

## Ears 101: Managing Otitis and More in Everyday Practice

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## Ears 101: Managing Otitis and More in Everyday Practice

- ▶ When you don't know where to start...
- ▶ When you don't own a video otoscope...
- ▶ When you don't know if you should culture...
- ▶ When it's not always about otitis...
- ▶ When you realize that otitis in cats is treated differently than in dogs...



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## What we'll cover:

- ▶ Otitis in dogs and cats:
- ▶ Bacterial/yeast
- ▶ Parasitic
- ▶ Common ear edge and pinnal diseases
- ▶ How dog and cat ears differ
- ▶ Ear solutions for otitis including recipes-what can and can't be mixed together



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## Breed differences with otitis

- ▶ Cockers, Springers, Labs-have **more apocrine glands and hair follicles** in the ear than other breeds.
- ▶ Standard Poodles have **more hair follicles** in their canals.
- ▶ Cockers-need early and aggressive therapy as **increased risk for chronic changes** (hyperplasia).
- ▶ Shar peis-very **narrow external meatus**.
- ▶ German shepherds and Cocker-highest % of **Pseudomonas** infections.
- ▶ Cavalier King Charles spaniels-**primary secretory otitis media (PSOM)**.

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## Primary Secretory Otitis Media (PSOM)

- ▶ Cavalier King Charles spaniels
- ▶ German shepherds
- ▶ Boxers
- ▶ Bulldogs, French Bulldogs
- ▶ Boston Terriers
- ▶ Pugs

- ▶ Bulging of the eardrum resulting from the **failure of mucoid drainage** from the tympanic bulla through the auditory tube or increased production of mucous-most often **noninfectious** unless TM ruptured.

Common signs include hearing loss, neck scratching, ear pruritus, peripheral vestibular signs or facial nerve paralysis, head shaking, yawning.

Rx: topical steroids, removal of mucous plug-but may reoccur

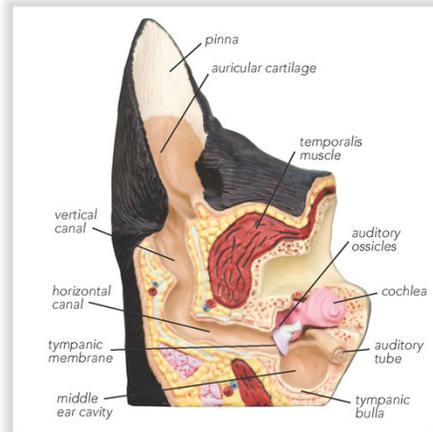


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## What about brachycephalics?

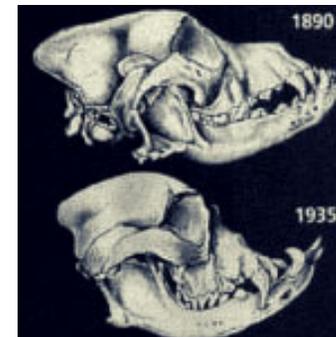
- ▶ Study showing “normal” brachycephalic dogs frequently had middle ear infections:
  - ▶ Pugs 20%
  - ▶ French bulldog 80%
  - ▶ Bulldogs 24%
  - ▶ Cavies 68%
- ▶ **Tympanic bulla malformation**-leads to hearing loss, pain, secondary infection, cholesteatoma (tympanokeratoma), vestibular issues.
  - ▶ CT preferred w/ myringotomy
- ▶ Vet Rad/U/S Mielke 2017.
- ▶ J Sm An Prac Stern 2003.

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## The bulldog skull-evolution?



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## Otitis: To be performed on every patient:

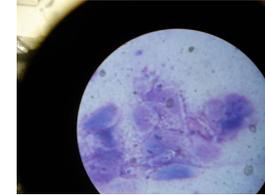
- ▶ EAR SMEARS-yeast or bacteria?
- ▶ If bacteria-cocci or rods.
- ▶ EAR SMEARS IN OIL-contagious mites such as Cheyletiella, Otodectes OR demodex.
- ▶ DO NOT FORGET TO DO EAR SMEARS IN OIL!



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## Otitis-cytology on every patient—Do it!!

- ▶ You must perform a cytology on every otitis patient or you won't know if you're dealing with yeast or bacteria!
- ▶ It gives you a head start as to what therapy you'll need.



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## Ear smears-how to:



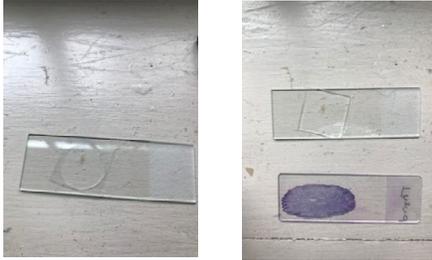
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## Ear smears-how to: 20 dips/10 dips/10 dips



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### Ear smears-how to:



Observe stained slide under oil immersion.  
Observe smear in oil with cover slip under  
10x or 40x.

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### Comparison of 4 staining methods

- ▶ Diff-Quik
- ▶ Diff-Quik/acetone
- ▶ Gram Quick
- ▶ Commercial rapid stain
- ▶ Heat fix? Not needed
- ▶ How many dips?
- ▶ 20/10/10 for Diff-Quik
- ▶ Diff-Quik most reliable...but doesn't always stain mast cells.
- ▶ Methylene blue for mast cell staining.
- ▶ Bouassiba C. 2013, German study

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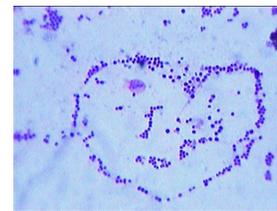
### General info about compounding otic solutions

- ▶ Just because you can mix up something doesn't mean it's stable or that it works!
- ▶ Do not instill cold ear drops!
- ▶ Watch expiration dates
- ▶ Label **"For the Ears"** if using Synotic (looks like an eye drop bottle!)
- ▶ The following compounded ear meds are considered off-label use.



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### Ears 101: Cocci bacteria



- ▶ Cocci bacteria is usually *Staph* or *Strep* which is a normal component of the ear flora unless present in large amounts.
- ▶ Round, "BB" shaped.
- ▶ Liquichlor-compounded, Osurnia (FTB), or Claro (**not for use in cats**) are my choices---if nonresponsive-culture! Other-Baytril Otic, Mupirocin (recipe to follow)

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## Mupirocin for otitis

- ▶ Mupirocin ear drop recipe: for Methicillin-resistant *Staph*:
  - ▶ Heat 1 tube Mupirocin (in the tube) in mug of warm water and allow to dissolve in the tube. Add to 60ml sterile water.
  - ▶ 3 month expiration, do not refrigerate, shake well
  - ▶ Dose: 10 drops bid in affected ear (large dogs)
- OR
- ▶ Squeeze 1/4<sup>th</sup> tube of Mupirocin into a 1oz bottle, then fill to 1oz mark with HB 101.

