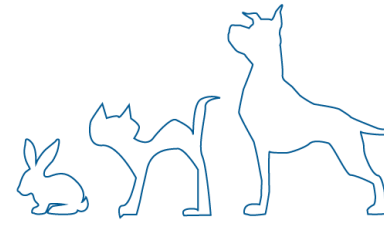
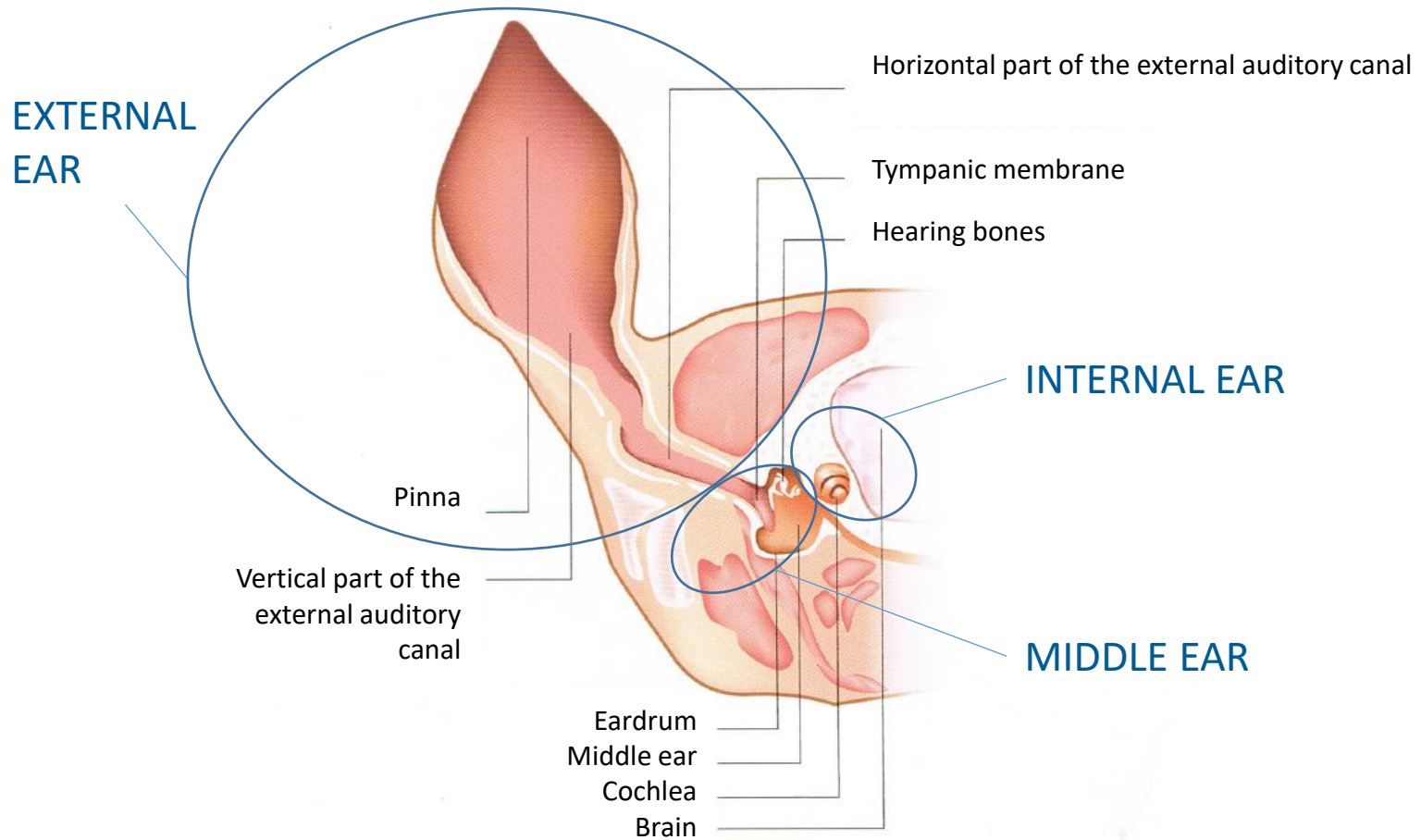


