

# SENSORION

Unlocking The Potential Of Advanced Therapies For Hearing Loss

January 2025

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## **Sensorion**

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## Establishing Global Leadership In Hearing Loss With Strong And Diversified Pipeline

- Unmet clinical need: 1.5bn people affected by hearing loss (HL)
- Multiple causes: genetic, environmental, idiopathic
- Modality agnostic approach to hearing loss disorders
- World-leading and exclusive partnerships
- Gene therapies (GT): SENS-501 and GJB2-GT
- Prospective Natural History Studies
- Small molecule SENS-401
- Multiple indications
- Multiple upcoming clinical milestones
  - 68 FTEs, listed on Euronext Growth
- Leading blue-chip life sciences shareholders

Market: Euronext Growth Ticker: ALSEN Market Cap: €207M Cash balance: c.€87M\* \*as of June 30th 2024; provides runway until end of 2025

# **Sensorion** Portfolio Of Advanced Hearing Loss Therapies

	Product	Indication	Discovery	In-vivo POC	Preclinical	Phase 1	Phase 2	Phase 3	Milestones (estimated)
	SENS-501*	Otoferlin Deficiency				Phase	e 1/2		2nd Cohort Completed in H1 2025
STORE	GJB2-GT*	Adult Onset (presbycusis)							CTA/IND Enabling Activities
Gene merap	GJB2-GT*	Pediatric Progressive							CTA/IND Enabling Activities
	GJB2-GT*	Congenital Onset		1			1 1 1 1		CTA/IND Enabling Activities
	SENS-401	Hearing Preservation after CI						Cochlear*	Ph2a Primary Endpoint Met
TREAT & PREVENT	SENS-401	Cisplatin-Induced Ototoxicity							Recruitment Completed H1 2025
TREAT	SENS-401	SSNHL					1 1 1		Exploring Partnering Opportunities

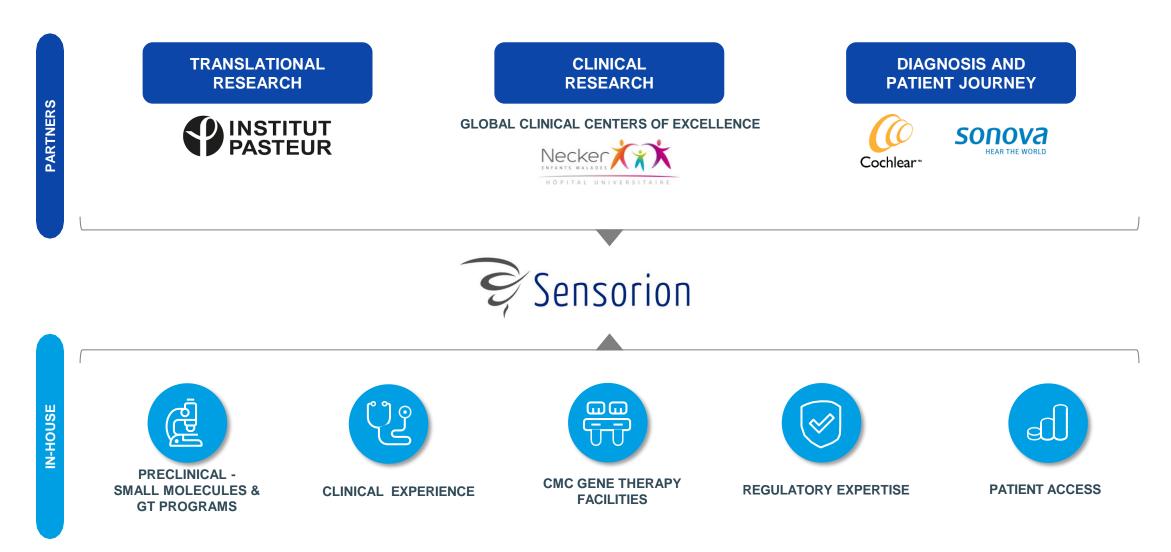
3SBio has a right of first refusal with respect to licensing in Greater China of SENS-401 (except in combination with cochlear implants) and SENS-501 OTOF-GT

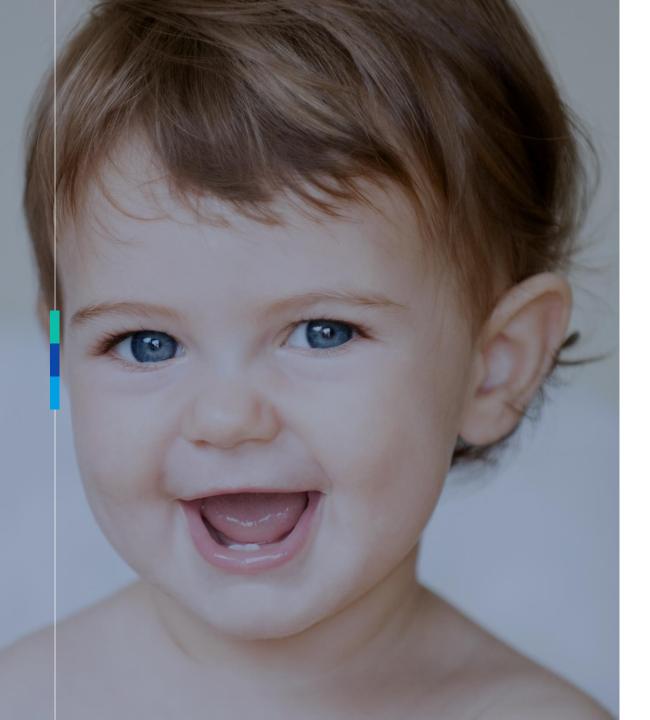
\*Option to obtain a licence from the Institut Pasteur (pre-defined financial terms and other terms to be negotiated)

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### **Sensorion**

Best-In-Class Partners And Internal Capabilities To Transform Standard Of Care







# GENE THERAPY PROGRAMS

## Sensorion Gene Therapy Programs Target Rare Auditory Diseases

### FIRST PROGRAMS RESULTING FROM THE INSTITUT PASTEUR COLLABORATION

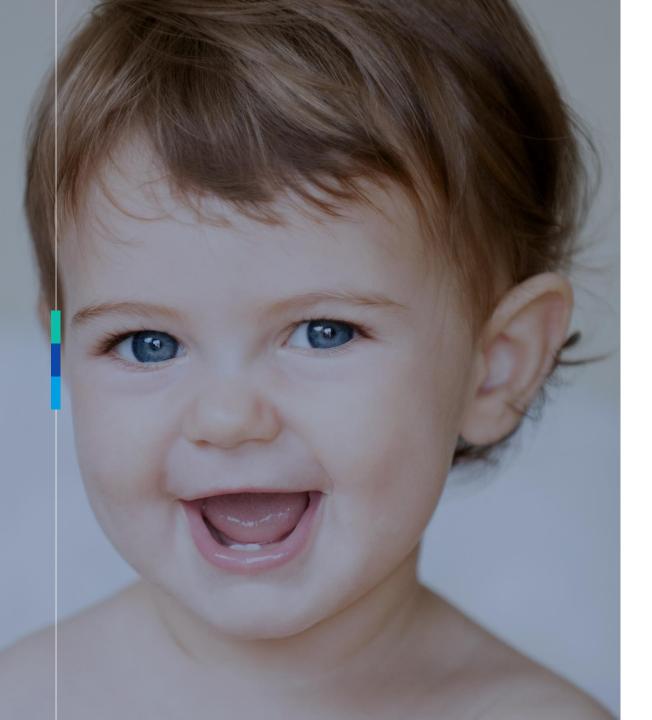
OTOFERLIN DEFICIENCY	GJB2-RELATED HEARING LOSS
<ul> <li>Pediatric patients with mutations in OTOF suffer from severe to profound sensorineural prelingual non-syndromic hearing loss</li> <li>Otoferlin deficiency could be responsible for up to 8% of all cases of congenital hearing loss</li> <li>Prevalence ~20,000 in the USA + EU</li> <li>Incidence ~1,100 per year in USA + EU</li> <li>EU and US Orphan Disease Designation, US Rare Pediatric Disease Designation</li> <li>Pediatric Investigational Plan Agreed in EU</li> </ul>	<ul> <li>We have identified three forms of hearing loss associated with GJB2 gene mutations:</li> <li>Early onset of severe presbycusis (adult population)</li> <li>Childhood onset (pediatric population)</li> <li>Congenital onset (pediatric population)</li> <li>~100,000 patients between 30- and 69-years old thought to be affected by a monogenic form of presbycusis due to GJB2 mutations</li> <li>Prevalence of congenital and childhood onset forms are estimated to be around 200,000 patients as around 50% of autosomal recessive non syndromic hearing loss cases are thought to be from GJB2 mutations</li> </ul>

