

Intratympanic steroid for prevention of meningitis-induced hearing loss

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Hearing loss and meningitis

- Hearing loss is the most common sequelae after bacterial meningitis
- Affecting up to 25% of survivors
- Treatment: Hearing aid or cochlear implant

Objective

Does
intratympanic steroid treatment
prevent
meningitis associated hearing loss
and cochlear damage?

Experimental study design

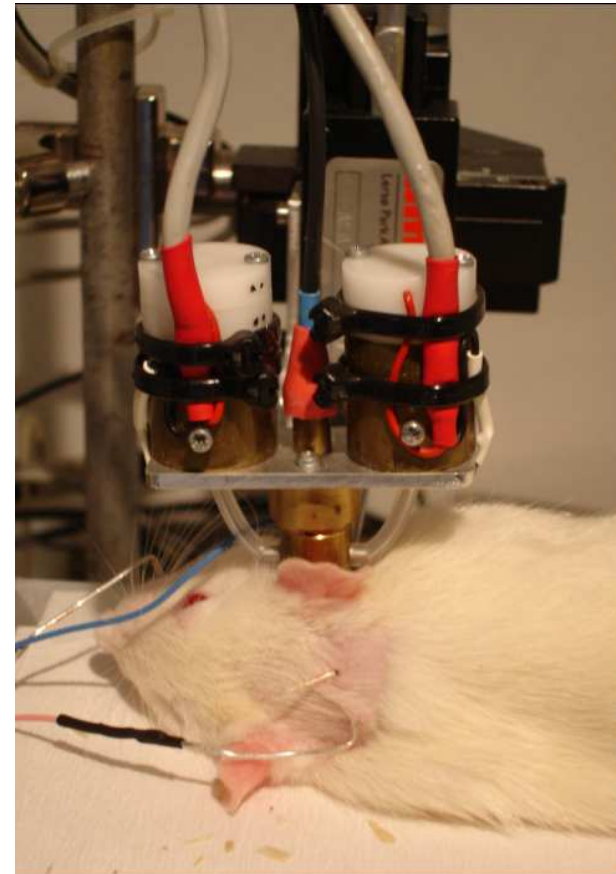
- Rat model
 - *Streptococcus pneumoniae* type 3



- 26 rats
 - Intratympanic steroid treatment (n=13)
 - Intratympanic NaCl (n=13)

Experimental study design

- Hearing assessments
 - Oto-acoustic emissions (OAE) and ABR (16kHz)
- Histopathology
 - Spiral ganglion cell loss
 - Middle ear pathology