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## Silver Sulfadiazine Ear Solution 0.15%

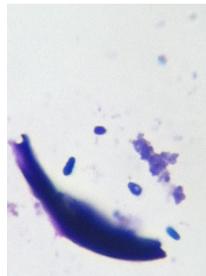
- ▶ 1% Silver Sulfadiazine cream 25Gm-use 4.4Gm  
PLUS
  - ▶ Sterile water 29.3ml
- Weigh out 4.4 Gm cream and add to water and heat with stirring until smooth mixture obtained. Transfer to 30ml bottle.
- Expiration: 60 days at room temp
- Label: For the ear, Shake well
- DO NOT COMBINE SILVER SULFADIAZINE WITH Triz EDTA!!**

Vet Pharm Assoc. 2016

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## Ears 101-Malassezia (yeast)

- ▶ Normally present in canine ears in small amounts.
- ▶ Yeast hypersensitivity-topical steroid
- ▶ Prefer NOT to use topicals containing gentamicin-why?
- ▶ No ear flush-keep ears dry. No oil-based Rx's.
- ▶ Miconazole/Synotic ear drops, Posatex
- ▶ Systemic antifungals, not compounded



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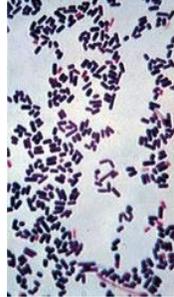
## Miconazole/Synotic ear drops for yeast otitis

- Miconazole lotion 1.5cc in 8cc Synotic:
- Instill 2-3 up to 4-5 drops sid or bid depending upon size of the dog. I don't use Conofite (Clotrimazole) lotion in cats due to the propylene glycol in the vehicle. For cats I use 1-2 drops sid or qod.
- ▶ Note: off label use, we give it a 6 month expiration date.
  - ▶ I often use as a 1-2x/wk maintenance.
  - ▶ Weekly Zymox HC as cleaner.

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## Ears 101-rod bacteria

- ▶ *Proteus* or *Pseudomonas*
- ▶ Culture usually necessary if systemic antibiotics to be used.
- ▶ Quinolones, aminoglycosides
- ▶ Caution with gentamicin-idiopathic deafness-on 1st application!
- ▶ Topicals important, topical steroids
- ▶ Systemic antibiotics



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## What's the deal with *Pseudomonas*?

- ▶ This bacteria likes to live in warm environments like dogs' ears and hot tubs!
- ▶ Rare in cats.
- ▶ A very small number of dogs carry *Pseudomonas* with no clinical disease.
- ▶ If a dog has any otitis externa for any reason, the bacteria has a chance to overgrow and set up infection.
- ▶ **Rare to see in an ear that has no trauma or excoriation of the epithelium.**



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## *Pseudomonas aeruginosa*

- ▶ Use culture & sensitivity when selecting a **systemic** antibiotic.
- ▶ Silver sulfadiazine at 1% is above the MBC (minimum bactericidal concentration)-found in Baytril Otic
- ▶ Silver sulfadiazine is synergistic with Baytril.
- ▶ Advantage to Baytril Otic-does not contain steroid.
- ▶ Triz EDTA enhances activity of antibiotics topically.
- ▶ Topical and systemic steroids helpful as well as cleaning.
- ▶ **Topical selection based on CYTOLOGY may work 90% of the time.**

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## Baytril/Synotic ear drops

- ▶ Recipe: 1.5cc small animal Baytril injectable in 8cc Synotic.
- ▶ Off label, compounded.
- ▶ We give it a 6 month expiration date.
- ▶ Dose: 3-4 to 4-5 drops s-bid (dogs)  
OR
- ▶ 0.25cc Baytril injection Large Animal (100mg/ml) in 8cc Synotic.

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## To culture or not to culture-why?

- ▶ Study by Robson, et. al. 2010 ACVS Proceedings-16 dogs with 20 affected ears.
  - ▶ 11/17 reported resistance to ab selected. 10/11 cured
  - ▶ 6/17 reported sensitive to ab selected. 5/6 responded
- ▶ *Pseudomonas a.* isolated pure or mixed.
- ▶ Rx topicals-Baytril, ticar/clav acid, Mometamax.
- ▶ 18/20 Rx prednisone
- ▶ Topical antibiotic is at much higher concentration than evident on culture! Culture based on serum levels.

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## Bottom line for cultures

- ▶ If rod bacteria present.
- ▶ If your current therapy is not working.
- ▶ Chronic bacterial otitis exists.
- ▶ If a systemic antibiotic is to be used (otitis media suspected)-Horner's, head tilt, etc.
- ▶ Remembering that the antibiotic sensitivity reflects serum level and not what you're using topically-topicals are 100-1000x the serum concentration!
- ▶ Sensitivity & response to therapy don't always agree.

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## Systemic antibiotics for rod bacterial otitis media

- ▶ Baytril 20mg/kg sid-dogs (do not exceed 5mg/kg sid for cats)
- ▶ Marbofloxacin 5-10mg/kg sid
- ▶ Orbifloxacin 10mg/kg sid
- ▶ Avoid Cipro systemically as oral absorption is inconsistent.
- ▶ Use generous doses as hard to get antibiotics systemically "into the ear".



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## Baytril/Dex/Triz EDTA ear solution

- ▶ Remove 16ml Triz EDTA from 4oz bottle and add 4ml Dex SP 4mg/ml and 12ml (1200mg) large animal Baytril injection (100mg/ml).
- ▶ Exp: 90 days
- ▶ This is off label use.
- ▶ Vet Pharm Assoc. 2017

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## Ciprofloxacin Ear Drops Amikacin Ear Drops

- ▶ Cipro ear drops recipe: Add 2cc Dexamethasone SP 4mg/ml to 2x5cc bottles of ciprofloxacin .3% ophth soln (remove 2cc first) to make a total volume of 10cc.
  - ▶ 3 month expiration This is off label use.
  - ▶ Amikacin ear drops recipe: 1cc Amikacin 250mg/ml injection + 12cc Dex SP 4mg/ml in 47cc normal saline.
  - ▶ 56 day expiration This is off label use.
- OR
- ▶ 1ml Amikacin 250mg/ml injection+1ml Dex 4mg/ml SP+8ml sterile water. off label use.