 $\approx$ 

**Current Standard Of Care Is Cochlear Implantation** 

### Gene Therapy Has A Life-Changing Potential For These Auditory Diseases

Sources: Akil et al. 2019 (<u>link</u>), Orphanet (<u>link</u>), NIH (<u>link</u>), company estimates based on publicly available population data, Chardan 2020 report, Bryan, Garnier & Co 2019 report, Institut Pasteur, Boucher et al. 2020 (<u>link</u>)

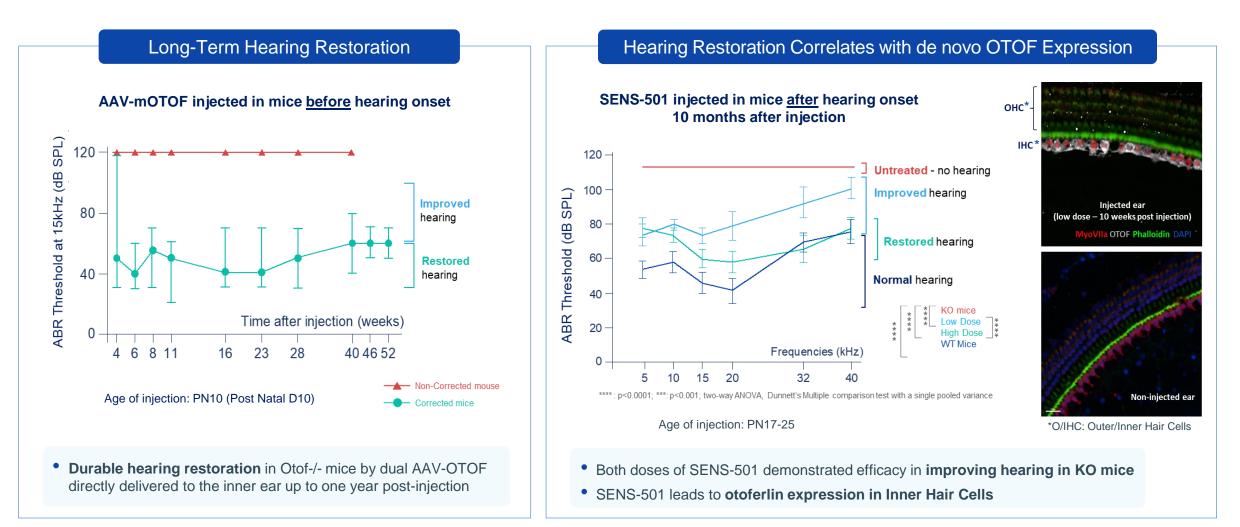




# OTOFERLIN DEFICIENCY

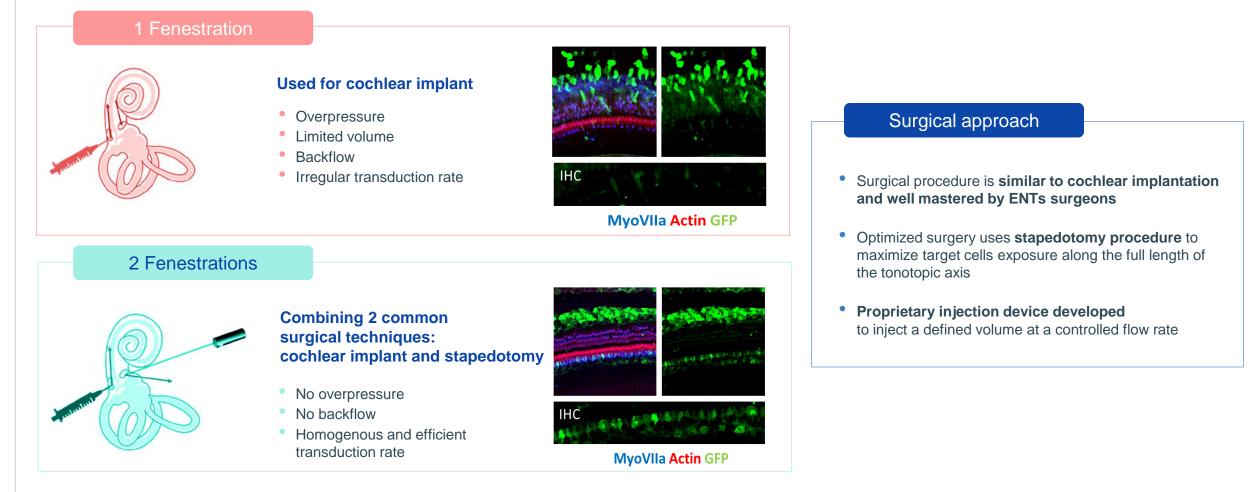
## **SENS-501**

Long-Term Hearing Recovery In A Standardized Translational Model Of Otoferlin Deficiency



# SENS-501 Dedicated Surgical Approach for Gene Therapy

Non-Human Primates injected through the round window membrane (RWI) with or without stapedotomy (stap)



## SENS-501 Raising The Bar With The SENS-501 Audiogene Study

We wanted to generate a compelling value story showing that SENS-501 treatment is able to:

- Demonstrate by itself hearing restoration in toddlers
- Enable infants to have **normal language acquisition** and **development**
- Improve Patient Reported Outcomes & QoL to allow infants social development

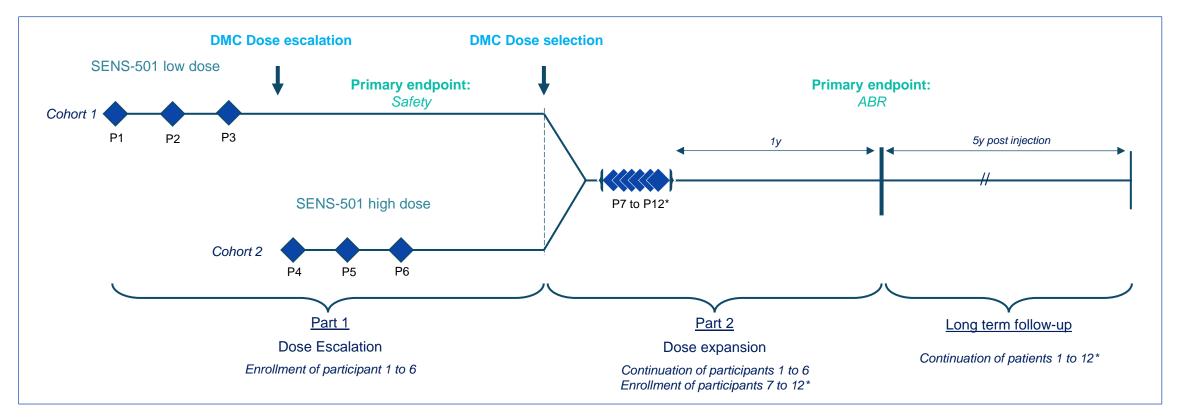
### Critical parameters that Audiogene have to demonstrate to be competitive:

- A homogeneous clinical study population in the right target age for speech acquisition (ie: below 3 years old)
- No concomitant cochlear implantation
- No previous cochlear implantation to be able to document the contribution of the GT in speech development
- Global clinical study leveraging the natural history network

## SENS-501 Phase 1/2 Audiogene Study



Audiogene, a Phase 1/2 clinical trial in homogenous population of infants and toddlers, aged 6 to 31 months, naive of cochlear implants, to assess safety, tolerability, and efficacy of SENS-501 following unilateral injection into the cochlea



\*Further participants may be recruited if required, who will be assessed in the same way as P7 to P12. Copyright by **Sensorion** - 2025 - All Rights Reserved