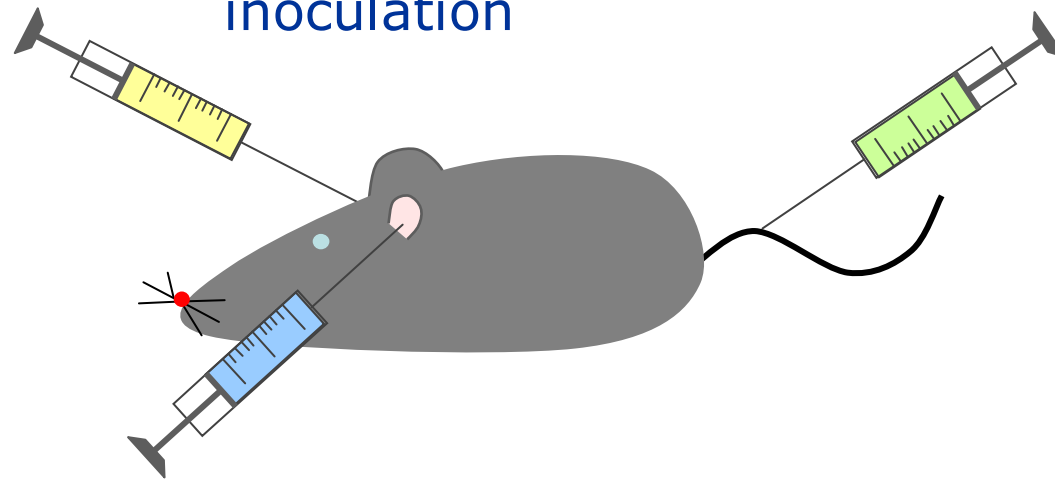


Experimental study design

- Experimental procedures

Day 1: Pneumococcal
inoculation

Day 2: Zinacef

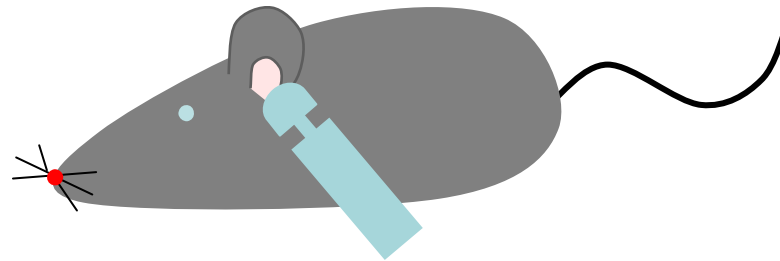


Day 2-5: Steroid/NaCl x 1 daily

Experimental study design

- Hearing assessments

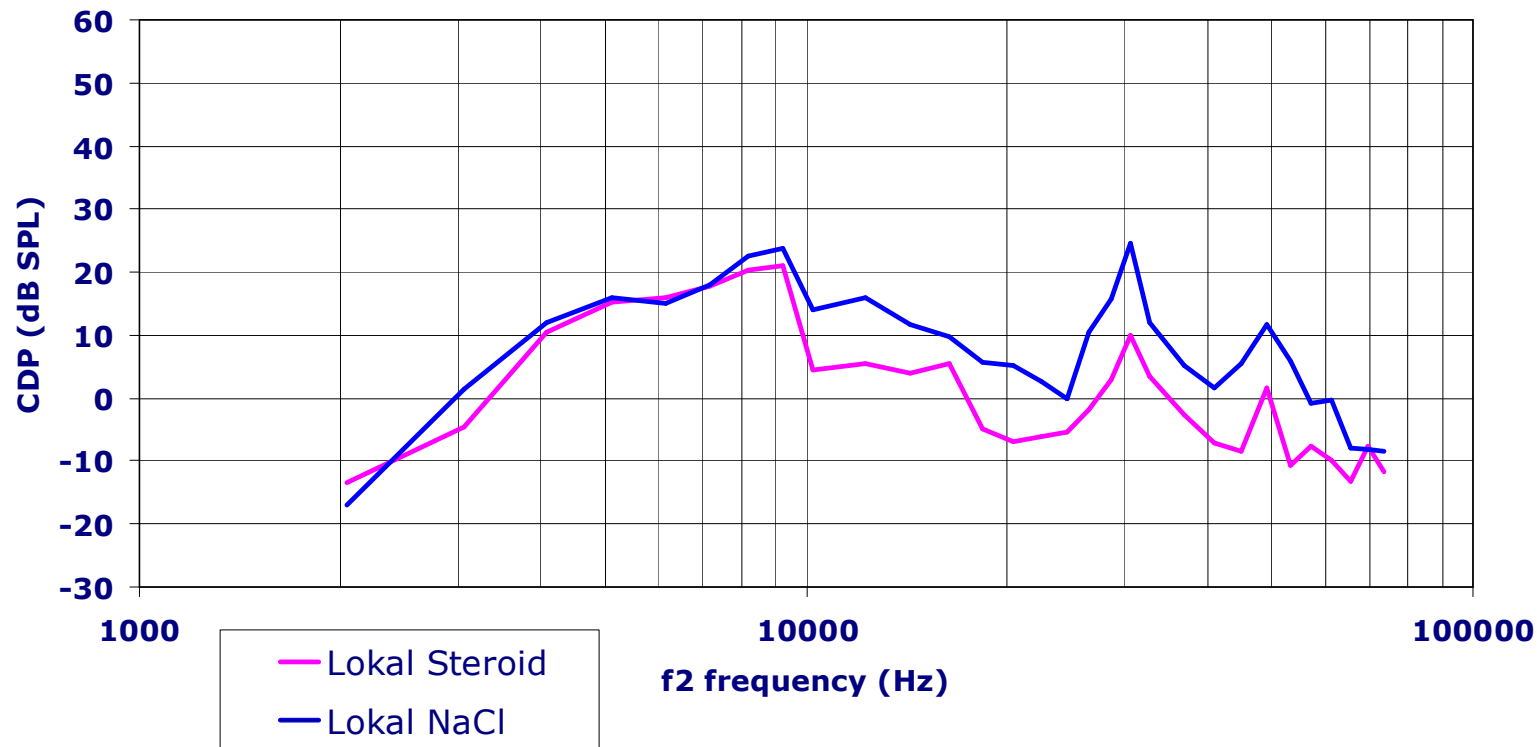
Day 1, 22 and day 56: OAE, ABR (16kHz)