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## Amikacin stability in 4 topical solutions over a 56 day period

- ▶ Amikacin 250mg/ml added to make 10mg/ml and 30mg/ml solns:
- ▶ Added to: Triz EDTA, Triz Chlor flush, 0.9% NaCl, 0.9% NaCl+ 2mg/ml Dex.
- ▶ All ok except the 10mg/ml Triz EDTA soln where Amikacin appeared less stable.
- ▶ Klinczar A, 9<sup>th</sup> WCVD April, 2021

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## Ceftazidime ear drops for *Pseudomonas* otitis

- ▶ Ceftazidime 2Gm vial (sometimes have to purchase a pack of 10)
  - ▶ Add 10ml sterile water to one vial=12ml
  - ▶ Make 3x 4ml aliquots. Use 1 of them and freeze the other 2-stable frozen x 1 month.
  - ▶ Mix freshly made aliquot with 10ml sterile water making 14ml of 50mg/ml solution. Lasts 7-10 days.
- ▶ Systemic dose is 25mg/kg SQ bid-\$\$\$

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## Tobramycin ear drops

- ▶ For *Pseudomonas* otitis:
- ▶ 0.3% Tobramycin ophthalmic drops 5ml x 2 bottles (10ml total) + 1ml (4mg) Dex SP added to the 10ml Tobramycin. 6 month exp.
- ▶ Dr. Louis Gotthelf DVM, pers comm. 2008
- ▶ Tobramycin ophth soln 5cc + Dex SP 10cc. 1oz amber bottle. 6 month exp.
- ▶ Of all the aminoglycosides, Tobramycin reduced BAER measurements (i.e. hearing test).

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## EasOtic by Virbac-available again

- ▶ Hydrocortisone aceponate- a “ soft steroid”
- ▶ Drug is activated by skin enzymes then destroyed by enzymes. High local efficacy, low systemic effects.
- ▶ Unique metered delivery system-1 pump delivers 1ml.
- ▶ Easy for owner to apply as premeasured doses.
- ▶ For medium to large dogs.



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## Biofilm-what is it?

- ▶ First identified in dental tartar.
- ▶ Self-produced by bacteria.
- ▶ A group of microorganisms-cells sticking together on a surface like dental tartar. Embedded in a self-produced polymeric matrix (EPS)---“Stime”.
- ▶ Protects the bacteria from antimicrobials, chemical stress and physical stress.
- ▶ Ear cleanings help break up biofilms.
- ▶ Pretreating with N-acetylcysteine (NAC) or Triz EDTA helps break it down!

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## Biofilm-even in medieval times!

- ▶ A 10<sup>th</sup> CENTURY REMEDY!
- ▶ “Bald’s eyesalve”-10<sup>th</sup> century remedy for eye infections.
- ▶ Mixture of: garlic, onion, wine, bovine bile
- ▶ Have to have all 4 ingredients!
- ▶ Effective against: *S. aureus*, *Pseudomonas*, *Strep*, gonorrhoea.
- ▶ Furner-Pardoe J, Anonye BO, Cain R, Moat J, Ortori CA, Lee C, Barrett DA, Corre C, Harrison F. **Anti-biofilm efficacy of a medieval treatment for bacterial infection requires the combination of multiple ingredients.** Sci Rep. 2020 Jul 28;10(1)



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## N-Acetylcysteine (NAC) recipes

- ▶ Used as flush at >0.5% concentration
- ▶ Safe in middle ears
- ▶ Protective
- ▶ Breaks down biofilm
- ▶ Available as powder from Amazon or 20% injectable solution
- ▶ 0.2ml NAC 20% injection in 3.8 ml 0.9% NaCl. Instill 2 ml AU
- OR
- ▶ 1ml NAC 20% in 19ml 0.9% NaCl
- OR
- ▶ 10ml NAC 20% in 120ml Triz EDTA
- ▶ Use 15-30 minutes before ear meds to breakdown biofilm

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## Triz EDTA/N-Acetylcysteine

N-acetylcysteine--40mg/ml is bactericidal to *Pseudomonas*.

Used as a pre-soak 15-30 minutes prior to prescription ear drops.

We use acetylcysteine powder from Amazon.com, 1 tsp in 4oz Triz EDTA .

## Triz EDTA

- ▶ Tromethamine; Disodium EDTA
- ▶ Effective against gram negative bacteria.
- ▶ Chelates minerals in bacterial cell walls, allowing antibacterials to enter bacteria.
- ▶ Synergistic with chlorhexidine, quinolones, aminoglycosides.
- ▶ Do not combine with silver sulfadiazine!
- ▶ Alkalinizing-sometimes irritating!
- ▶ Antibiofilm
- ▶ Non-ototoxic
- ▶ For topical use in dogs, cats, horses.

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## Triz EDTA---2 kinds

- ▶ Tris-EDTA Disodium
- ▶ pH 4-6
- ▶ 3% Tetrasodium EDTA
- ▶ pH 10-11
- ▶ Finnegan, Simon, and Steven L Percival. "EDTA: An Antimicrobial and Antibiofilm Agent for Use in Wound Care." *Advances in wound care* vol. 4,7 (2015): 415-421. doi:10.1089/wound.2014.0577



## Ear Cleaners-when to use them

- ▶ DON'T OVERUSE-you don't want to ruin the natural flora, macerate, or disrupt the cleaning mechanism of the ear (epithelial migration).
- ▶ White vinegar 1 part in 9 parts water (acetic acid)
- ▶ Triz EDTA
- ▶ Epi Otic, Epi-Otic Advanced
- ▶ Duoxo Micellar
- ▶ NO IODINE IN CATS!
- ▶ Ear cleaning needed if using aminoglycosides or Polymixin B (Surolan)-pus inactivates these meds.
- ▶ Try and avoid excessive wetness in yeast otitis as you want to keep the ear canal dry.
- ▶ Contact reactions can occur.
- ▶ Swimmer's ear: HB101 or Cortastrin

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## Ear Cleaners

- ▶ Epi-Otic ear cleaner showed bactericidal activity against *Pseudomonas*, *S. pseudintermedius* after 4 and 8 minute exposure but no bactericidal activity against *Malassezia*.



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- ▶ Fantini O, Vetoquinol, France. 2018 Vet Derm.

## Ear Cleaners

- ▶ T8 Keto by Elanco
- ▶ Has benzoic acid which also has activity against gram (-) bacteria.
- ▶ Triz EDTA-increases permeability of the gram (-) cell wall.
- ▶ Used in conjunction with topical antibiotics



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## Ear cleaners-stability when dexamethasone is added

- ▶ Dexamethasone (not SP) 2mg/ml to make 0.1 and 0.25mg/ml solution when added to:
- ▶ Stable at room temp and refrigerated temps for **90 days**.
- ▶ Triz Ultra+Keto Flush
- ▶ Mal-A-Ket Plus Triz EDTA flush
- ▶ Epi-Otic Advanced
- ▶ Duoxo Micellar Solution

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## Stability of 0.9% compounded Baytril in ear cleaners

- ▶ Efficacy against *Staph pseudintermedius* and *Pseudomonas aeruginosa* after **28 days**
- ▶ Stability in Triz Chlor only 14 days due to pH difference.
- ▶ Baytril in:
  - ▶ Triz EDTA
  - ▶ Triz Chlor
  - ▶ Epi-Otic
  - ▶ Epi-Otic Advanced
  - ▶ Sterile water
- ▶ Metry C. Vet Derm 2012

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## Ear cones-what about them?

