additional procedure included Cochlear Implants or Bone-anchored hearing aids. Charts were analysed for type of cholesteatoma, surgical procedures, hearing results, recurrence and follow up.

*Results*: Charts of 664 patients were analysed. Of these patients, 39% underwent CWD surgery, 38% CWU surgery, 4.9% CWD with Bondy's technique, 4.3% radical CWD, 0.75% subtotal petrosectomy and 13% of patients underwent a revision tympanoplasty. For long-term functional and hearing outcomes, 552 patients with a follow-up of $>$ 1 year were analyzed separately. Our experience shows an incidence of recurrent cholesteatoma of 19% during 10 years of follow up. In most of these cases CWU procedure was converted into a CWD mastoidectomy. Hearing results will be discussed upon presentation.

*Conclusion*: Surgery for cholesteatoma is especially challenging in a pediatric population because of the need for hearing preservation. Hence canal wall up mastoidectomy in a single or two stages should be the approach of choice in the pediatric population. The modified Bondy technique is a very useful hearing preservation procedure in limited epitympanic cholesteatomas. Radiological follow-up by DWI is mandatory in children for more than 5 years as recurrences can be seen even after 5 years.

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## Free Papers (F812)

### ID: 812.1

### External auditory canal pathology and Cholesteatoma complication. Management

Presenting Author: **Marcel Cosgarea**

Marcel Cosgarea, Alma Maniu, Violeta Necula
*ENT Clinic Cluj- Napoca*

*Learning Objectives*:

External auditory canal (EAC) pathology very ofen is not a simple pathology. To resolve this ear problems : malfomations, infections, tumors etc., is necessary to have good medical and surgical knowledges. Cholesteatoma remains one of the most challenging ear diseases, its evolution leading sometimes to serious complications (facial palsy, vestibular disorders, meningitis, intracranial abscesses, sigmoid sinus thrombosis etc.). Surgical treatment is always required.

*Methods*: We reviewed the operative reports of 534 cases treated in the ENT clinic from Cluj between 1998–2005. Patients ages ranged from 3 to 81 years, with a mean age of 30. The surgical procedure was to follow the cholesteatoma extension from the tympanic cavity to mastoid cavity. We used for ossicular chain reconstruction incus body without osteitis, head of the malleus, and temporal cortical bone. For the reconstruction of the eardrum and the canal wall we used perichondrium, cartilage with perichondrium(palisade technique), or only cartilage. Patients with complications underwent the canal wall-down technique.

*Results*: Recurrence of supuration was noticed in 28% of cases, requiring a second intervention.

Hearing improvement was obtaind in 58% of cases, satisfactory results 19% of the patients, and 23% showed no improvement of the hearing.

The best outcomes in the hearing recovery were obtained by using the head of the malleus or the incus as a PORP prosthesis(40%). Tragal cartilage was used as the columella between the eardrum and the stapes with good results(15%). We also used temporal cortical bone grafts as TORP prosthesis with good results(13%).

*Conclusions*: In EAC deasthe infections need medical treatment , the tumours surgery and themalformation restoring of hearing and somtime of aesthetics surgery.

Reconstructive techniques using autologous materials proved to be valuable procedures for the recovery of the patients hearing.

The cholesteatoma must always be operated, the technique being individualized from case to case.

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## Free Papers (F812)

### ID: 812.2

### Studies to establish the safety of middle ear pellets using auditory brainstem response, cytocochleograms and histology

Presenting Author: **Emma Hoskison**

Emma Hoskison[1], Mat Daniel[2], Mike Mulheran[3], David Furness[4], Roger Bayston[5], John Birchall[5]
*[1]City Hospital, Birmingham, [2]Nottingham University Hsopitals, [3]University of Leicester, [4]Keele Univertiy, [5]Nottingham University*

*Learning Objectives*: Otitis Media with Effusion (OME) is the commonest cause of paediatric hearing impairment globally. Primary treatment is ventilation tube insertion with a 25% recurrence rate. Antibiotic laden pellets placed in the middle ear present a potential novel treatment strategy. This study aims to establish the safety of these pellets *in vivo*.

*Introduction*: Otitis Media with Effusion (OME) is the commonest cause of paediatric hearing impairment globally (Mandel et al 2008). Primary treatment is ventilation tube insertion (NICE Guidelines 2008) with a 25% recurrence rate (Gates et al 1987). Antibiotic laden pellets placed in the middle ear present a potential novel treatment strategy. This study aims to establish the safety of these pellets *in vivo*.

*Methods*: Rifampicin and Clindamycin loaded pellets made of poly lactic-co-glycolic acid were surgically placed in guinea pig middle ears. Auditory Brainstem Responses

(ABRs) between 8–30 kHz were tested over 16 weeks. ABR thresholds, amplitudes and latencies were measured to assess for ototoxicity; cytocochleograms to identify any cochlea hair cell loss and middle ear histology carried out for evidence of inflammation.

