

## OBJECTIVES

Inner ear delivery offers several advantages for gene therapy, including reduced viral titers, non-systemic administration, and improved transduction efficiency.

Delivery can be performed via the **round window (RW)**, **posterior semi-circular canal (PSCC)**, or **intra cochleostomy (IC)**, each providing access to specific inner ear compartments.

PSCC injections target both endolymphatic & perilymphatic spaces, while RW and IC approaches primarily deliver into the perilymph in adult animals. These techniques are **technically challenging** due to the small size, delicate structure, and deep anatomical location of the inner ear, requiring **high surgical precision** and species-specific anatomical knowledge.

This poster highlights the cross-species application of these techniques, showcasing **successful delivery via PSCC and RW injection in mice, intracochlear (cochleostomy) infusion in guinea pigs, and RW injection in swine.**

Intracochlear Injection			
Species\RoA	RW	PSCC	Cochleostomy
Mouse	☑	☑	☑
Guinea Pig	☑	☒	☑
Swine	☑	☒	Not tested

## CONCLUSION

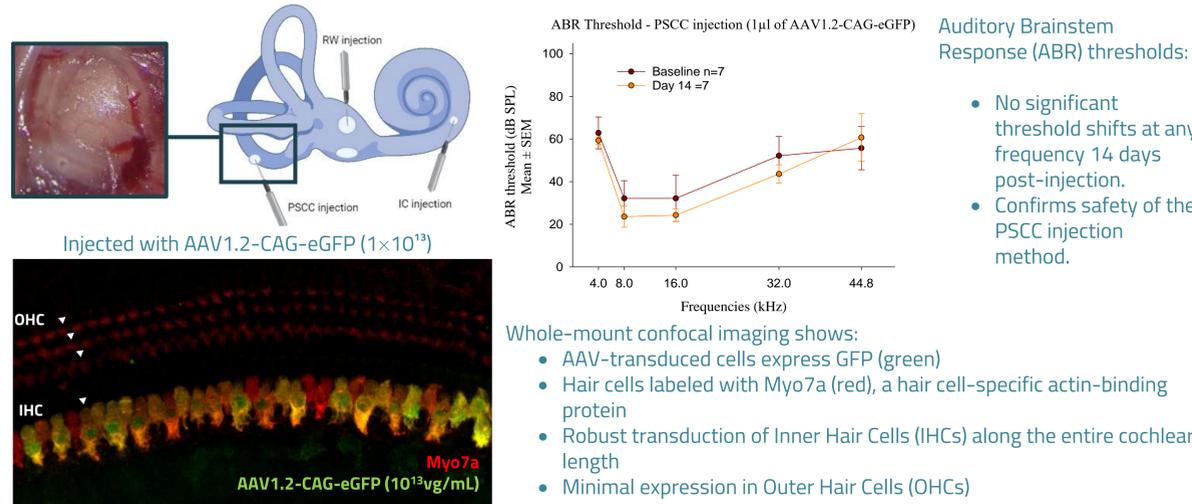
These results demonstrate the **effectiveness of inner ear injection techniques** for **gene therapy** across species, with access routes adapted to each model.

**PSCC injection in mice**, targeting the vestibular system, shows **no impact on hearing**. In contrast, approaches involving the cochlear base—such as **round window injection in mice and cochleostomy in guinea pigs**—result in **slight to moderate ABR threshold shifts**. In **swine**, the **round window** provides **reliable cochlear access, confirmed by imaging and histology.**