# SENS-501 Audiogene Study Status

**FIRST** 

COHORT

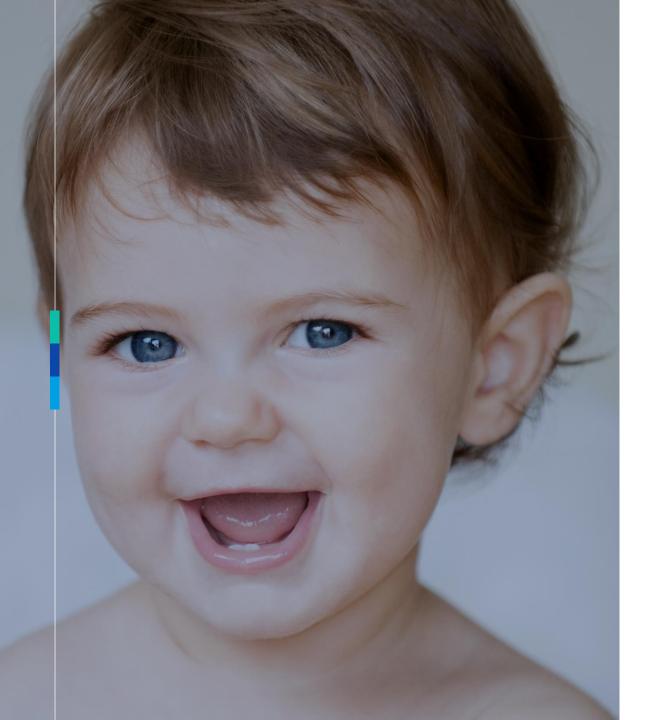
**INJECTED** 



- First cohort of infants and toddlers (3 patients) injected in H2 2024
- Surgical administration procedure was uneventful in the 3 patients
- Initial safety reported in first two patients
  - No dose-limiting toxicities, no Serious Adverse Events
  - Vestibular function remained intact and unchanged from baseline
  - Otoacoustic Emissions (OAEs) remain present
- Encouraging behavioral improvements in first two patients assessed for efficacy

- Patient recruitment going as planned:
  - 1<sup>st</sup> cohort completed by year-end 2024
  - 2<sup>nd</sup> cohort of patients to be recruited in H1 2025
  - Ongoing Natural History Study Otoconex supports eligible patients' identification
- KOL event to be held in early 2025
- Engage FDA in pre-IND Discussions in H1 2025

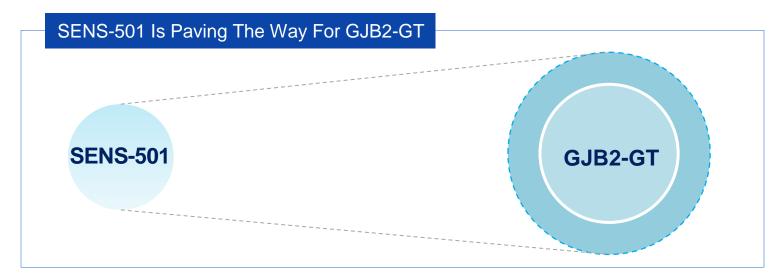
STUDY UPDATE





# GJB2-RELATED HEARING LOSS

# GJB2-GT Leveraging SENS-501 Program For GJB2-GT Program Success



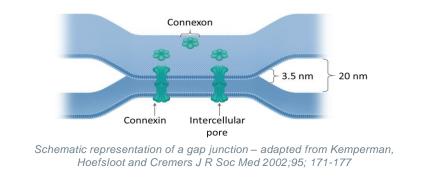
### Aiming To Develop Best-In Class And First-In Class Gene Therapy

- AAV capsid selected for high-level of target cells specificity
- GT product showing high level of target cells transduction
- Limited off-target tissue biodistribution
- Surgical approach developed and mastered by ENTs surgeons

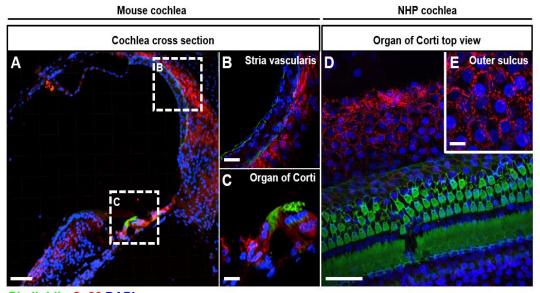
# **GJB2-GT** Connexin 26 Is A Gap-junction Protein Encoded By *GJB2* Gene And Is Responsible For Tissue Homeostasis

### Mutations in the *GJB2* gene Lead to Deafness

- *GJB2* is the gene encoding for the Connexin 26 protein; one of 20 known connexins
- Cx26 and Cx30 proteins are the dominating connexins in the cochlea; heteromeric or heterotypic hexamers forming Gap Junctions
- Gap Junctions are key for the intercellular exchange of molecules (miRNA, glucose, ions, etc.) hence responsible for tissue homeostasis
- More than 100 recessive mutations origin Cx26 truncation / deletion leading to non-syndromic hearing loss and deafness, most are addressable via gene replacement
- Severity of hearing loss correlates with degree of loss of *GJB2* function



#### GJB2 Expression in the Cochlea

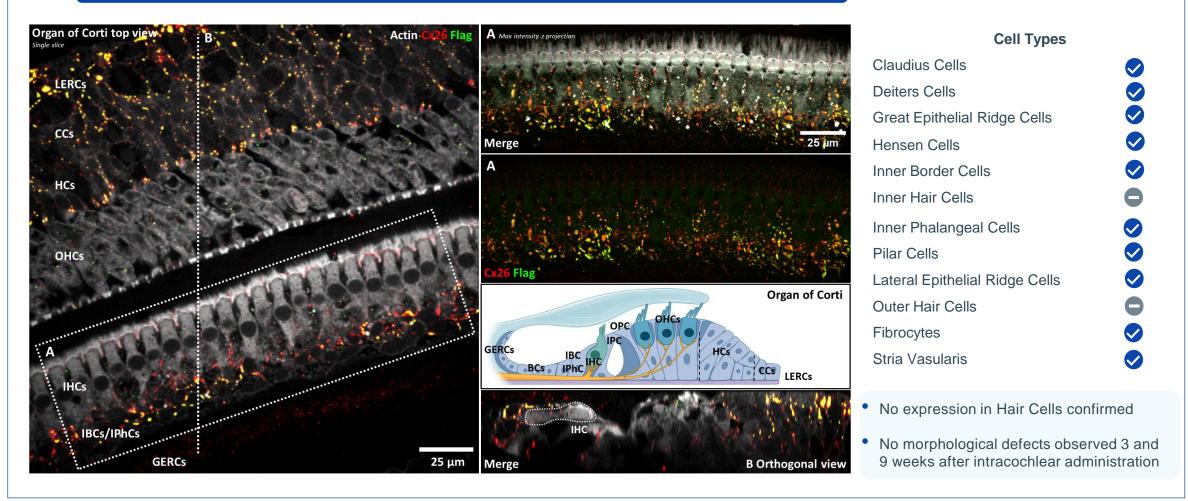


Phalloidin Cx26 DAPI

- Supporting cells of the organ of Corti
- Fibrocytes of the spiral limbus and the lateral wall
- Intermediate and basal cells of the stria vascularis
- Not expressed in hair cells

# **GJB2-GT** Lead Candidate Can Deliver Cx26 In The Appropriate Target Cells

Correct Delivery Of Cx26 Using Lead Candidate Flag In Non-Human Primate Cochlea

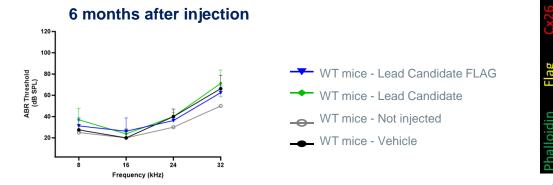


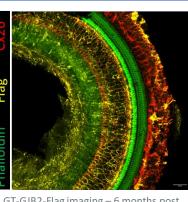
## GJB2-GT Lead Candidate Demonstrates Adequate Safety and Biodistribution Profile -Including Long-Term Local Tolerability in Mice and NHP

### Acute toxicity in WT Mice - High Dose IV injection

- Study performed in preparation of upcoming GLP-toxicity in mice after IV injection
- GJB2-GT does not interfere with normal growth and don't elicit elevated transaminase levels 4 and 8 weeks after injection
- Behavioral evaluation (Functional Observation Battery, exploratory behavior (videotracking) 3 and 7 weeks after injection: no findings

### 6-Month Exploratory Safety and Transgene Expression in WT Mice – Intracochlear Injection





GT-GJB2-Flag imaging – 6 months post intracochlear injection in mice

- No impact on ABR up to 6 months following Lead Candidate injection
- Normal histology maintained, transgene expression persistence
- Hair cells detargeted
- Clinical pathology: no findings