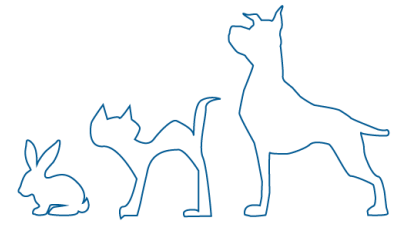


# Training session : oto products



# The ear: anatomical and physiological reminders





## The ear: anatomical and physiological reminders

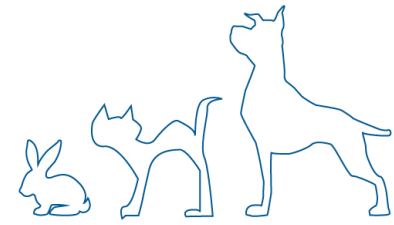
### Earwax

**Physiologically produced** in the **external auditory canal**

Mixture of secretions from sebaceous glands, ceruminous glands and corneocytes

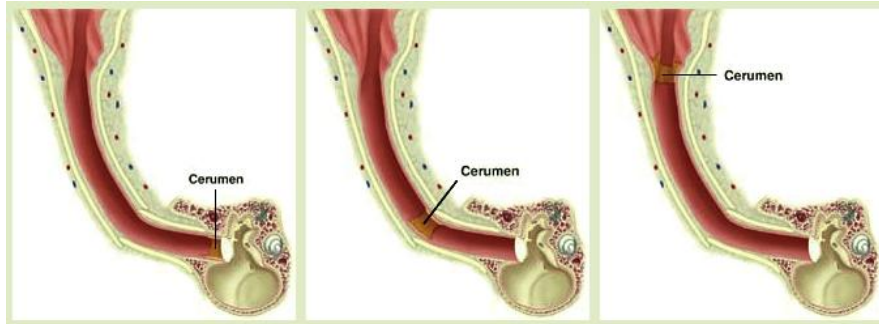
50% of lipids <sup>(1)</sup>  
Ig A, G, M

**Mechanical barrier, anti-fungal and anti-bacterial** <sup>(2)</sup>



## The ear: anatomical and physiological reminders

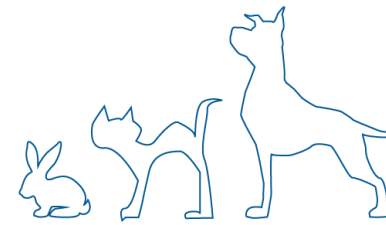
### Epithelial migration



Epithelial cell renewal with migration to the opening of the external auditory canal like a real "treadmill"

➔ Evacuation of debris and earwax

True "physiological cleansing"



## Importance of ear diseases

Ear disease prevalence up to <sup>(3,4)</sup>

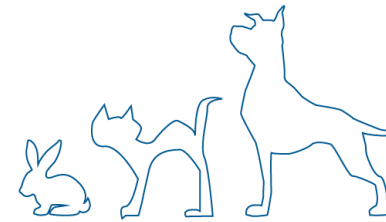
→ 25% in dogs

→ 6% in cats



**Otitis externa**

up to **20%** of veterinary consultations in small animal practice <sup>(5)</sup>



## Different types of otitis

### OTITIS EXTERNA

Inflammatory disease of the external auditory canal divided into 2 groups according to clinical criteria:

#### Erythematous-ceruminous otitis externa (ECO)

- Very erythematous EAC
- High quantity of earwax, thick, dry, brown to black
- Pruritus ++
- Little painful



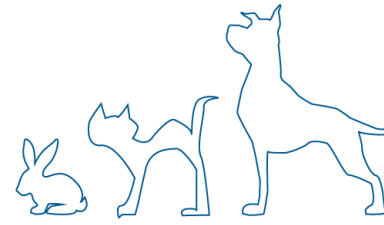
© Dr. W. Bordeau

#### Purulent or suppurated otitis

- Erythematous EAC
- Erosions, ulcers
- Purulent earwax, creamy, yellowish-white to green
- Strong and unpleasant odor