- ▶ Use a separate ear cone for examining each ear.
- ▶ One study showed 29% of ear cones were contaminated:
- ▶ 6% with *Pseudomonas*
- ▶ 4% *Staph pseudintermedius*



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## What are you cleaning your ear cones with?

- ▶ 24% of vet hospitals didn't know the name of the solution they were using to clean cones!
- ▶ Do not store cones with other instruments.
- ▶ Don't use benzalkonium chloride-not effective.
- ▶ Most effective: **Cetylcide G**
- ▶ Chlorhexidine gluconate 2%
- ▶ *Pseudomonas* lived thru: wipe and water rinse, 70% isopropyl alcohol
- ▶ VetDerm 2006/2010.

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## For maintenance once infection clears...

- ▶ Studies show that there remains **subclinical inflammation** once skin appears normal.
- ▶ After infection clears, use a topical steroid such as Synotic drops as maintenance 2-7 days/wk. Keeps the canal less inflamed, **less inflamed canal is less able to harbor infection.**
- ▶ Remember: normal skin has the ability to "fight off" infection, compromised skin does not!
- ▶ Compromised skin likes to attract *Pseudomonas*.
- ▶ **BE SURE TO RECHECK EARS!!**

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## Other thoughts on otitis...

- ▶ If long-standing yeast & bacterial otitis-most likely started out as yeast otitis. Ear canal's ability to fight off infection due to chronic yeast otitis encourages secondary bacterial otitis.
- ▶ Check cytology-if rods + yeast present-TREAT RODS 1st, recheck, then if rods gone, address the yeast otitis. Try and catch yeast otitis early! **ALWAYS DO CYTOLOGY-** don't rush to culture-believe what YOU see on cytology!
- ▶ **Rod bacteria is always the first priority-even on multiple bacterial culture results!**

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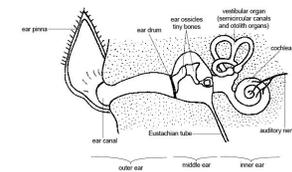
## Other thoughts on otitis, continued

- ▶ Apoquel-not much help, if at all, for ears. One current study WCVD 2021 shows it helps in “allergic otitis”.
- ▶ Address and control any **underlying allergies-atopy, food allergy**.
- ▶ My top choices for controlling otitis associated with atopy are immunotherapy +/-modified cyclosporine.
- ▶ Short term steroids to reduce stenotic canal.
- ▶ Consider maintenance ear drops.
- ▶ Routine cleaning but don't overdo-ruins natural flora and mechanical “washing” of the canal.

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## Ear canal size-based on size of dog

- ▶ Small dogs: 4-6 drops=0.25ml
- ▶ Medium dogs: 8-10 drops=0.5ml
- ▶ Large dogs: 10-15 drops=0.75ml
- ▶ Giant dogs: 20 drops=1ml
- ▶ Forsythe W. AJVR 1985



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## What about “leave-in” products?

- ▶ **Lanolin base** can cause **concretions** to form in canal that have to be manually removed.
- ▶ Can accumulate in middle ear if TM not intact. Especially true in cats!!
- ▶ BNT, Oto-Pack, Triple Otipak
- ▶ May be useful in aggressive dogs.
- ▶ Claro-monthly-preferred as has mometasone-doesn't penetrate systemically
- ▶ Osrnia-weekly-has betamethasone

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## Comparison of Claro and Osrnia

- |                               |                               |
|-------------------------------|-------------------------------|
| ▶ Claro                       | ▶ Osrnia                      |
| ▶ Florfenicol 16.6mg/ml       | ▶ Florfenicol 10mg/ml         |
| ▶ Terbinafine 14.8mg/ml       | ▶ Terbinafine 10mg/ml         |
| ▶ <b>Mometasone</b> 2.2mg/ml  | ▶ <b>Betamethasone</b> 1mg/ml |
| ▶ 1ml, clear liquid soln      | ▶ 1ml translucent gel         |
| ▶ Room temperature            | ▶ Refrigeration needed.       |
| ▶ Monthly application         | ▶ Weekly application          |
| ▶ <b>Not for use in cats.</b> | ▶ <b>Not for use in cats.</b> |

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## “Ear Packs”-be careful!

- ▶ Lanolin-based otics may cause conductive hearing loss.
- ▶ If product gets into the middle ear- impossible to remove!
- ▶ There is **no solvent to remove** lanolin-based products!
- ▶ Report of ototoxicity caused by Osurnia-**only apply with intact TM.**
- ▶ 3yr old Maltese-pain, edema OS- 24hr post ear med. application: KCS, ipsilateral dry nose.
- ▶ Mascarenhas M, ACVD abstract 2020

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## Otitis externa - consider contact allergy to topical ear meds!

- ▶ Check ear smears
- ▶ Inquire about what products are being used and where applied & how often i.e. pinna vs canal application.
- ▶ Check ear canal
- ▶ **Stop all topicals**, short term oral steroid to reduce inflammation.



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## Otitis externa-”peeling” ear pinna

- ▶ Topical steroids cause a thinning of the skin resulting in a fine “peeling” of the medial aspect of the pinna.
- ▶ Solution—stop the steroid-containing topical! Owners will try and use MORE to remedy the problem.



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## Topical steroid sensitivity



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## Ear hematoma non-surgical Rx

- ▶ 10 dogs with ear hematomas Rx'd with 0.4ml triamcinolone acetonide (6mg/ml) into the hematoma after draining + oral prednisone 1mg/kg x 10 days. Evaluated at day 5,10. All resolved by day 10.



- ▶ Cordero ACVD Abstract 4/13/2019

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## Cardiac arrest following deep ear flush under anesthesia

- ▶ 14yr old Cocker spaniel.
- ▶ Cardiac arrest due to stimulation of the auricular branch of the vagus nerve. (when you stimulate the vagus you slow the heart)
- ▶ Add atropine or glycopyrrolate as preanesthetic to offset bradycardia due to otic flushing.
- ▶ Gould A. JAVMA 250;9: 2017.

