 · By **Dr. Blanca Cervantes** (CSIC)

The scientific programme covered such different topics as physiopathology of auditory pathway, innovative therapies of the inner ear or the most recent developments in genetics of deafness. Dr. Blanca Cervantes, postdoctoral research fellow Marie Curie in the TARGEAR project, attended this event as part of her academic training in auditory neurobiology. In this congress she presented a standardized cellular model for screening of the potential otoprotective properties of new pharmacological drugs. For the standardization of this cellular model she used a molecule with a known mechanism of action. The IEB was an excellent workshop, which gave young scientists an opportunity to present their work and receive feedback from specialists in the area of inner ear biology. In fact, Blanca considers that her



attendance and participation in this workshop was very important for her training because it allowed her to interact with top European researchers in the field. Besides Blanca, this edition of the IEB workshop counted with posters and oral presentations by many TARGEAR members. A few of them fruit of collaborations and secondments, as those presented by Dr. Nicolas Caron (seconded from Affichem to CSIC) and Miguel Díaz Gómez and Dijana Mitrovic (seconded from MED-EL to BIOMED).

International Symposium: 'International platforms for biomedical research: A focus on rare diseases'

Madrid (Spain), 3–4 November, 2016 · By **Dr. Silvia Murillo-Cuesta** (CSIC-CIBERER)

The International Symposium: 'International Platforms for Biomedical Research: A Focus on Rare Diseases' was held at the Ramón Areces Foundation. This event was organized by the Biomedical Research Center of Rare Diseases Network (CIBERER) with the support of the Ramón Areces Foundation. The objective of this meeting, in which representatives of Spanish, French, British, German, British, Dutch and American laboratories participated, was to encourage the interaction between members of national and international platforms of information, biobanks, bioinformatics and phenotyping of genetically modified mice. The symposium was divided in four sessions in which the following subjects were developed: 1) Platforms of phenotyping, generation and archiving of mice; 2) Generation and analysis of genomic and

proteomic data; 3) Rare diseases in information systems and biobanks; and 4) Bioinformatics Platforms for the study of rare diseases. Altogether, the sessions covered the evolution of technology and the supply of available resources in these areas, making it especially interesting for early stage researchers. This meeting was coordinated by Prof. Isabel Varela-Nieto (CSIC-CIBERER) and deputy coordinators Drs. Joaquín Dopazo (Prince Felipe Research Center), José M^a Millán (Instituto de Investigación Sanitaria La Fe) and Francisca Sánchez (University of Malaga).

Upcoming activities

TARGEAR's editorial initiative: 'Hormones and Neural Aging: Lessons from Experimental Models'

TARGEAR has launched a new editorial initiative in the open access journal 'Frontiers in Ageing Neurosciences'. The research topic is 'Hormones and Neuronal Aging: Lessons from Experimental Models' and the editors are Profs. Isabel Varela-Nieto (CSIC), Luis Miguel García-Segura (CSIC) and Dr. Julie A. Chowen (Niño Jesús University Children's Hospital, Madrid, Spain). The relationship between the hormonal status and neural aging has been studied in different contexts, from metabolism to reproduction. Neural aging is associated with modifications in the levels of different peripheral neuroprotective hormones, as it is also affected the sensitivity of neurons and glial cells to respond to peripheral metabolic signals. In turn, neural aging affects the control exerted by the hypothalamus on peripheral endocrine glands and body metabolism. Therefore, the feed-back loops between the brain and the body are progressively altered during the aging process, contributing to neural dysfunction. This new topic of Frontiers wants to connect these studies with the current knowledge on the neurodegeneration of brain and sensory systems that takes place alongside aging. Molecular pathways implicated in the decreased cell renewal, cell senescence and cell death, as well as potential strategies to promote healthy brain aging and rejuvenation will be presented.