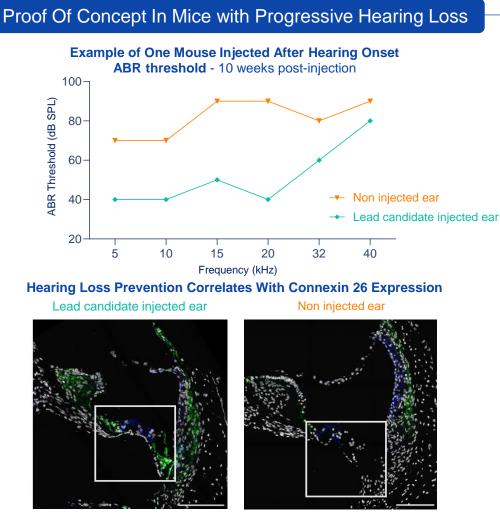
### 3-Month Exploratory Toxicity and Biodistribution in Non-Human Primate – Intracochlear Injection

- Lead Candidate is well tolerated and did not induce any macroscopic/organ weight changes or local/systemic microscopic findings
- Normal cochlear histology
- No lab and clinical findings
- Biodistribution: the vast majority of the vector remains in injected ears, no dissemination observed in gonads, main organs, dorsal root ganglion (DRG)

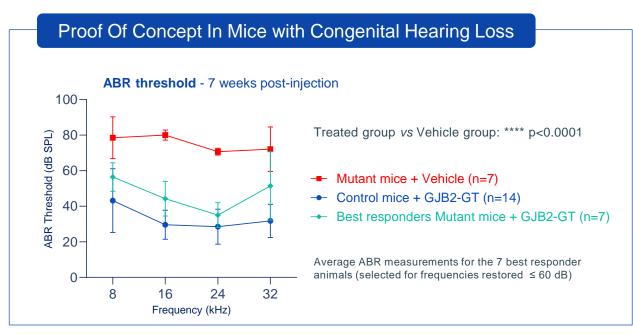
S. Pierredon et al., ESGCT 2024 (link) Copyright by Sensorion - 2025 - All Rights Reserved

## **GJB2-GT**

## Lead Candidate Prevents Hearing Loss In Relevant Mouse Model



Left: Green staining demonstrates efficient Cx26 re-expression in target cells, which are otherwise depleted (right) in Cx26 in the GJB2 deficient model



- In progressive model: ongoing work indicates that hearing loss prevention correlates with Connexin 26 re-expression in target cells
- In congenital model: ongoing studies indicate that lead candidate GJB2-GT induced a statistically significant hearing recovery
  - as early as 3 weeks after injection
  - evidence of dose-response

Tran Van Ba et al., ESGCT 2024 (link)

Additional data on two models: GJB2 gene therapy-response of two pre-clinical mouse models of the most frequent form of human deafness, DFNB1. Heritier et al., ESGCT 2024 (link)

## **GJB2-GT** Program Status

Ongoing European Natural History Study OTOCONEX

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Ongoing Natural History Study in Collaboration with Sonova

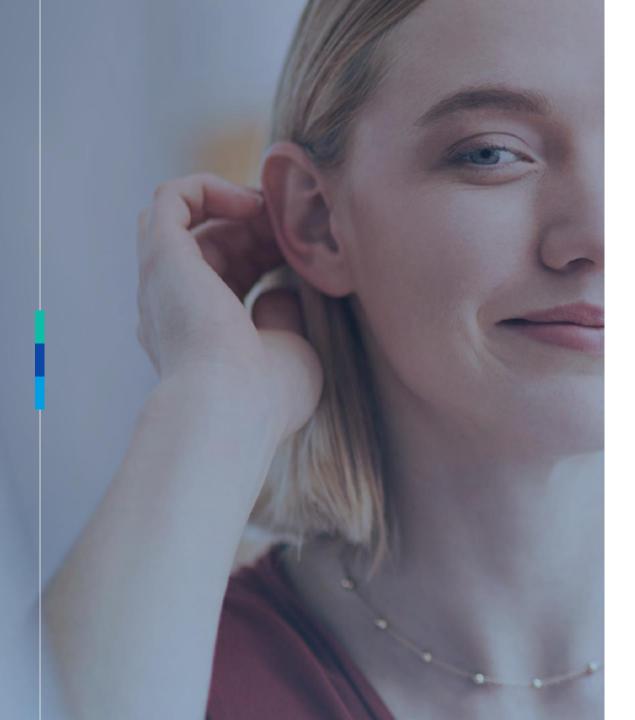
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Update on Additional PoC Efficacy and Safety Data Oct 2024 (ESGCT)

IND/CTA Enabling Studies

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Clinical Trial Applications H2 2025



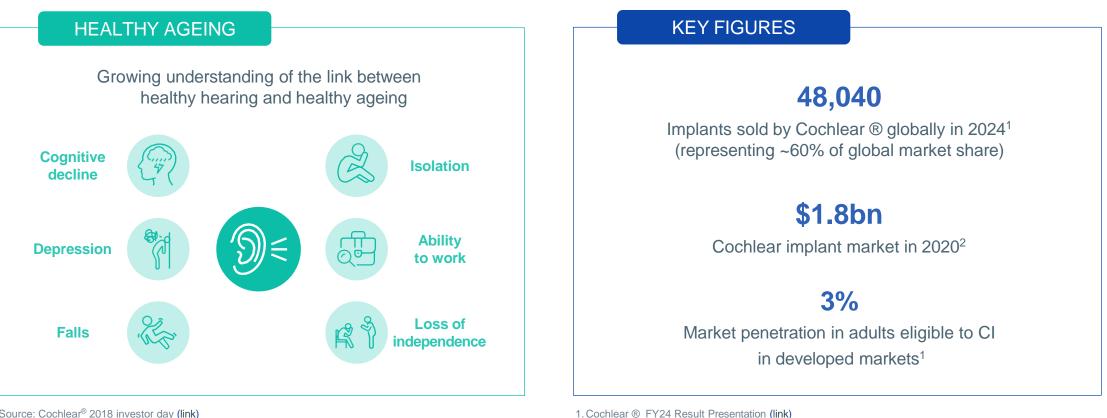


# SENS-401 PROGRAMS

Multiple Indications To Treat And Prevent Hearing Loss

C SENS-401 To Preserve Residual Hearing After Cochlear Implantation

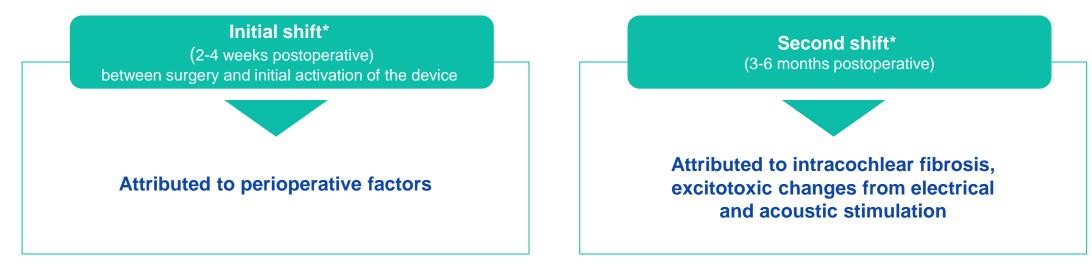
### **COMBINATION OF COCHLEAR IMPLANT WITH SENS-401** TO PREVENT CELL-DEATH POST COCHLEAR IMPLANT PROCEDURE



Source: Cochlear® 2018 investor day (link)

2. Global Hearing, the highest growth hearing market, a primer on cochlear implants, Bernstein 2023

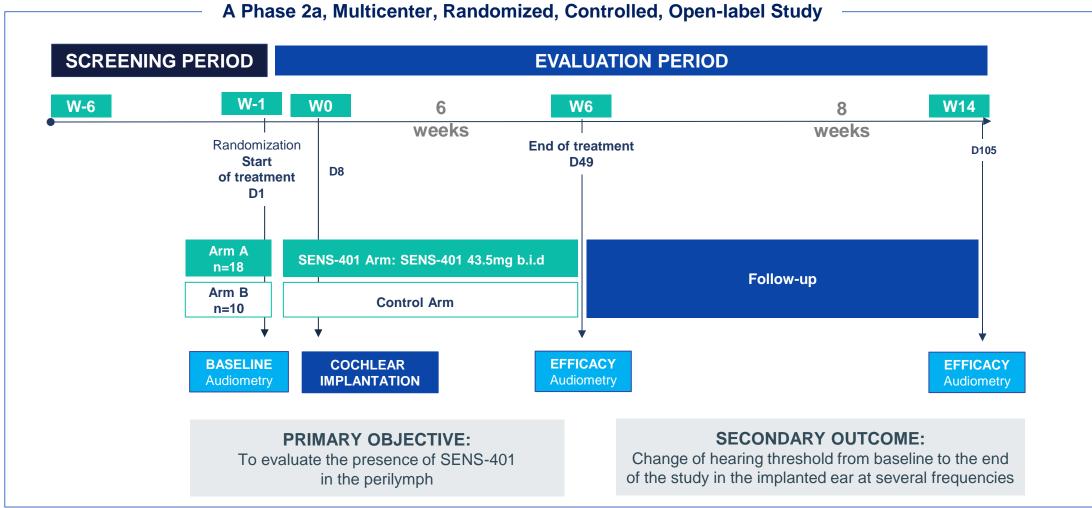
CI Residual Low Frequency Hearing Benefits for Cochlear Implant Users