*Results*: At one week post insertion of antibiotic laden pellets marked ABR threshold elevation (15–40 dB) was observed ($P < 0.002–0.0001$) against control groups. Persistent significant elevation (25–40 dB) was apparent at 8 and 30 kHz at week 16 with some partial mid frequency recovery. No significant changes in ABR wave amplitudes and latencies were seen. Representative cytocochleograms did not exhibit frank hair cell loss and middle ear histology revealed pellet remnants causing a moderate inflammatory response at 16 weeks.

*Conclusions*: This novel pattern of threshold elevation in the absence of frank hair cell loss has not been reported previously. The lack of significant changes in ABR latency and amplitude suggests the ototoxic effects are localised to the inner ear without accompanying neurotoxicity. Clinically, this study suggests that rifampicin and clindamycin laden pellets may not be safe to treat OME *in vivo*.

*Learning Objectives*: This study demonstrates that middle ear pellets laden with rifampicin and clindamycin cause an ABR threshold elevation and middle ear inflammatory response in guinea pig animal models.

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## Free Papers (F812)

### ID: 812.3

### Wnt activation protects against neomycin-induced hair cell damage in the mouse cochlea

Presenting Author: **Yan Chen**

Yan Chen[1], Liman Liu[1], Yanping Zhang[1], Renjie Chai[2], Huawei Li[1]

[1]*Fudan University,* [2]*Southeast University*

*Learning Objectives*:

Recent studies have reported the role of Wnt/β-catenin signaling in hair cell (HC) development, regeneration, and differentiation in the mouse cochlea; however, the role of Wnt/β-catenin signaling in HC protection remains unknown. In this study, we took advantage of transgenic mice to specifically knock out or over-activate the canonical Wnt signaling mediator β-catenin in HCs, which allowed us to investigate the role of Wnt/β-catenin signaling in protecting HCs against neomycin-induced damage. We first showed that loss of β-catenin in HCs made them more vulnerable to neomycin-induced injury, while constitutive activation of β-catenin in HCs reduced HC loss both *in vivo* and *in vitro*. We then showed that loss of β-catenin in HCs increased caspase-mediated apoptosis induced by neomycin injury, while β-catenin overexpression inhibited caspase-mediated apoptosis. Finally, we demonstrated that loss of β-catenin in HCs led to increased expression of Foxo3 and Bim along with decreased expression of antioxidant enzymes; thus, there were increased levels of reactive oxygen species (ROS) after neomycin treatment that might be responsible for the increased aminoglycoside sensitivity of HCs. In contrast, β-catenin overexpression reduced Foxo3 and Bim expression and ROS levels, suggesting that β-catenin is protective against neomycin-induced HC loss. Our findings demonstrate that Wnt/β-catenin signaling plays an important role in protecting HCs against neomycin-induced HC loss and thus might be a new therapeutic target for the prevention of HC death.

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## Free Papers (F812)

### ID: 812.4

### A comparative study evaluating the utility of EGF, FGF-2, and ofloxacin drops on eardrum regeneration

Presenting Author: **Zhengcai Lou**

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*yiwu central hospital*

*Learning Objectives*:

*Objective*: We compared the effects of epidermal growth factor (EGF), fibroblast growth factor-2 (FGF-2), 0.3% (w/v) ofloxacin drops, and conservative observation (only), on the healing of traumatic tympanic membrane perforations (TMPs).

*Study design*: A prospective, randomised, controlled clinical study.

*Setting*: A University-affiliated teaching hospital.

*Subjects and Methods*: All patients had traumatic TMPs covering >25% of the entire tympanic membrane. The closure rates, closure times, and rates of otorrhoea in patients who were treated with EGF, FGF-2, or 0.3% (w/v) ofloxacin drops, and who underwent conservative observation only, were compared.

*Results*: At the 6-month follow-up, the closure rates did not significantly differ among the groups ($P = 0.170$), Similarly, pairwise comparisons did not reveal any significant between-group differences ($P > 0.0083$). The mean closure time differed significantly among the four groups ($P < 0.001$); pairwise comparisons showed that the mean closure time was significantly longer in the observational group than in the test groups ($P < 0.001$). However, no significant difference in mean closure time was evident between any two experimental groups ($P > 0.0083$).

*Conclusion*: Topical application of EGF, FGF2, and ofloxacin drops accelerated the closure of large human traumatic TMPs. Surprisingly, neither the closure rate nor closure time differed significantly among the three test groups. This results indicate that topical application of ofloxacin drops aids in the healing of traumatic TMPs and should be considered as an alternative treatment option.