ME-DEL on 'a hearing bus'

Innsbruck (Austria), 11 May, 2016 · By **Mario Walser** (MED-EL)

One of TARGEAR's main objectives is to raise awareness about hearing loss and treatment options, especially for the elderly. Therefore MED-EL organized informative meetings and workshops for local ENTs and care staff from the nursing homes. We visited schools with providing lectures and invited classes to MED-EL's research and production facilities. Together with the Tirol Kliniken a hearing bus was designed. This bus was placed in Innsbruck's pedestrian zone. MED-EL measured the hearing thresholds of 455



mainly elderly people, followed by one-on-one consultation from the hospital's audiologist Viktor Koci.



AFFICHEM participated in the 'Made in 31' festival

Toulouse (France), 4 June, 2016

The 'Made in 31' festival was held on June 4 at the 'Quai des Savoirs' (The Knowledge Docks), the new center for dissemination and exchange of scientific, technical and industrial culture in Toulouse. This initiative was organized by the Toulouse Junior Chamber and supported by the Toulouse Chamber of Commerce and Industry, as well as other private partners (Toulouse Métropole and the Quai des Knowledge and companies such as FICAM, FEDER, Veolia and Bouygues Energies and Services). Over time, in the department of Haute-Garonne (also known as Department 31) have emerged remarkable and innovative companies, however, many of these companies are still unknown to the local general public. The Junior Chamber wanted to encourage with this festival the meeting between the citizens and the successful companies of department 31 with the aim of publicizing the economic vitality of this department as well as promoting a stronger local support. The event was a showcase of 31 companies of the department of Haute-Garonne which offered different activities to the

public. Affichem is a biotechnology company of Toulouse that works on the development of candidate drugs for the treatment of neurodegenerative diseases, particularly to treat deafness. There is currently no drug treatment option in the fight against hearing loss and thanks to its innovative R & D program for the development of Dendrogenin B (AF243), a drug candidate for the treatment of deafness, AFFICHEM was selected to participate in the 'Made in 31' Festival. AFFICHEM organised an activity titled 'Do not turn a deaf ear: support our research against deafness'. To carry out this promotional activity, Affichem scientists and Dr. Blanca Cervantes (seconded) built a funny road map with games linked to the theme of deafness. The use of French and Spanish was very welcomed by the public. The 'Made in 31' festival was a success to promote the 'TARGEAR consortium' and our thematic on 'Deafness'. The activity organised caught the interest of adults and children, in fact, AFFICHEM reached the second place at the trophy 'favourite company for the public'.



TARGEAR's participation in the European Researchers' Night 2016

Madrid (Spain), Firenze (Italy) and Toulouse (France), 30 September 2016

The European Researchers' Night takes place every year all over Europe and beyond the last Friday of September. In 2016, these popular science events happened on Friday September 30. The activities organised were an opportunity to meet researchers, talk to them, and find out what they really do for society in interactive and engaging ways. This year Prof. Isabel Varela-Nieto (CSIC) together with the [Spanish Society of Biochemistry and Molecular Biology](#) organized the European Corner in the 'Instituto Cervantes' Madrid (Spain), the statistic of Spanish organizations participating in Marie Curie Action was presented in a poster, as it was TARGEAR as an example of an action Marie Curie funded by

the European Union. Meanwhile in Firenze, TARGEAR was represented by Dr. Francesca Cencetti (UNIFI) in the event 'Brilliant Researchers Impact on Growth Health and Trust in Research' (BRIGHT). She gave the lecture 'Innovative strategies for the treatment of hearing loss', which described the TARGEAR project and explored the role of sphingosine 1-phosphate signalling pathway in inner ear biology. In Toulouse, AFFICHEM was at the Researchers Corner where a European officer visited the Affichem Box dedicated to their research on deafness and their program TARGEAR. Dr. Blanca Cervantes actively participated in the event and was later selected as [MSCA fellow of the week](#).