- Sacrifice Day 22 and 56
- Histopathological investigations

Intratympanic steroid - results

Intratympanic steroid 56 days after infection

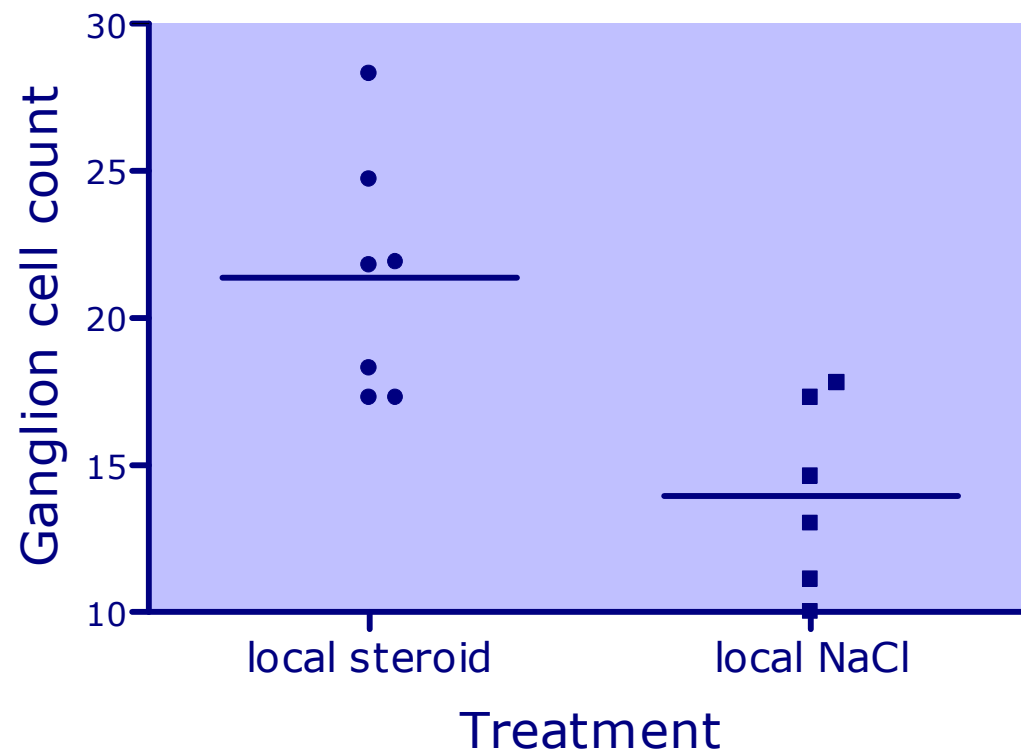
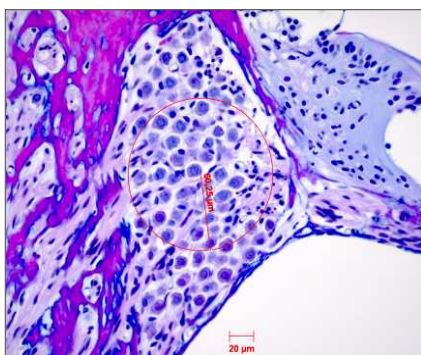


Mann-Whitney test
for Δ AUC $P=0.71$

ABR 16kHz: - no difference

Intratympanic steroid - results

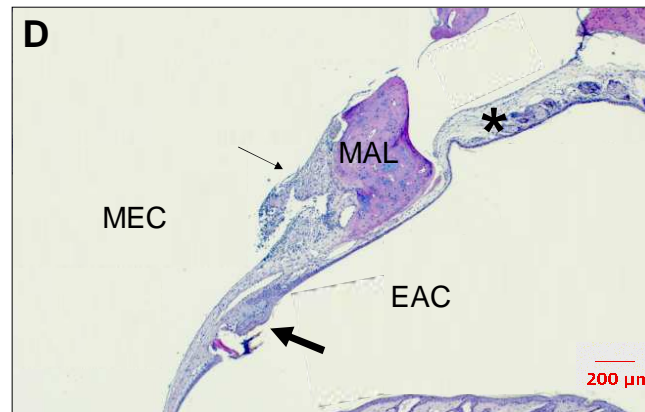
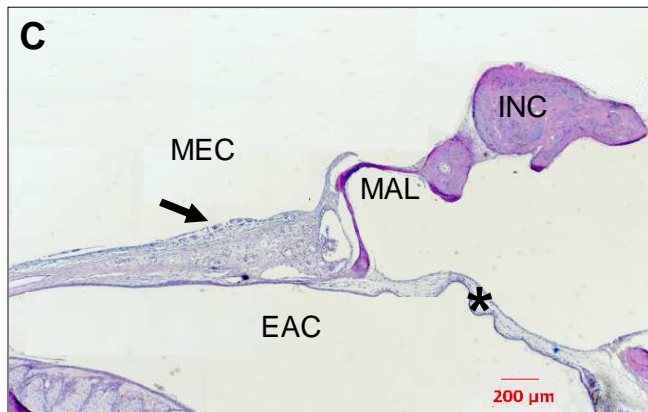
Spiral ganglion cells



Mann-Whitney test; $P=0,0082$

Tympanic sclerosis and fibrosis

	Intratympanic steroid							Intratympanic NaCl						
	8	9	10	11	12	13	14	22	23	24	25	26	27	28
Tympanic sclerosis	2+		2+	2+	1+		1+							
Intratympanic fibrosis	2+	2+	2+	2+	1+	1+	1+							



Conclusions

- **Intratympanic steroid treatment:**
 - Reduces spiral ganglion cell loss
 - Induces a low-frequency hearing loss
 - tympanic fibrosis possible explanation