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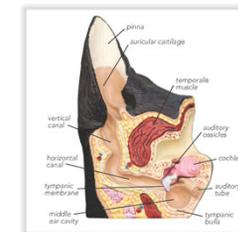
## Safety re: ototoxicity-products may also contain multiple ingredients

- ▶ Cerumene and Duoxo Micellar—both appear to be safe for wax removal.
- ▶ Ceftazidime, Clotrimazole, Dexamethasone,
- ▶ Enrofloxacin, Flucanazole, Nystatin, Ofloxacin, Squalene, Triamcinolone, Tris-EDTA
- ▶ Koch 2012

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## Used in ruptured eardrums

- ▶ 2% acetic acid used as a flush daily.
- ▶ Aqueous solutions of quinolones or silver sulfadiazine reported to be safe even in ruptured eardrums.
- ▶ Aqueous solutions of glucocorticoids.
- ▶ N-acetylcysteine >0.5%



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## Underlying primary causes of otitis-don't forget to address

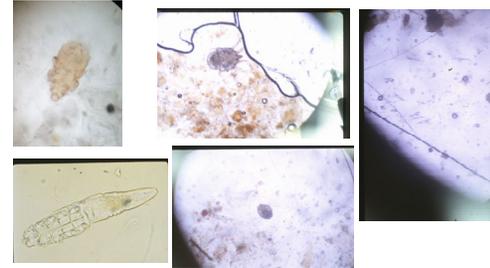
- ▶ 100 dogs with acute (37%) and chronic (63%) otitis externa-most common cause was **allergic dermatitis (43/100)**. Others had foreign bodies or ear mites or undetermined.
- ▶ Up to **50%** of atopic dogs may present with **UNILATERAL** otitis only!



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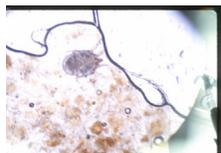
## Ectoparasites--can affect ears & skin- check ear smears in oil



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## Ears 101-parasitic-Otodectes

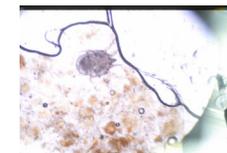
- ▶ Otodectes cynotis
- ▶ Can live ON the dog or cat, outside of the ear.
- ▶ Usually secondary yeast present.
- ▶ Ear smears in oil or observation in canal.



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## Otodectes cynotis (ear mites)

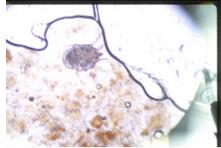
- ▶ Life cycle- 3 wks
- ▶ Mites feeding cause irritation-ear canal fills with blood, exudate, cerumen.
- ▶ # of mites not proportional to amount of discharge.
- ▶ Diagnosis by visual otoscope or smears in oil



64

## Otodectes cynotis (ear mites)

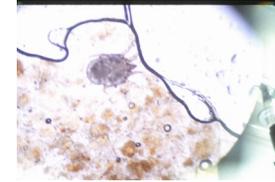
- ▶ Live in ears but also neck, rump, tail.
- ▶ Local rx's: Acaress, Tresaderm, Milbemite. Clean ears first.
- ▶ Systemic: Selamectin, Ivermectin, Advantage Multi, Isoxazolines
- ▶ Treat household in kennel environments.



65

## Otodectes cynotis-ear mites

- ▶ A single oral administration of Sarolaner (Simparica) was safe and highly effective in the treatment of Otodectes cynotis in dogs.
- ▶ “Efficacy and safety of sarolaner in the treatment of ear mite infestation caused by Otodectes cynotis: a non-inferiority study.”
- ▶ Besckeskei C. Vet Derm 2018;29: 100-103.



66

## Cheyletiella-“Walking dandruff”

- ▶ Affects dogs, cats, rabbits, guinea pigs, humans, and ?
- ▶ Physical appearance-large!
- ▶ Mostly surface living (non burrowing)--prefer the dorsum-can affect ears/eyes/nose
- ▶ Life cycle-21 days
- ▶ 3 species: C. yasguri: usually affects dogs
  - ▶ C. blakei: usually affects cats
  - ▶ C. parasitovorax: usually affects rabbits
- ▶ All of the above can transiently affect humans.

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## Cheyletiella

- ▶ Clinical appearance-DOGS
- ▶ Flaky, papular, waxy otitis, itchy/swollen face, sneezing, “hookworm infection”-Cheyletiella larvae look like hookworm eggs.
- ▶ Some patients asymptomatic i.e. can have asymptomatic carriers

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### Cheyletiella Mites "Walking Dandruff"

Almost an epidemic!

69

## Cheyletiella

- ▶ Clinical appearance-CATS
- ▶ Miliary dermatitis, EGC lesions, flaky skin, sneezing, nasal congestion, facial pruritus, Depo-Medrol responsive.
- ▶ Asymptomatic carriers.
- ▶ Can find on ear smears or on combs from the pet.

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### Cheyletiella

Mite is larger!

Mite egg resembles hookworm egg but larger.

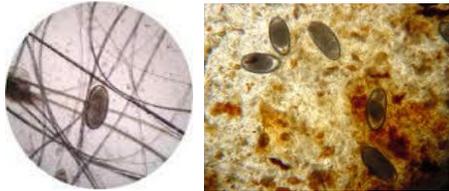
71

## More Cheyletiella views



72

## Cheyletiella larva resemble hookworm eggs!



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## Cheyletiella-mites can crawl into/out of ears/nostrils



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## Cheyletiella

- ▶ Treatment- DOGS
- ▶ Ivermectin- 200ug/kg/wk x 4 doses-not in herding breeds, caution in elderly dogs no matter which breed.
- ▶ Interceptor 1mg/kg qod x 16 days
- ▶ Revolution- 3 doses, 15 days apart.
- ▶ Must be heartworm negative 1st

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## Cheyletiella

- ▶ Treatments-DOGS, continued
- ▶ Advantage Multi q 2 wks x 4 treatments
- ▶ Lime dip q wk x 4-5 weeks
- ▶ Frontline spray q 3 wks x 2 applications
- ▶ Pyrethrin shampoo q wk x 4-5 wks
- ▶ Bravecto, NexGard, Simparica
- ▶ Treat the household especially carpet/upholstery with a topical parasiticide eg. Knockout Premise Spray.

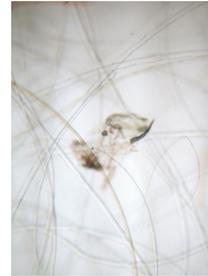
76

## Cheyletiella

- ▶ Treatment-CATS
- ▶ Ivermectin 200ug/kg/wk x 4 wks
- ▶ Revolution-3 doses, 15 days apart
- ▶ Lime dips q wk x 4-5 weeks
- ▶ Frontline spray q 3 wks x 2
- ▶ Interceptor 1mg/lb q wk x 4 wks
- ▶ Bravecto topical solution x 1
- ▶ Remember to treat the environment!