XVI Science Week: Round table on Tinnitus

Madrid (Spain), 14 November, 2016

The Science Week in Madrid is an event that aims to stimulate the knowledge of science and technology among citizens by opening the scientific spaces normally closed to visitors. TARGEAR joined this celebration organizing the 'Round table on tinnitus: mechanisms, evaluation, clinical and sound therapies' which took place on 14 November, 2016, at the Institute of Physical Technologies and Information (ITEFI-CSIC). The round table was focused on the latest advances that have been made on tinnitus, both in the field of scientific research and in clinical practice, which are being carried out in the Marie Curie Action TARGEAR. Dr. Pedro Cobo explained to the audience the TARGEAR project, Dr. Luis Lassaleta ([La Paz University Hospital](#)) talked about the role of ENT specialist in the treatment of Tinnitus patients and on the available therapeutic approaches. He defended the use of hearing

aids to mitigate Tinnitus. Two members of the clinic ACURE, specialised on Tinnitus and Hyperacusis, also participated on the round table: the psychologist Cintia Gonzalez and the audiologist Isabel Diges. M. Jesús García León from the '[Affected by Tinnitus Association of Madrid](#)' talked about the difficulties, individual and collective, of the management of Tinnitus. Finally, Dr. Pedro Cobo (CSIC) presented the current therapies for Tinnitus and explained that to date there is no drug approved by the FDA to treat Tinnitus, although currently there are several clinical trials ongoing. The [Spanish Meniere's Syndrome Association \(ASMES\)](#) attended the round table as a listener to transmit to its members the contents disseminated on this event.



TARGEAR was on the radio

Madrid (Spain), 2 and 23 November, 2016

'Among test tubes' and 'The laboratory of JAL' are two scientific programmes broadcasted by the Spanish National Radio 5. Both programmes are presented and directed by Dr. José Antonio López Guerrero, professor and researcher of the Department of Molecular Biology of the Autonomous University of Madrid and Director of Scientific Culture of the Severo Ochoa Center for Mo-

lecular Biology. Prof. Isabel Varela-Nieto (CSIC) participated on the edition of the programme 'Among test tubes' emitted on November 2. The topic was biomedicine and the cure of rare diseases, which include deafness ([listen programme](#)). 'The laboratory of JAL' issued on November 23 was dedicated to TARGEAR and deafness in our elders ([listen programme](#)).

Interview in the 'ConCiencia' TV programme

Madrid (Spain), 15 November, 2016

Several members of TARGEAR were interviewed in 'ConCiencia', a programme of the Spanish TV channel 'Telemadrid' that brings science and technology in an open and accessible way. TARGEAR participated on the programme broadcasted on November 15th and 20th 'Barriers out!'. The programme showed the intense struggle to achieve the goal of a world without barriers and explored the rela-

tionship between disabilities and science. On this context, Dr. Javier Gavilán (Head of the Otorhinolaryngology Service of the Hospital de la Paz and member of TARGEAR SAB), Dr. Julio Rodrigo Dacosta (General Director of MED-EL Spain and Portugal) and Prof. Isabel Varela-Nieto (CSIC_CIBERER) spoke about deafness, cochlear implants and otoprotective drugs. You can [see the programme on YouTube](#).

Blanca Aurora Cervantes: Fellow of the Week on the MSCA Facebook Page

16 December, 2016

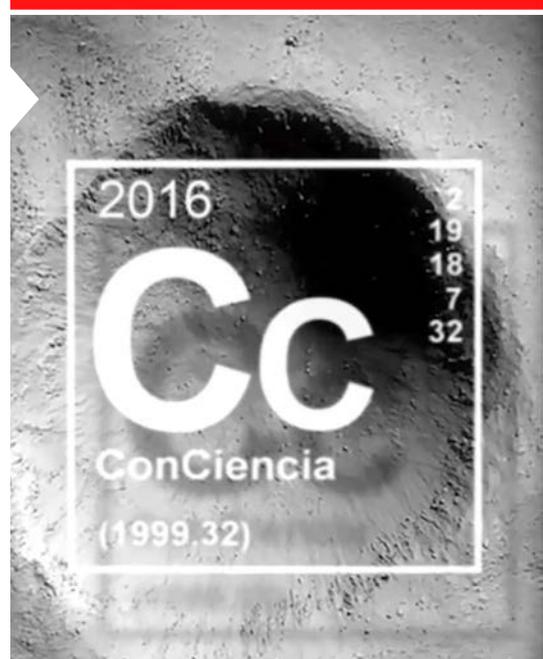
The European Commission has two social networks related to the Marie Skłodowska-Curie Actions (MSCA), Facebook and Twitter, and each week a post dedicated to a Marie Curie Fellow is published on these networks. On December 16, our postdoctoral research fellow at the Hearing Neurobiology Laboratory of CSIC, Dr. Blanca Aurora Cervantes Sánchez, was selected as [Marie Curie Fellow of the](#)