© Dr. W. Bordeau



## Predispositions to otitis

### Anatomical features

- Verticality of the canal / « L » shape
- Poor air circulation
- Narrow canal limiting the natural drainage
- Partial or total obstruction of the EAC by hair
- Abundance of secretory glands



### Breed

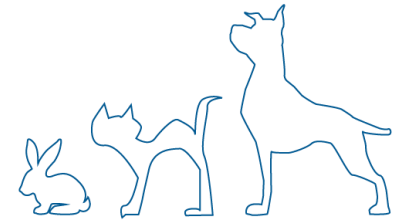
Animals with floppy ears, and Sharpeis for which a narrowing of the diameter of the canal is observed

### Age

Mainly young animals (ear mites, atopy, keratinization disorders)<sup>(4)</sup>

### Season

Mostly spring-summer



## Etiology of otitis

### Primary factors

**Foreign bodies**  
spikelets

**Allergies**  
Between 55% and 86% of dogs  
with atopic dermatitis have  
associated otitis externa <sup>(6,7)</sup>



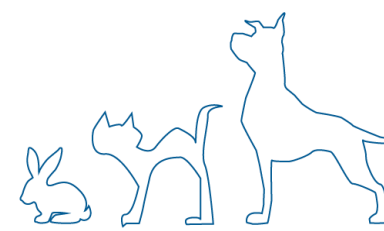
**Parasites**  
Ear mite, body mite, ticks,  
demodicosis ...

**Endocrine disorders**  
hypothyroidism,  
hyperadrenocorticism

**Keratinization disorders**

**Autoimmune diseases**  
Pemphigus, lupus





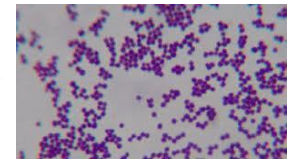
# Etiology of otitis

## Secondary factors

**Biofilm**

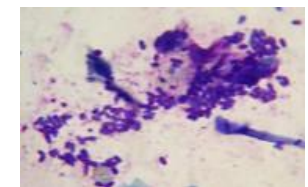
### Bacteria

*Staphylococcus pseudintermedius*++,  
*Pseudomonas aeruginosa*



### Yeasts, fungi

*Malassezia pachydermatis* ++ and  
*Candida spp.* +/-

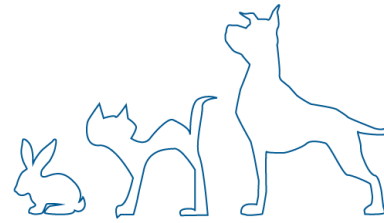


### Tissue changes

Hyperplasia of the ceruminous glands

### Unsuitable treatments

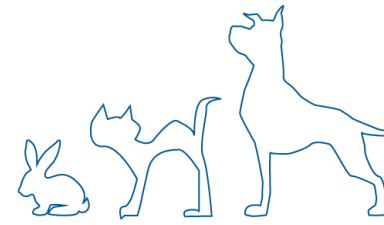




## A new challenge = the biofilm

- a biofilm is a **group of microorganisms (bacterias, yeasts, fungals..)** clustered and **protected within a matrix** they have produced themselves
- In the case of a **bacterial otitis of *Pseudomonas aeruginosa*** type, **biofilms may form**
- Biofilms are **responsible for therapeutic failure and antibiotic resistance**
- Indeed, most of the time, when an **appropriate antibiotic is ineffective**, it may mean that a **biofilm is present**. Therefore, when a biofilm is identified, **it is necessary to eliminate it**.
- **Manuka essential oils for example, N-acetylcysteine and Tris-EDTA are well known for their effectiveness in preventing biofilm formation.**





## A dual approach is essential

**Cleansing**



**Topical treatment**

**Objectives:**

Eliminate debris, earwax, foreign bodies  
without damaging the EAC

**Important properties:** cerumenolytic,  
restructuring, soothing, antimicrobial,  
antibiofilm

**Objectives defined according to the condition:**

Antibiotic / antibiofilm, anti-inflammatory,  
antiparasitic...