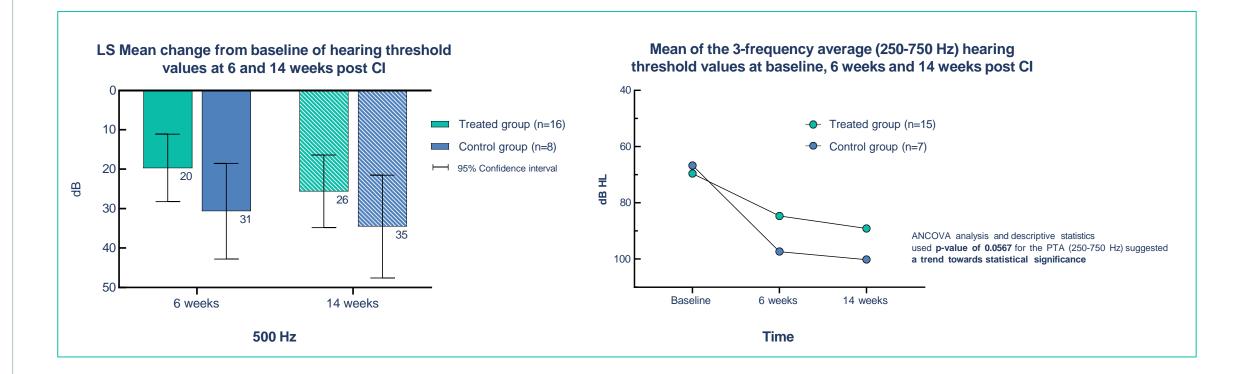
\*Jensen et al., Hearing Preservation After Cochlear Implantation, 2021

**Postoperative hearing preservation** defined as: unaided air-conduction **thresholds < 85 dB HL** at 125, 250, and 500 Hz



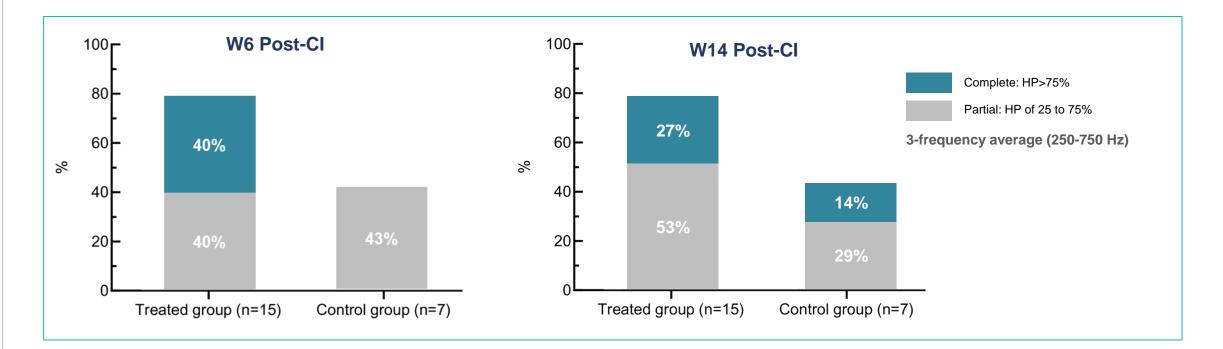


# CI SENS-401 Provides Hearing Protection 6 & 14 Weeks Post-Cochlear Implantation



- Residual hearing loss is lower in patients treated with SENS-401 compared to control group 6 weeks after cochlear implantation
- This preservation effect is maintained 8 weeks after SENS-401 discontinuation (14 weeks post-CI)

# CI SENS-401 Provides Residual Hearing Preservation\* 6 & 14 Weeks Post-Cochlear Implantation



- Patients in the SENS-401 treated group are twice as likely to show complete or partial hearing preservation compared to control group after 7 weeks
  of continuous treatment
- Only SENS-401 treated group show a complete hearing preservation with 40% of treated patients compared to 0% in the control group at 6 weeks post-Cl
- These results are maintained 8 weeks after SENS-401 discontinuation (14 weeks post-CI)

\*Skarzynski H, van de Heyning P, Agrawal S, Arauz SL, Atlas M, Baumgartner W, et al. Towards a consensus on a hearing preservation classification system. Acta Otolaryngol Suppl. 2013(564):3-13. Copyright by **Sensorion** - 2025 - All Rights Reserved

# **CI** SENS-401 CI Final Results - Conclusion



SENS-401 can cross the labyrinthine barrier to target cochlear hair cells in all patients sampled, confirming primary endpoint is met. SENS-401, present in the perilymph fluid, reaches concentrations that are pharmacologically active.



A complete hearing preservation is exclusively observed in 40% of patients treated with SENS-401 at 6 weeks post cochlear implantation



Eight weeks after discontinuation of SENS-401, the hearing protective effect is maintained



Residual hearing loss is reduced in the SENS-401 treated group compared to the untreated group at 6 weeks post-cochlear implantation



SENS-401 taken for 8 weeks confirms it has a good safety profile



SENS- 401 has the potential to modify the outcome of CI while preserving residual hearing by improving speech perception in quiet and noise, music perception, spatial localization and maintaining more natural sound quality



These results support the SSNHL phase 2 data and further development of SENS-401

## CIO

Cisplatin Administration For Chemotherapies Damages The Inner Ear And Leads To Hearing Loss, Tinnitus And Dizziness

### WHAT IS CIO?

Hearing loss caused by cisplatin administration as chemotherapeutic treatment.Risk factors include young age as well as individual and cumulative cisplatin doses.CIO leads to permanent inner ear problems in 40-60% of adult cases and up to 90% of pediatric cases.

These complications significantly impact patients' quality of life due to:

- Hearing loss, tinnitus and dizziness impacting daily life activities
- Problems in language acquisition and learning for pediatric patients
- Difficulties in communicating, social isolation, cognitive decline

Potential treatments must not interfere with cisplatin efficacy.

Incidence of cisplatin treated patients: 570,000 patients in 2025 in G7 countries1

1. Company/ estimates based on publicly available data (in the US, Japan, Germany, France, the UK, Italy and Spain)

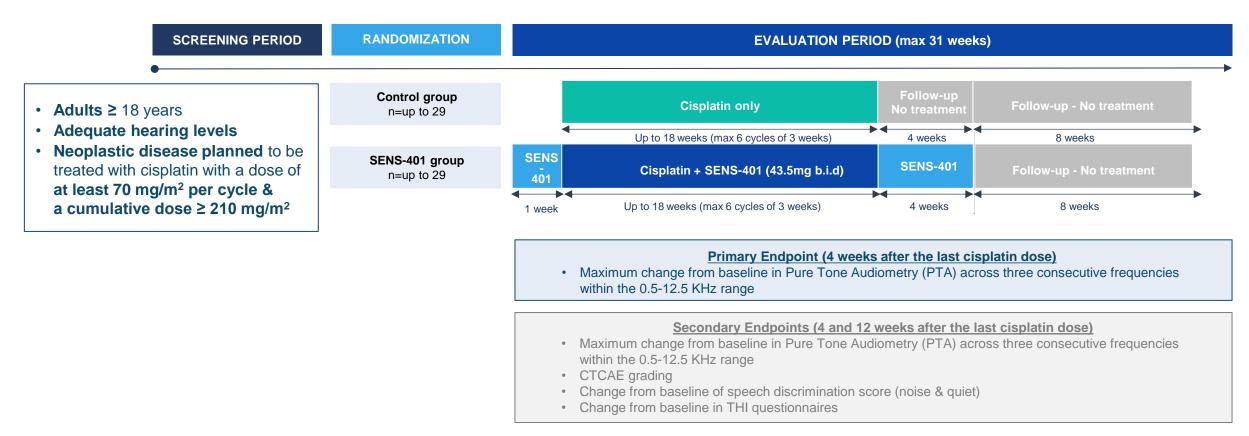
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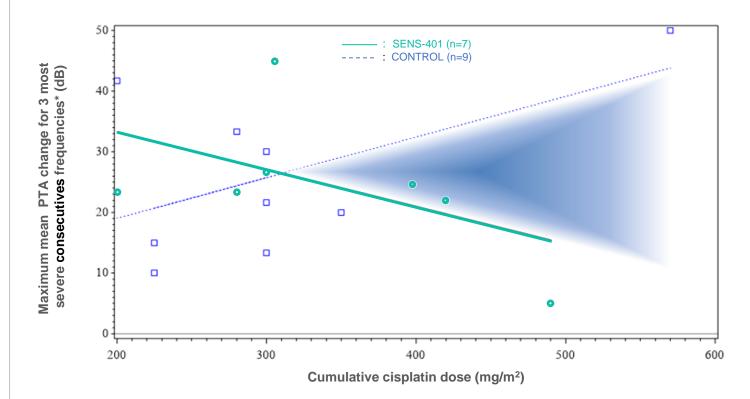
## **CIO** SENS-401 Phase 2a Proof-Of-Concept Study NOTOXIS Positive Preliminary Safety Data