[week](#). In the post published in these social networks, Blanca presents TARGEAR, explains that her work deals with developing cellular models for the study of the activity of new molecules with therapeutic potential in the treatment of age-related hearing loss. Blanca also comments her personal experience as MSCA researcher and participant in the European Researchers' Night.

radio 5
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El laboratorio de JAL

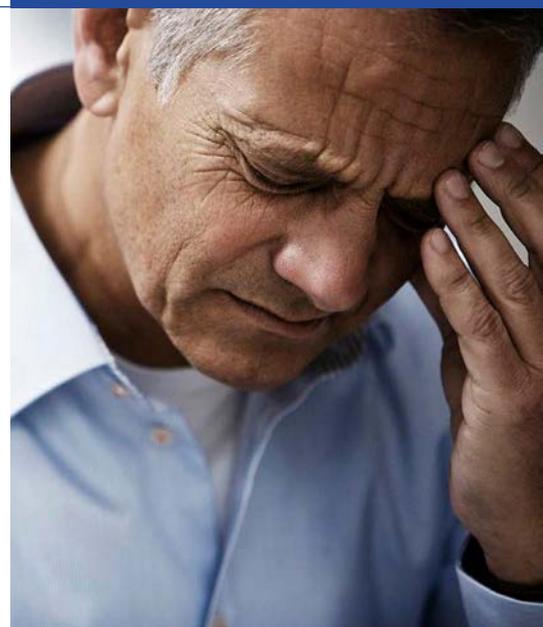


Tinnitus a component of hearing ageing

By **Dr. Pedro Cobo** (CSIC)

Tinnitus is the auditory perception of sounds in the absence of any external source. Tinnitus that occurs every day for more than 5 minutes is reported by 10–15% of the population, and for 1 to 2% it is a handicap that interferes significantly with their quality of life (severe tinnitus). Despite the intensive research into therapeutic options, including surgery, pharmacotherapy, and electrical and acoustical stimulation, there is not an approved treatment for Tinnitus at present. Although the exact origin of tinnitus is still unknown, it seems to be the correlate of maladaptive attempts of the brain at reorganization due to distorted sensory input (brain plasticity). This theory is consistent with the fact that most Tinnitus is associated with hearing loss. TARGEAR also wants to cope with Tinnitus, as it is a Project which long-term objective is to develop a stronger biomedical research in hearing loss.

Two challenging research issues concerning tinnitus are being investigated within TARGEAR: sound therapies and objective measures. Acoustical therapies try to take advantage of the brain plasticity, stimulating properly the auditory system to produce tinnitus relief. An Enriched Acoustic Environment (EAE), which can be played also through Cochlear Implants, has been designed for Tinnitus patients. Since Tinnitus is not apparent to others, there currently not exist objective procedures for its diagnosis. Its loudness, frequency and severity are usually assessed in basis on the subjective report of the patient. Therefore, the search for an objective measure of such pathology is nowadays one of the challenges in tinnitus research. But the audiologists have some tools to look into the auditory system. One of them, the Auditory Brainstem Response (ABR), consists of recording in electrodes



over the scalp the electrical activity evoked by acoustic stimuli at the auditory periphery. Thus, the potential use of ABR as a tool for objective diagnosis of Tinnitus is also being investigated within TARGEAR. This research is being carried out in close collaboration with MEDEL and BIOMED, two partners of the TARGEAR Consortium.