I'm all ears!

Ears prone to infections

Otitis externa

Predisposed ears (narrow canal, hairy duct, floppy ears, atopic pets...)

Routine ear hygiene

Dirty ears, bad odors

Excessive earwax

?

**OTO** products

To help manage ear disorders

# OTO products

To help manage ear disorders

## PYOclean<sup>®</sup> Oto

Purifying ear cleanser



## Essential Oto<sup>®</sup>

Physiological ear cleanser

## INDICATION

- Prevention of recurrent erythematous-ceruminous otitis (ECO)
- Complementary care for treatment of otitis externa

### Helps:

- **Cleanse & deodorize**
- **Purify thanks** to antimicrobial and antibiofilm active ingredients
- **Limit the proliferation of pathogens & rebalances skin flora**
- **Soothe** the ear canal



Hygienic and practical single-dose format

*ECO: once a day prior to the medical treatment*

*Maintenance to avoid relapses: once a week for one month and then once every two weeks as long as necessary*

# PYOclean<sup>®</sup> Oto

## Purifying & soothing ear cleanser



10 single-doses

# PYOclean® Oto

Purifying & soothing ear cleanser



## Single doses format – Major advantage of this product !

- A very **ease of use**
- A **precise dosage** of 5 mL to cleanse each ear
- **No more risk of cross contamination** between the two ears
- **One of the only ones on the market** with this format

# PYOclean<sup>®</sup> Oto

Purifying & soothing ear cleanser

## 100% NATURAL ACTIVE INGREDIENTS

**Cerumenolytic action**  
Lipoaminoacid of green apple



**Soothing & anti-inflammatory action**  
Honey  
Propolis

**Antimicrobial action**  
Propolis  
Essential Oil of red myrtle

**Antibiofilm action**  
N-acetylcysteine  
Propolis



## When to use it ?

### PREVENTIVE CARE

Purifies ear canals to prevent relapses in pets prone to otitis externa.



### ADJUNCTIVE CARE

Prepares the ear canal to receive a medical treatment and helps maximising its effects.



## How to use it ?



### SCIENTIFIC EVIDENCE

Evaluation of N-acetylcysteine combined with natural extracts against *Staphylococcus pseudintermedius*, *Malassezia pachydermatis* and *Pseudomonas aeruginosa*

C. Feuillolay, E. Bensignor, L. Fabriès, R. Andriantsalama, C. Roques  
Poster NAVDF 2019, Abstract Veterinary Dermatology, August 2019

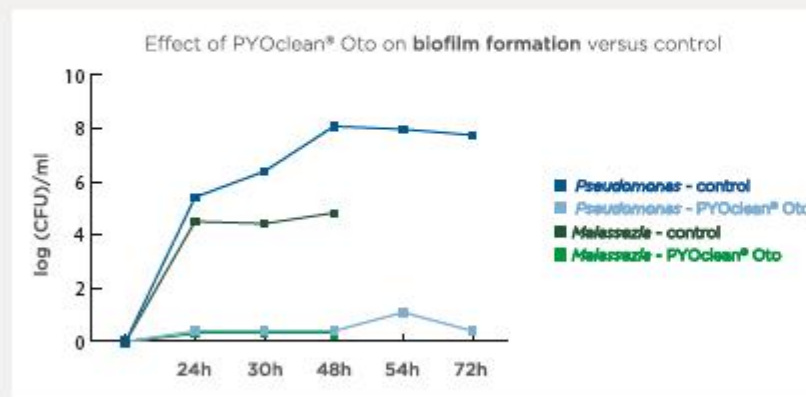
#### Objectives of the study :

- 1/ Evaluate PYOclean<sup>®</sup> Oto effects on biofilm formation in 2 different strains
- 2/ Evaluate its effect on existed biofilm