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## Cheyletiella



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## Canine Sarcoptic Mange-scabies



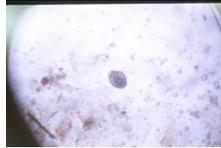
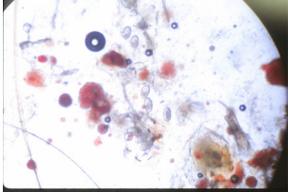
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## Canine scabies

- ▶ Clinical signs: PRURITUS, usually nonresponsive to antiitch steroid doses.
- ▶ Elbows, hocks, ear edges, abdomen. Lymphadenopathy. Early scabies presents just as pruritus with no lesions.
- ▶ Success rate of finding a mite on scrapings: 20-50%
- ▶ Ear hematoma? Check for scabies, otitis.

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## Canine Sarcoptic Mange-scabies



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## Canine scabies: Diagnosis

- ▶ Deep skin scrapings till blood- yields mite, eggs, or fecal matter-scrape nonexcoriated areas such as intact yellow crusts.
- ▶ Skin biopsy.
- ▶ Positive pinnal/pedal reflex.
- ▶ House dust mite positive on skin test.
- ▶ Elisa test in Europe, Idexx in the U.S.
- ▶ "Ivermectin response test".

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## Canine scabies: Treatment

- ▶ Bathing to remove crusts, antibiotics for secondary infection, steroids at anti-inflammatory doses.
- ▶ Lime sulfur dips q 5-7 days. OR
- ▶ Mitaban dips weekly x 2 wks, if >16wks old. OR
- ▶ Doramectin 0.6mg/kg weekly injection successful by week 7 in 95% of dogs. OR

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## Canine scabies: Treatment

- ▶ Interceptor: 1mg/kg qod x 16 days, lst must be heartworm negative. OR
- ▶ Revolution: 1 tube topically q 15 days x 2 doses then q month. Heartworm neg. lst. OR
- ▶ Ivermectin: 200ug/kg/wk SQ or PO x 4 wks, heartworm neg. lst. Do not use in herding breeds, careful in elderly patients OR
- ▶ Bravecto, Nexgard, Simparica

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## Canine scabies: Treatment

- ▶ Treat all dogs that were exposed to the patient.
- ▶ Treat environment with pesticide, vacuum floors & upholstery, wash bedding. Mite can live off the host from 4-21 days.
- ▶ Hypothyroid dogs tend to have massive numbers of the mite.
- ▶ Consider in an older dog that never had skin problems before!
  
- ▶ IF YOU EVEN SUSPECT SCABIES, TREAT FOR IT!
  
- ▶ Can the mite live on humans? Possibly for only a few days at most since its an unpreferred host!

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## Notoedres-feline scabies



86

## Notoedres (feline scabies)

- ▶ Regional-seen only in certain areas.
- ▶ Crusting of face/ears/hocks
- ▶ Skin scrapings
- ▶ Easier to find than canine scabies
- ▶ Treatment as for Cheyletiella mites- Revolution, topical Bravecto, Credelio



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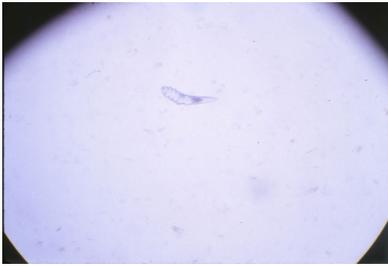
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## Noncontagious Mites Causing Otitis

They're not contagious but still cause a lot of trouble!

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## Canine Demodex Otitis



89

## Canine Demodex otitis

- ▶ Remember to perform ear smears in oil.
- ▶ Can be localized only to the ears particularly in "steroid-sensitive" dogs such as Doxies, Pugs that have been on chronic steroids or steroid-containing topicals.
- ▶ Treatment: Milbemite, Bravecto, NexGard, Simparica

90

## Canine Demodex-unusual presentation



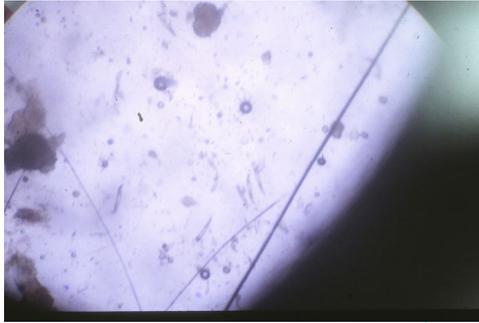
91

## Demodex otitis-cats



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## Demodex cati



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## Demodex cati

- ▶ Appearance: long/slim like Demodex canis.
- ▶ Localized: usually affects head/ neck or presents as a waxy otitis.
- ▶ Variably pruritic, patchy, crusty, alopecia.
- ▶ May be self-limiting
- ▶ Treatment: lime sulfur, amitraz in mineral oil lcc in 29cc mineral oil--prepare fresh daily.
- ▶ Topical Bravecto, Credelio
- ▶ Avoid steroid use.

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## Demodex cati

- ▶ When ears only affected--may present as a waxy otitis--be sure to check ear smears in oil even if very little discharge.
- ▶ May be contagious.
- ▶ Diluted lime dip 1-2 drops in affected ear sid or 2-3x/wk.
- ▶ Avoid steroid use.

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## Demodex cati-may be localized to the ears and face



96

## Ear Cleaners

- ▶ Don't over use! Destroys normal ability of the ear to fight off infection.
- ▶ Use sparingly in yeast otitis-want a dry ear, not chronically moist!
- ▶ Contact reactions can occur.
- ▶ Use especially in rod bacterial otitis, pus-containing ears to remove debris/pus to instill medication.
- ▶ Never put cold meds in ears!

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## Stenotic canals

- ▶ Find underlying reason: food allergy, atopy, yeast hypersensitivity
- ▶ Oral prednisone-short course
- ▶ Topical steroid-Synotic
- ▶ Surgery-calcified cartilage
- ▶ Discuss expectations with owner!



98

## Cocker Spaniels' hyperplastic ears

- ▶ Reaction of glands lining the ear canal to chronic inflammation/infect.
- ▶ Most often surgical.
- ▶ Topical steroids: Synotic, injectable steroids into hyperplastic tissue, laser removal of hyperplastic tissue.
- ▶ Apoquel may make worse.
- ▶ Goal: keep canal open



99

## Cyclosporine in end-stage otitis

- ▶ 5 dogs with end stage proliferative otitis (1 Golden retriever, 4 Cocker spaniels).
- ▶ Treated with 5mg/kg bid modified cyclosporine x 12 wks. All dogs showed significant improvement.
- ▶ Hall JA, Veterinary Dermatology 14; 2003: p 212.