Mouse models to understand age-related hearing loss

By **Dr. Giacomo Mandruzzato** (MED-EL) secondee at CSIC

During my TARGEAR secondment at the Institute of Biomedical Research 'Alber to Sols' (CSIC-UAM) in Madrid, I participated actively in the acquisition and analysis of ABR data in noise-exposed Bmt null mice with the goal to study the effect of the deprivation of the BHMT enzyme (betaine homocysteine S-methyltransferase) in hearing. From previous experiments, it is known it increases the level of homocysteine (Hcy) leading to increasing hearing threshold, oxidative stress on the cochlear metabolism, leading eventually to hearing loss (HL). The data collected and analysed during my secondment at CSIC-UAM (y. 2015) were presented at the 9th International Symposium on Objective Measures in Auditory Implants in Szeged, Hungary, in form of poster and oral talk. This work was

one of the few works at the symposium where audiological objective measures responses have been confirmed by histological examinations. The role of objective measures in audiology is gaining more and more interest from the experts in the field because of the possibility to judge non-invasively and accurately the physiology of the ear and auditory pathway. Moreover, these experiments are of high value because histological and gene expression analysis could have been done eventually on cochlea samples, rarely done in human experiments, with the possibility to investigate the correlation with electrophysiological mea-

surements. Additional experiments and data will be performed to confirm the results gained in this trial. The long term goal is to understand the mechanisms involved in the age-related HL (ARHL) and noise-induced HL (NIHL) on the human ear.



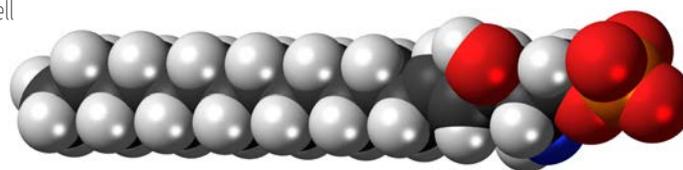
Sphingosine 1-phosphate

By **Dr. Chiara Donati** (UNIFI)

Bioactive sphingolipids, once considered inert structural components of cell membranes, are now emerged as crucial regulators of biological processes, such as cell proliferation, differentiation and survival. In particular, sphingosine 1-phosphate (S1P) is a pleiotropic bioactive sphingolipid that derives from the catabolism of sphingomyelin and plays key roles in the regulation of physiological and pathological functions. S1P is intracellularly produced by the enzyme sphingosine kinase and can be irreversibly degraded by the action of S1P lyase or reversibly dephosphorylated back to sphingosine by the action of specific S1P phosphatases. S1P exerts many of its action consequently to its export mediated by the specific transporter SPNS2 and its ligation to S1P specific G-protein coupled receptors, S1PR1-5. S1P can also act inside the cell activating a number of intracellu-

lar recently identified targets. Our research group is devoted since many years to the elucidation of the biological role of S1P signaling axis in different cell contexts such as skeletal muscle precursors, cancer cells, adipose-tissue derived mesenchymal cells and mesodermal precursors named mesoangioblasts. A crucial role for S1P signaling in inner ear biology has recently emerged. Mice lacking S1P2 or SPNS2 are profoundly deaf, the receptor and the transporter respectively are indeed required for auditory functions and for the maintenance of cochlear viability. Moreover, the activation of S1P2 with selective receptor agonists has been demonstrated to increase cell viability and reduce cisplatin-mediated cell death by reducing oxygen reactive species, suggesting that S1P2

may serve as a therapeutic target for attenuating drug-mediated ototoxicity. Recently, novel mutations in S1P2 gene in consanguineous patients with hearing loss have been identified, highlighting the concept that S1P signaling axis contribute to the aetiology of hearing impairments in humans. Thanks to the TARGEAR project, our research group focuses on the characterization of the biological role of S1P signaling pathway in inner ear progenitor cells and on the dissection of the involved molecular mechanism of action that will likely lead to the identification of possible novel therapeutical approaches to prevent cochlear degeneration during hearing loss.