A Phase 2a, Multicenter, Randomized, Controlled, Open-label Study to Evaluate the Efficacy of SENS-401 to Prevent the Ototoxicity Induced by Cisplatin in Adult Subjects with a Neoplastic Disease



## CIO

Preliminary Results Show Patients with High Exposure to Cisplatin May Benefit the Most from SENS-401's Otoprotective Effects



Groups	n	Variables	Mean	SD
Control	9	Cisplatin dose	305	110.0
Control		PTA change	26	13.6
SENS-401	7	Cisplatin dose	342	98.7
3E113-401		PTA change	24	11.7

- Hearing loss is similar between SENS-401 and control group
- SENS-401 subjects were exposed to significantly more cisplatin than control

- As the cumulative dose of cisplatin increases, severity of ototoxicity observed in the control group escalates *r*=0.42
- Benefit of SENS-401 increases with higher cisplatin doses
- SENS-401 treatment group outperforms the control group at cisplatin doses > 300 mg/m<sup>2</sup>

# **CIO** Key Takeaways From Preliminary Study Data



Cumulative dose of cisplatin is a key factor of ototoxicity severity



SENS-401 has a **favorable safety profile** when administered continuously for up to **23 weeks** in adult patients undergoing cisplatin-based chemotherapy



Recruitment is progressing well



Based on preliminary data, no significant difference observed on ototoxicity measured by PTA change or CTCAE grading, however SENS-401 treated group received higher cumulative dose of cisplatin compared to control



Patients with higher exposure to cisplatin may benefit the most from SENS-401's otoprotective effect



The preliminary results suggest a trend toward an otoprotective effect of SENS-401 beyond a cisplatin dose of 300 mg/m2

## Sensorion Conclusion





 Developing hearing loss therapeutics to treat, prevent and restore hearing – an area of high unmet clinical need



• Combining extensive internal capabilities with world-leading exclusive partnerships



 Advancing a robust and diversified pipeline with multiple upcoming milestones in 2025



- Completion of patient recruitment of the second cohort in Audiogene in H1 25
- Completion of patient recruitment in SENS-401 CIO in H1 25
- Clinical Trial Application for GJB2-GT in H2 25

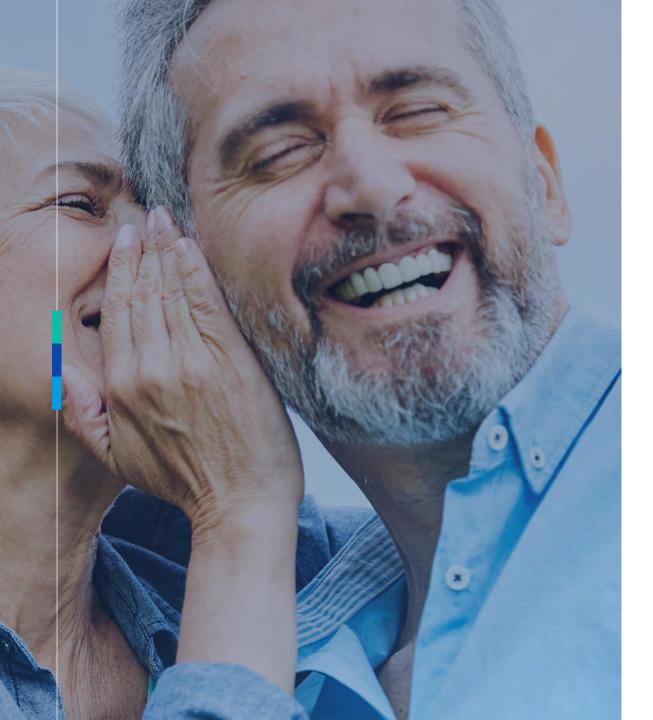


# **THANK YOU**

E:contact@sensorion-pharma.com



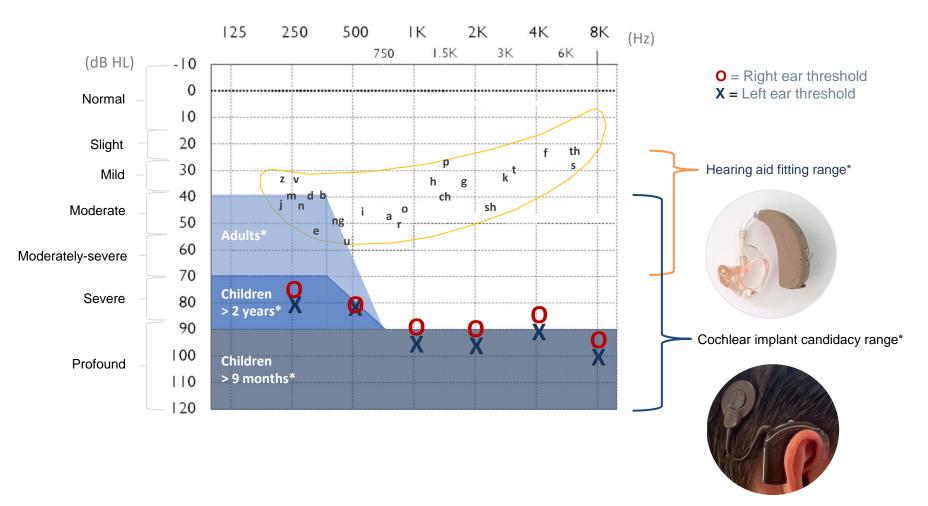
# Appendix



# HEARING LOSS

## **HEARING**

Access And Clarity Are Mandatory For Optimal Outcomes

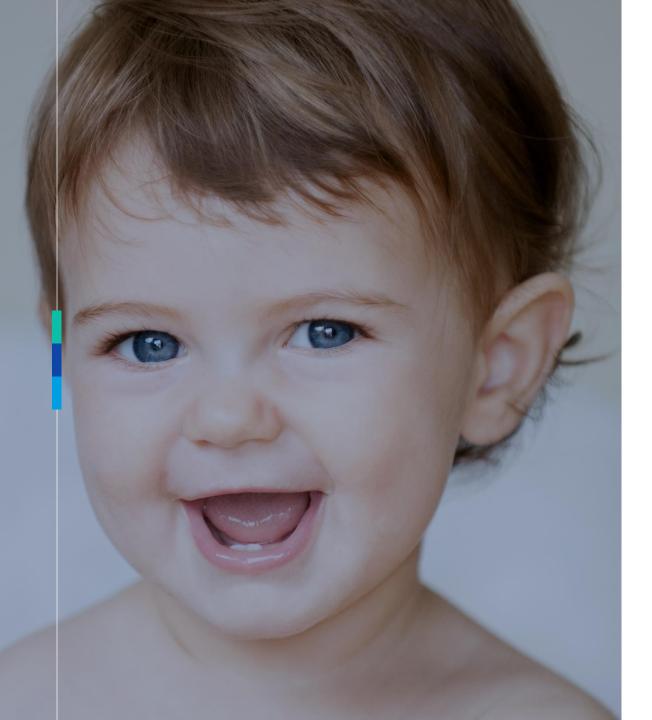


\*Guideline criteria may vary slightly by manufacturer, device, and/or country

Image of hearing aid: https://commons.wikimedia.org/wiki/File:Unitron\_Ziel\_photo\_2.jpg