100

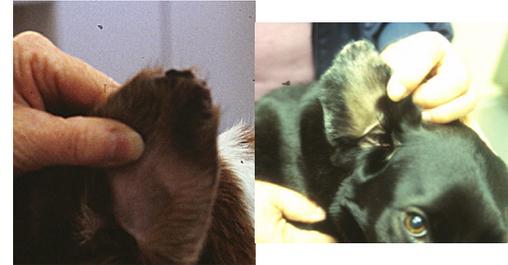
## Ear edge vasculitis

- ▶ Seen in Chihuahua's, Doxie's, Poodles
- ▶ Sometimes vaccine related
- ▶ Can become systemic
- ▶ Steroids, Vit E 20iu/kg sid orally, pentoxifylline 25mg/kg tid, doxycycline 2-5mg/kg bid, cold avoidance, tacrolimus 0.1% topically, Apoquel 0.4-0.6mg/kg bid



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## Ear edge vasculitis



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## Ear edge vasculitis-backlighting



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## Miscellaneous ear pinnal stuff



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### Miscellaneous ear pinnal stuff



105

### Miscellaneous ear pinnal stuff



106

### Miscellaneous ear pinnal stuff

- ▶ German shepherds
- ▶ Seen in winter months in the Midwest.
- ▶ Ear edges alopecic, crusty, not pruritic. Hair regrows in spring/summer.
- ▶ Thought to be due to low humidity?



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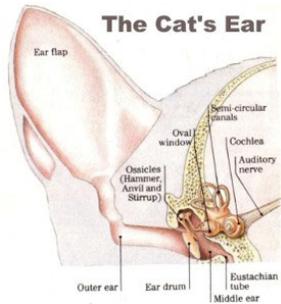
### What about hematomas in dogs?

- ▶ 251 surveyed: 43% needle drainage, -16% without instilling steroids locally, 29% surgery, drain placement 4%.
- ▶ Surgery: linear incision w/ sutures 35%, stents 24%, s-shaped incision 23%
- ▶ Other stent approaches 18%
- ▶ Surgery 91% success, needle drainage with steroids 51% success, no steroids 38%
- ▶ Most common initial Rx-needle drainage w/ steroids 59%.

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## Cat's ears-how they differ

- ▶ Incidence of ear disease in cat 2-6%
- ▶ Allergy doesn't affect cats' ears as much as in dogs.
- ▶ Coag. neg *Staph* most often cultured-*Pseudomonas* not very common.
- ▶ *Malassezia*-more common.



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## Cat's ears-how they differ

- ▶ Middle ear-cat has a much different ventral tympanic bulla.
- ▶ Ventral bulla is divided by an incomplete septum-branch of sympathetic nerve runs thru this-damage results in Horner's syndrome.
- ▶ Septum is more readily damaged when flushing, cleaning, or by instruments-Horner's more common in cats with otitis!
- ▶ Fluid in cats' ears stays there! If irritating-causes damage.

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## Other thoughts on cat otitis, continued

- ▶ Often see outbreaks of otitis in cats post upper respiratory infection. Presumed to be secondary to Herpes virus.
- ▶ Rx: Famciclovir 90mg/kg bid for 2-4 wks
- ▶ Some cats "blow out" their eardrums from violent sneezing-put ear mite rx in-develop otitis media from the rx or ivm! Will see neutrophils and few cocci on smears. Rx-oral antibiotics, no further ear meds!

111

## Otitis media in cats

- ▶ Most often from ascending infection from the auditory tube (TM usually intact).
- ▶ Or as extension from otitis externa thru a perforated TM-due to allergy or ear mites.
- ▶ *Pasturella*, *strep*, *staph*, *Bacteroides*, *strep zoo*-most are sensitive to Clavamox or if *pseudomonas*-Baytril or Zenaquin.

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## Malassezia otitis in cats

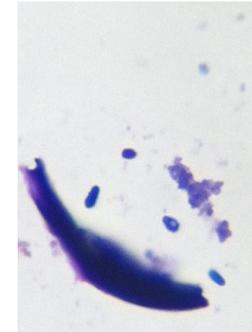
- ▶ Can be primary or secondary to underlying atopy.
- ▶ I see atopy a lot in orange colored cats-includes calicos and tortoise-shell.
- ▶ Can be spread to chin and face by their pawing their face.



113

## Malassezia otitis in cats

- ▶ Oral Ketoconazole 200mg 1/8<sup>th</sup> tablet sid or qod-watch for anorexia. DO NOT COMPOUND
- ▶ Miconazole Lotion 1.5cc in 8cc Synotic and use 1-2 drops once daily. NO FLUSH
- ▶ **No Clotrimazole or Chlorhexidine or Iodine in cats!**



114

## Malassezia otitis-cats



- ▶ Can see a primary yeast hypersensitivity.
- ▶ Possible ear hematomas due to yeast hypersensitivity.
- ▶ Check ear smears, chin/face smears.

115

## Treating cats' ears-how they differ

- ▶ **Avoid ear flushing! Be very gentle!**
- ▶ No ear packs!
- ▶ **Systemic treatment** for otitis vs. topicals
- ▶ Cats **more sensitive** to topicals.
- ▶ Young cats with recurrent otitis-suspect polyps
- ▶ Yeast otitis-oral ketoconazole, Tresaderm or miconazole/synotic-use as little topicals as possible!!
- ▶ Try and avoid topical gentamicin-deafness
- ▶ Instruct owners on how to medicate with topicals.
- ▶ Warm ear meds to room temperature.

116

## Cats' ears-misc. diseases

- ▶ Inflammatory polyps
- ▶ Proliferating necrotizing otitis
- ▶ Ceruminous cystomatosis



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## Inflammatory ear polyps in cats

- ▶ Arise from the epithelial lining of the nasopharynx, auditory tube, or middle ear.
- ▶ Chronic inflammation +/-infection leads to their development.
- ▶ In 4 cats with bilateral polyps, detection of the 2<sup>nd</sup> polyp wasn't possible without CT.
- ▶ No clinical difference between signs in unilateral vs. bilateral polyps.