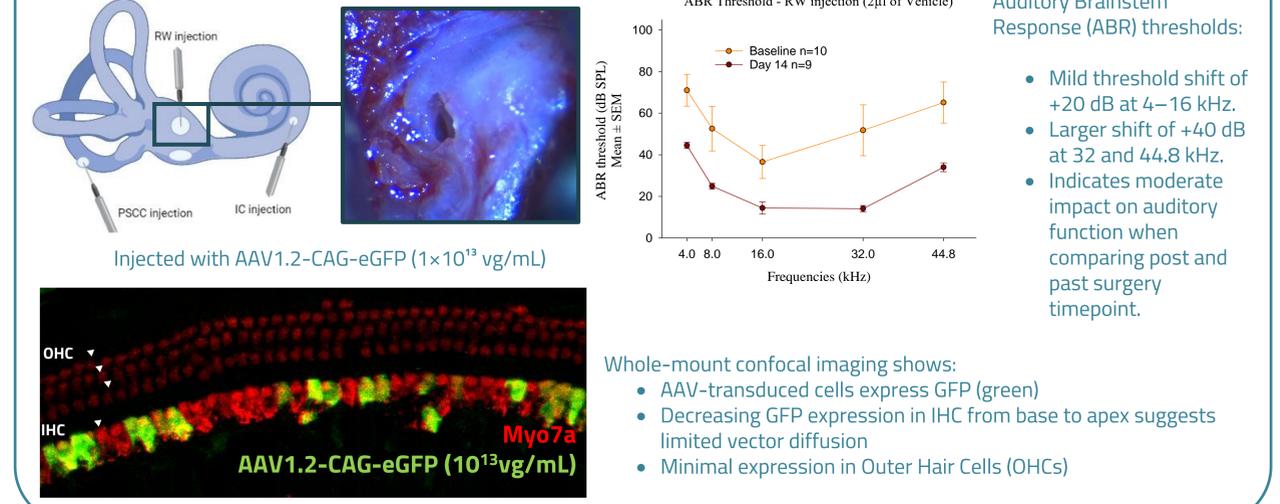
Together, these findings highlight the **importance of route selection by species** and **support the translational potential of these targeted delivery strategies.**

## METHODS & RESULTS

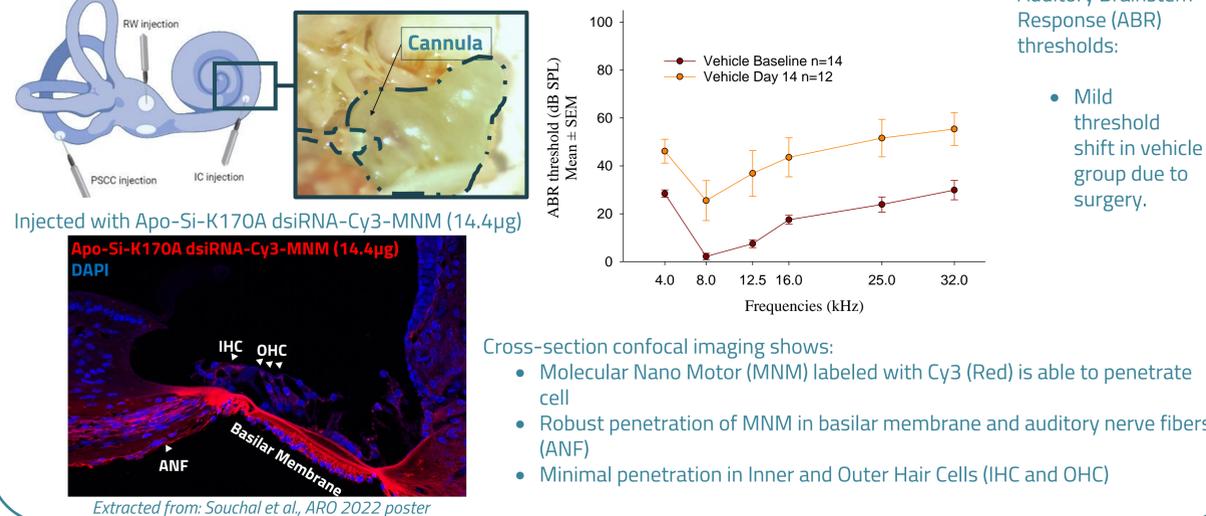
**Figure 1: Efficient Transduction of Inner Hair Cells Following PSCC Injection in Adult Mouse Cochlea without impact on hearing**



**Figure 2: Efficient Transduction of Inner Hair Cells & Hearing Shift Following Round Window Injection in Adult Mouse**



**Figure 3: Efficient MNM-siRNA Delivery & Hearing Shift Following Intracochlear Infusion in Guinea Pig**



**Figure 4: Successful Round Window Injection and Delivery in Swine**