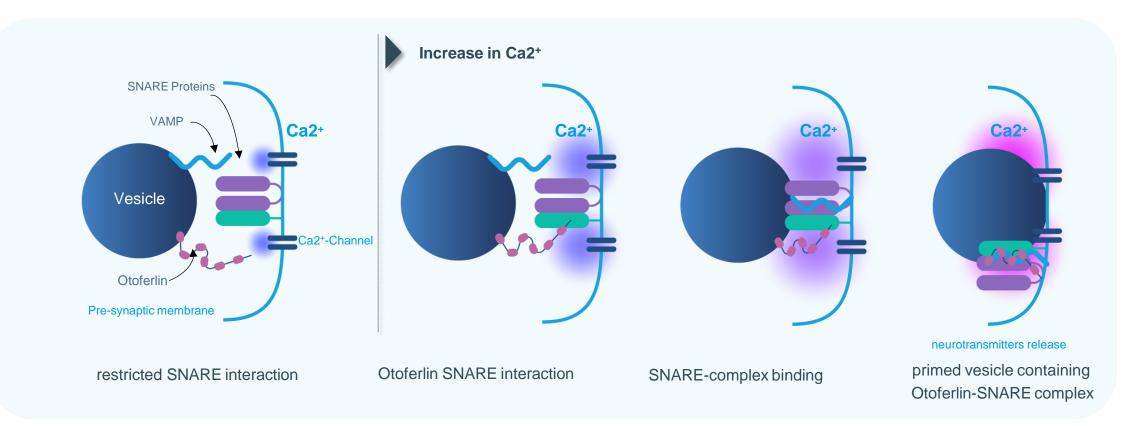
Image of cochlear implant sound processor on ear: https://commons.wikimedia.org/wiki/File:Cochlear\_Nucleus%C2%AE\_7\_Sound\_Processor.jpg

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# GENE THERAPY PROGRAMS BACK-UP

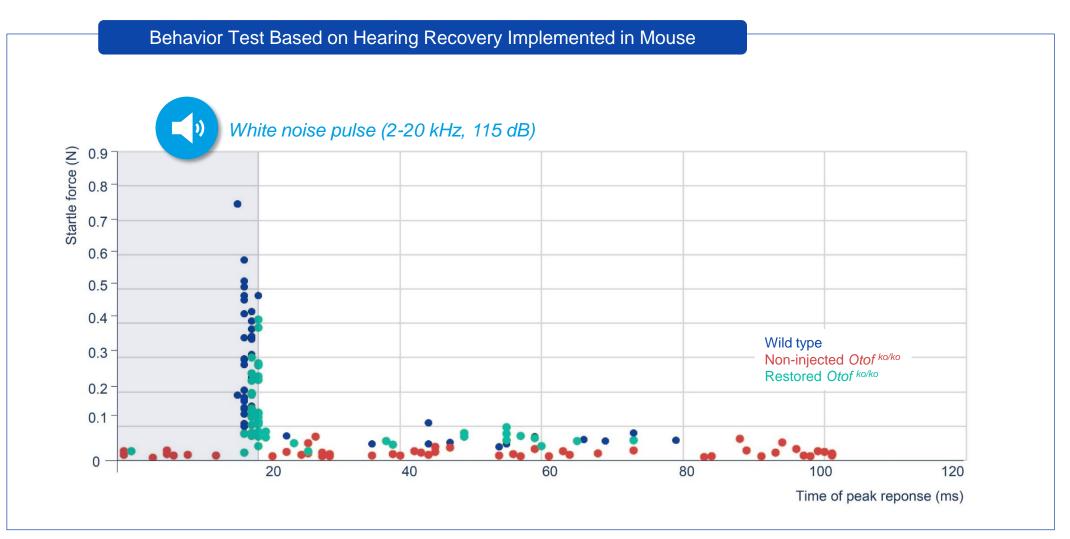
# SENS-501 OTOF Gene Encodes Otoferlin, a Key Ca2+ Sensor Protein



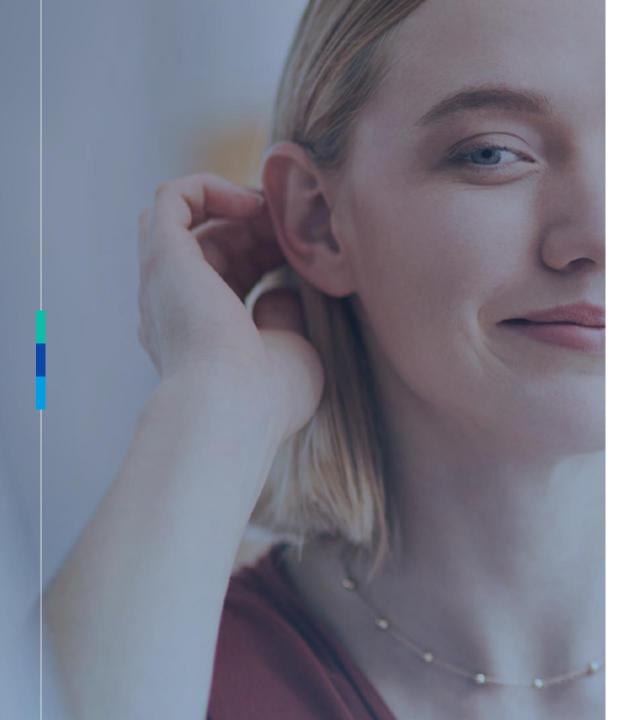
# OTOF is the gene coding for the otoferlin protein, a Ca2<sup>+</sup> sensor key for vesicle fusion and vesicle pool replenishment at auditory hair cell ribbon synapses

Model illustrating calcium regulation of otoferlin/SNARE interaction in the hair cell – Adapted from Ramakrishnan et al. 2014 Copyright by **Sensorion** - 2025 - All Rights Reserved

# **SENS-501** Leads to Restoration of Efficient Sound Processing in Behavioural Test



Olivier et al. ASGCT 2023

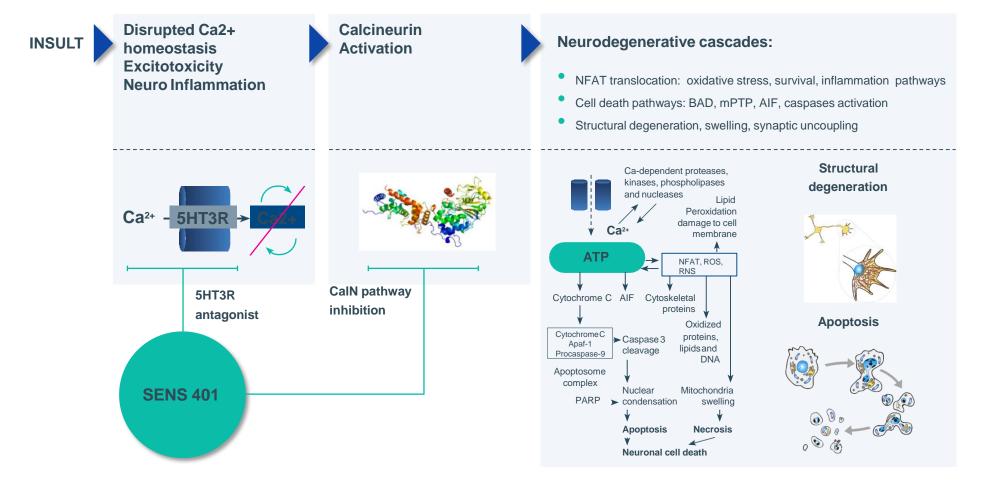


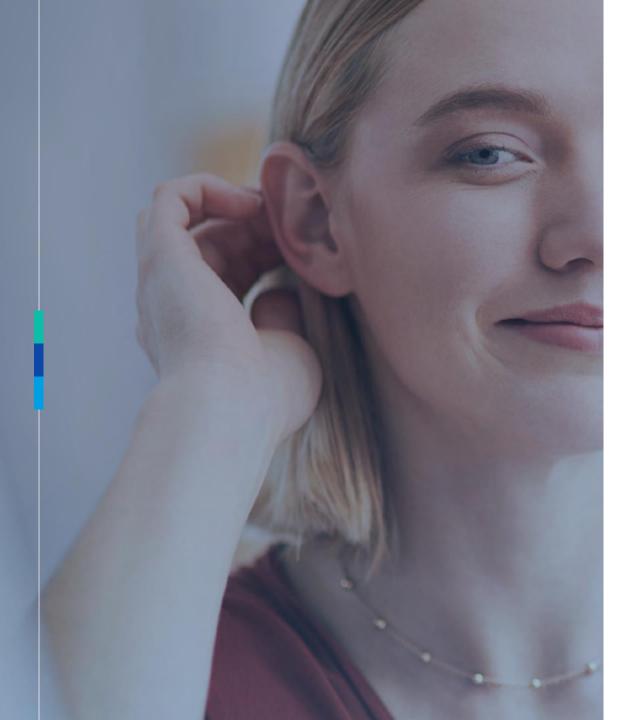
# SENS-401 PROGRAMS BACK-UP

Multiple Indications To Treat And Prevent Hearing Loss

# **SENS-401: A Pipeline In A Product**







# SSNHL

Sudden Sensorineural Hearing Loss Sudden Sensorineural Hearing Loss (SSNHL) is a Severe Disease Affecting more than 200,000 Patients Per Year

### WHAT IS SSNHL?

- The sudden onset of a significant hearing loss due to dysfunction of the cells of the cochlea and central auditory structures.
- Hearing loss develops over less than 72 hrs, hearing sensitivity is reduced by at least 30 dB (1,000 fold) in the affected ear(s).
- >90%1 of cases are idiopathic, known causes include noise/head trauma, ischemia, infection.
  >33%2 of patients suffer from permanent disabling hearing loss, mostly those with initial severe/profound hearing loss.