118

## Inflammatory ear polyps in cats

- ▶ Arise from the epithelial lining of the nasopharynx, auditory tube, or middle ear.
- ▶ Signs: otorrhea, head shaking, ear rubbing, head tilt
- ▶ 28.5% are bilateral-if you're only seeing 1, possible the remaining polyp hasn't pushed through the TM yet!
- ▶ 4/8 cats with bilateral polyps had URIs
- ▶ CT picked up 13/19 cats
- ▶ No difference in clinical signs between bilateral and unilateral polyps.
- ▶ Video otoscopy picked up 10/19 cats

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## Traction followed by steroid

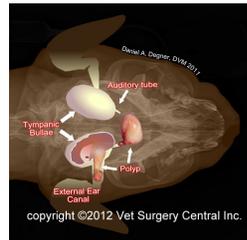
- ▶ Traction removal has 33-85% chance for recurrence.
- ▶ Traction followed by 8 week course of prednisolone 2-3mg/kg/day + topical steroid was as effective as aggressive surgical removal.
- ▶ Bachtel J, ESVD abstract 2021



120

## Nasopharyngeal polyps

- ▶ Traction removal preferred to incision.
- ▶ Recurrence: 13.5-57% of the time.
- ▶ Complications infrequent but up to 43% Horner's syndrome reported.



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## Proliferative Necrotizing Otitis

- ▶ Self resolution in <2 years but not always.
- ▶ Best rx: Tacrolimus 0.1% bid topically and/or Famciclovir.
- ▶ Steroids less reliable but some report intralesional or topical steroids help.
- ▶ Response can take weeks to months.
- ▶ Photo: Dr. Emery ACVD



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## Feline cystomatosis



- ▶ Usually due to underlying allergy.
- ▶ Surgical removal via laser or topical steroids such as Synotic.

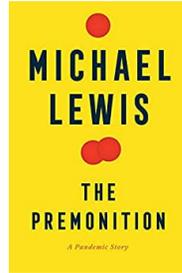
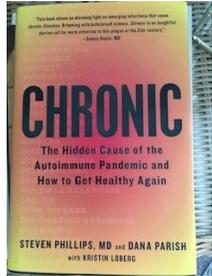
123

## Ears-final thoughts

- ▶ Do **ear smears** on all patients both **dry and in oil**.
- ▶ **Culture if rods** present or if not responding to current meds.
- ▶ Keep **ears dry with yeast** otitis-no flush!
- ▶ Ear cleaning in rod bacterial otitis or before using Polymixin B or Gentamicin.
- ▶ **Minimize topicals** in **cats**. Gentle, if any, ear flush! What's in the cat's ear, stays there!
- ▶ Be aware of possible contact reaction to ear cleaners.
- ▶ Not all otitis requires ear flushing!!
- ▶ Recurrent otitis in cats- consider polyps.

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2 great books!



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Thanks for the great work you all do!!



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NOTE: CE certificate not available for watching the recording.

Questions about CE?  
[events@heska.com](mailto:events@heska.com)

Questions about topic?  
[ajeromin@purrfectpet.com](mailto:ajeromin@purrfectpet.com)

Thank you for joining us!



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Now everyone go home and hug your pets!!



128

Because they're the best thing that ever happens to us in life!



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## References

- ▶ Bradley C, et al. The otic microbiota and mycobiota in a referral population of dogs in eastern USA with otitis externa. *Vet Derm* 31: 2020 225-e49.
- ▶ Mascarenhas M. An atypical presentation of ototoxicity caused by an ear medication containing florfenicol, terbinafine, and betamethasone acetate. *ACVD abstract* 2020 P-63.
- ▶ Baehniel J, et al. Partial traction/avulsion followed by systemic and topical glucocorticoid therapy for the management of feline aural inflammatory polyps. *ACVD abstract* 2020 FC-6.
- ▶ Kennis, R. Feline Otitis: Diagnosis and Treatment. *Vet Clinics NA SAM* 2013 43: 51-56.
- ▶ Hoppers S, et al. Feline bilateral inflammatory aural polyps: a descriptive retrospective study. *Vet Derm* 2020 (31) 385-e102.
- ▶ Metry C, et al. Determination of enrofloxacin stability and in vitro efficacy against *Staphylococcus pseudintermedius* and *Pseudomonas aeruginosa* in four ear cleaner solutions over a 28 day period. *Vet Derm* 2012 (23) 1: 23-8.
- ▶ Erzey C, et al. Preliminary study of the stability of dexamethasone when added to commercial veterinary ear cleaners over a 90 day period. *Vet Derm* 2021 (32): 168-e039.
- ▶ Hoff S, et al. Stability of diluted cefazidime in three otic preparations under different storage conditions over a 28 day period. *ACVD abstract* 2019
- ▶ Klinczar A, et al. Determination of amikacin stability in four topical solutions over a 56-day period. *ACVD abstract* 2020
- ▶ Stevens B, et al. Pathology in Practice (feline necrotizing otitis). *JAVMA* (241)5:2012: 567-569.
- ▶ Kirby AL, et al. Evaluation of otoscope cone disinfection techniques and contamination level in small animal private practice. *Vet Derm* 21: 2010: 175-183.
- ▶ Newton H, et al. Evaluation of otoscope cone cleaning and disinfection procedures commonly used in veterinary medical practices: a pilot study. *ESVD* 17: 2006: 147-150.

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## References

- ▶ Gould A, et al. Cardiac arrest in an American Cocker Spaniel during a deep ear flush procedure. *JAVMA* 250(9);2017: 1023-1026.
- ▶ Bouassiba C, et al. Comparison of four different staining methods for ear cytology of dogs with otitis externa. *Tierarztl Prax* 41(1); 2013: 7-15.
- ▶ Sparks TA, et al. Antimicrobial effect of combinations of EDTA-Tris and amikacin or neomycin on the microorganisms associated with otitis externa in dogs. *Vet Res Comm* 18(4);1994: 241-9.
- ▶ Wainberg S, et al. Comparison of complications and outcome following unilateral, staged bilateral, and single-stage bilateral ventral bulla ostomy in cats. *JAVMA* 253 (7);2019: 828-836.
- ▶ Cordero A, et al. Non-surgical treatment of canine auricular haematoma with intralesional and systemic corticosteroids, a pilot study. *ACVD abstract* 2019: P-121.
- ▶ Stern-Bertholtz W, et al. Primary secretory otitis media in the Cavalier King Charles spaniel: a review of 61 cases. *J Sm An Prac* 44;2003: 253-256.
- ▶ Cole L, et al. Bacteriology and cytology of otic exudates in 42 cavalier King Charles spaniels with primary otitis media. *Vet Derm* 30;2019: 151-e44.
- ▶ Robson DC, et al. Correlation between topical antibiotic selection, in vitro bacterial antibiotic sensitivity and clinical response in 17 cases of canine otitis externa complicated by *Pseudomonas aeruginosa*. *ACVD Proceedings* 2010: 101-102.
- ▶ Paterson S. Otitis media with effusion in the boxer: a report of seven cases. *J Sm An Prac* 59;2018: 646-650.

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