Multimedia resources

Dissection and culture of chicken otocysts: 'The chicken embryo as an experimental model in Hearing Neurobiology'

Drs. Yolanda León and Laura M^a Frago from the UAM have generated an educational resource, a video, showing how to dissect and culture the otocyst from the chicken embryo. The inner ear is the sensory organ responsible for hearing and balance. The development

of the inner ear is very similar in all vertebrates, although the final morphology shows considerable differences. This video was prepared for TARGEAR Summer School and it is now available in our [YouTube channel](#) as well as in the [website of TARGEAR](#).



Auditory Evoked Brainstem Response (ABR)

Prof. Isabel Varela-Nieto (CSIC) and Dr. Silvia Murillo-Cuesta (CSIC-CIBERER), among others, have generated a second educational video on the Auditory Brainstem Response (ABR) test. This is a widely used electrophysiological technique for diagnosing hearing impairment

in both patients and animal models. It uses surface electrodes to record the electrical signal produced in auditory pathway, especially along the brainstem, in response to sound. The educational video is available in TARGEAR's [YouTube channel](#).



Jiří Lindovský

Secondee from BIOMED to MED-EL

[→ Read more](#)

Dr. Jiří Lindovský is a junior researcher in the Institute of Experimental Medicine, the Czech Academy of Science, Prague (BIOMED). In the Department of Auditory Neuroscience led by Prof. Josef Syka he has participated in several projects covering both, the hearing periphery (inner ear) as well as the central part of the auditory pathway (brain stem, inferior colliculus, auditory cortex). Being educated as biologist he specialized in electrophysiological methods such as patch-clamp, intra- and extracellular recording and (auditory) evoked potentials. In the current time he is focused mainly on the acoustical environment and its influence on the central nervous system during early postnatal period of life in laboratory rats. His attention was brought to auditory science several years ago thanks to his main personal hobby: sound 'hunting'. His passion for abstract sounds of objects, animals or environments naturally boosted his interest in questions related to how animals and people perceive sound or

how sounds are used in communication. Do we need to learn to hear, can we improve it by exercising? How is it possible that even the most complex and abstract sounds such as the bubbling of a water stream are immediately recognized by our ears and are capable of evoking a whole bunch of brain processes including strong emotions? Personal experience with the 'pleasure of listening' was the motivation for him to seek and luckily find a laboratory where hearing would be the key research topic. During the year 2016 he had the opportunity to participate in TARGEAR, which allowed him to look at hearing yet from another perspective. The perspective of practical medical problems related to hearing impairment and the possibilities of cochlear surgery. He spent two months in Innsbruck (Austria) in the Electrode Development R&D department of MED-EL, one of the main producers of cochlear implants, led by Dr. Claude Jolly. He took a part in a project aiming at development of a special type of electrode



that would be used as a measuring tool during cochlear implantation and that should help surgeons to take responsible decisions during the surgery. He worked mainly on analysis of electrophysiological data. Specifically, his task was to categorize and quantify useful information that can be extracted from so called endocochlear potentials measured during cochlear implantation in animal models. This collaboration represented to him an occasion to witness the process of bringing outcomes of basic research work into the real world of medical application.



Caterina Bernacchioni

Secondee from UNIFI at Affichem

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Dr. Caterina Bernacchioni was secondee from the University of Florence to Affichem SA in 2016, where she conducted in vitro preclinical studies on the employment of defined chemical compounds to prevent hearing loss. The research focused on the mechanism of action of AF243, a new drug candidate developed by Affichem for prevention/treatment of deafness. In particular, using different experimental approaches, she evaluated the possible involvement of sphingosine 1-phosphate signaling in the biological actions of AF243 both in human and murine neurons. She joined Prof. Paola Bruni's group at UNIFI, many years ago. The University of Florence is an important and

influential centre for research and higher training. It is one of the largest and most productive public research systems in Italy. This result is accomplished thanks to the number of permanent and temporary researchers working in a wide range of disciplinary and scientific fields. It is also due to an intense participation in research programs of national and international relevance and to the significant scientific results achieved. She is a member of the Lipid Cell Signaling and Biology Lab, where the involvement of bioactive sphingolipids in hearing loss is investigated in order to unravel new pharmacological targets for prevention and/or innovative therapies of deafness.