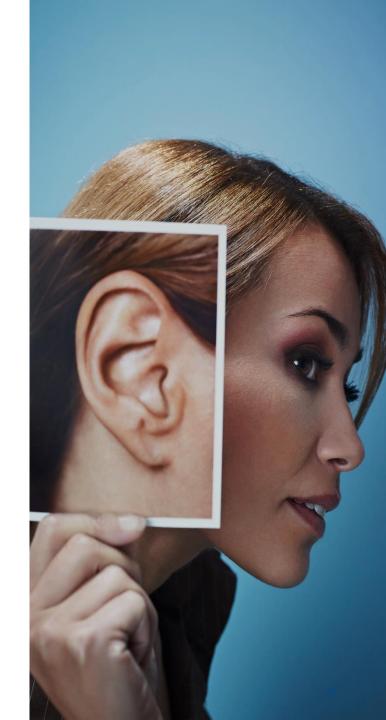
#### Complications significantly impact quality of life due to:

- Difficulties in communicating, social isolation, cognitive decline
- Accompanying tinnitus

Incidence: 27-35 per 100,000 (c.200,000 patients in 2017 in G7 countries)<sup>1</sup>

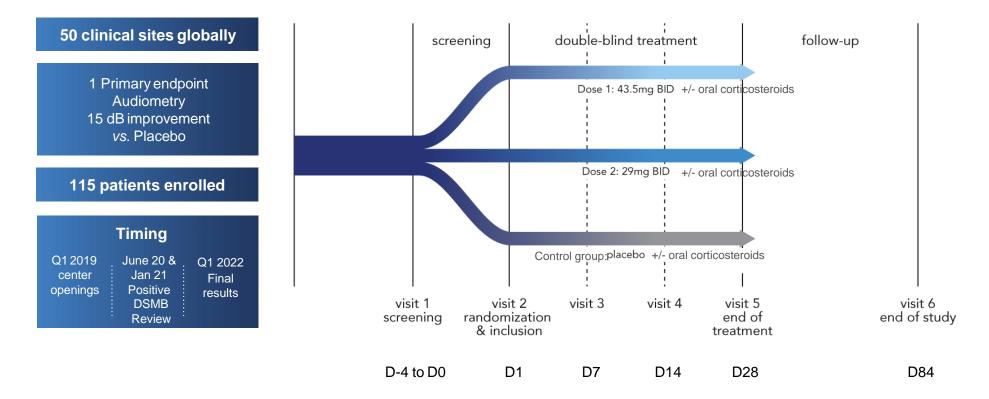
American Academy of Otolaryngology–Head and Neck Surgery Foundation (AAO-HNSF) Clinical Practice Guidelene
 Scenary Interviews
 Company/ optimates based on publicly available data (in the US\_lapan\_Company\_France, the UK\_Italy and Spain)

3. Company/ estimates based on publicly available data (in the US, Japan, Germany, France, the UK, Italy and Spain) Copyright by **Sensorion** - 2025 - All Rights Reserved



# SSNHL SENS-401 SSNHL Program: AUDIBLE-S Phase 2 Design

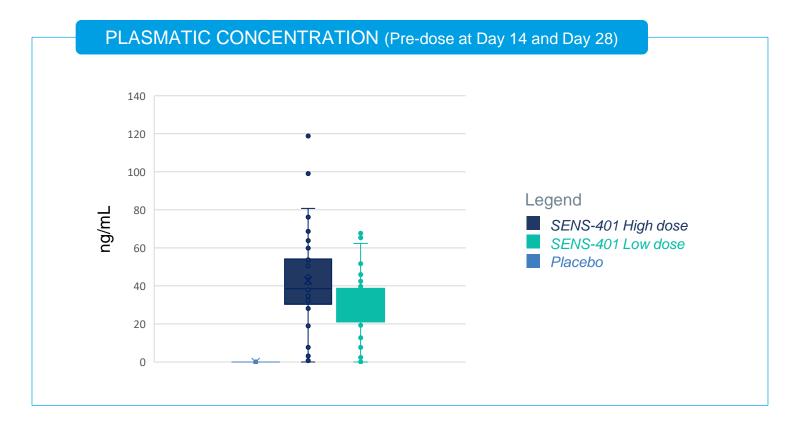
### A RANDOMIZED, MULTICENTER, DOUBLE-BLIND, PLACEBO-CONTROLLED TRIAL



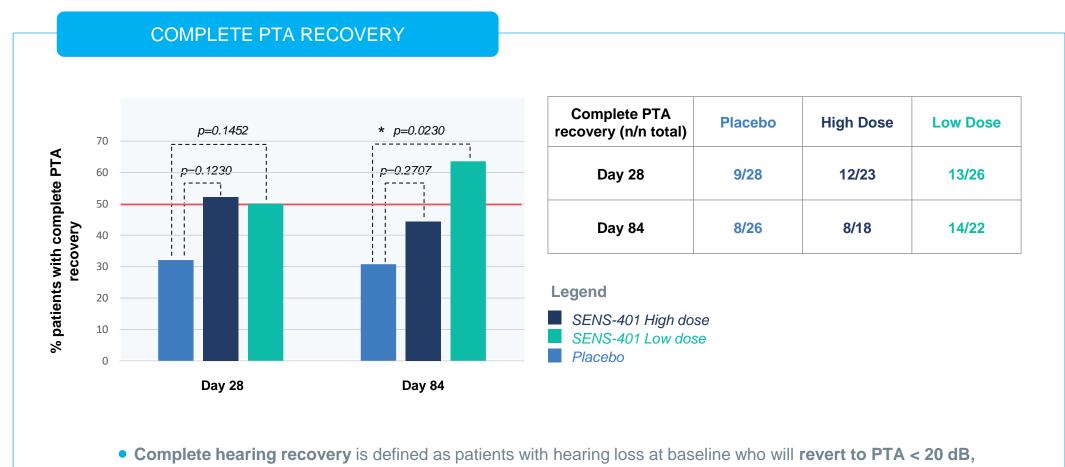
#### Primary endpoint definition:

"...change in pure tone audiometry (PTA); average of the hearing threshold of 3 contiguous most affected hearing frequencies in decibels in the affected ear from baseline to the end of treatment visit (Visit 5/D28±3)"

## **SSNHL** SENS-401 Plasmatic Exposure



# **SSNHL** SENS-401 Induces Complete PTA Recovery In 50% Of Patients



considered as "normal" hearing.

# SSNHL SENS-401 SSNHL Phase 2 Results Summary

### AUDIBLE-S SECONDARY ENDPOINT RESULTS

- Complete PTA recovery is achieved in 50% of the SENS-401 treated patients
- SENS-401 shows a clinically meaningful and statistically significant effect on PTA change (at least 10 dB) over time in a large homogeneous idiopathic population of patients treated with corticosteroids
- SENS-401 induces a significative PTA change of at least 19 dB at day 28 and up to 25 dB at Day 84 allowing a reduction of the hearing loss degree from profound to mild, in large profound hearing loss sub-group
- A better response was observed in both treatment groups with a **continuous improvement between** Day 28 and Day 84
- The change in PTA translates into functional improvement evidenced with speech audiometry tests
- Safe and well tolerated in 115-patient SSNHL study; although primary endpoint not met data supports and informs further clinical development
- **Responder rate is always better in the treated group** compared to Placebo and difference with Placebo increases over time