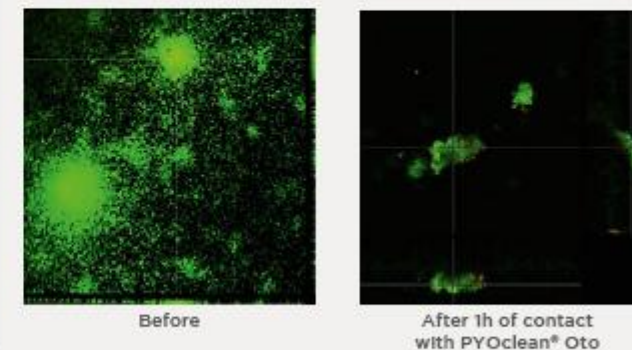
#### Protocol

- Test on *Malassezia pachydermatis* & *Pseudomonas aeruginosa*, often involved in otitis
- Follow up of **biofilms formation** over 48 or 72h and of a structure of **mature biofilms** up to 240 min in the presence of **PYOclean<sup>®</sup> Oto** or sterile distilled water as a control

#### Results



Disruption of *P. aeruginosa* mature biofilm after contact with PYOclean<sup>®</sup> Oto (confocal microscopy observation)



Proven inhibition of *Malassezia pachydermatis* and *Pseudomonas aeruginosa* biofilm formation with **PYOclean<sup>®</sup> Oto** and **disruptive effect** on mature biofilms

### SCIENTIFIC EVIDENCE

**Evaluation of an ear cleaner based on natural ingredients with antimicrobial, anti-biofilm and anti-inflammatory properties in rabbits with otitis externa**

G. Sheinberg, A. Martin Cordero, C. Romero, A. Flores, R. Heredia,  
Short Com ESVD 2019, Abstract Veterinary Dermatology, December 2019

#### Objectives of the study :

1/ Evaluate PYOclean® Oto effects on rabbits presenting signs of otitis externa

#### PROTOCOL

30 rabbits showing clinical signs of otitis externa or prone to recurrent otitis are included.

- ▶ 15 rabbits receive PYOclean® Oto 1x/week
- ▶ 15 rabbits do not receive any product
- ▶ Duration of the study: 4 weeks (+1 week of follow-up after stopping the application)

#### RESULTS

##### CYTOLOGY

At D0: All rabbits had parasites (*Psoroptes cuniculi*) and bacteria. No *Malassezia*.

##### 100% NEGATIVE CYTOLOGIES

after 1 month of PYOclean® Oto application. (No change in the control group)

##### CLINICAL LESIONS

##### D0

73% of the ears had lesions evaluated as severe (67% in the control group)

##### D21, D28 & D35

100% OF EARS WITHOUT LESION in the group with PYOclean® Oto (0% in the control group)

Significant improvement in cytology and clinical signs of otitis with PYOclean® Oto. In this study, PYOclean® Oto enabled the successful management of otitis externa in rabbits as stand-alone care.



D0



D35

# PYOclean® Oto

## Purifying & soothing ear cleanser

### STRENGTHS



- Complete "4-in-1" action: cerumenolytic, soothing, purifying & antibiofilm
- Formulated with 100% natural origin active ingredients
- A preventive and complementary care to help limit antibiotics use and microbial resistances
- Practical and hygienic form : single dose format of ease of use
- Excellent tolerance : non-irritating active ingredients & physiological pH adapted for dogs, cats and rabbits
- Physiological pH : respect animal's skin, fragrance-free
- Scientifically proven efficacy



**Is it necessary to use the entire tube per ear? Especially for smaller animals like cats and rabbits?**

For small animals such as cats or rabbits, the volume of 5ml of each PYOclean<sup>®</sup> OTO monodose may be a bit too high. We thus recommend that you instill the content by filling up the ear canal to ensure an optimal cleansing and purifying efficacy. The design of PYOclean<sup>®</sup> OTO monodose enables you to recap it safely for a second time use. In order to limit the risk of cross contamination between ears, please make sure to mark clearly on each monodose Right or Left for next time use into the good ear for each.

Make sure that the lead time between the 2 usages does not surpass one week to ensure optimal freshness of content without oxidation.

**Can PYOclean<sup>®</sup> Oto be used in association to any treatment for the otitis externa?**

Yes, PYOclean<sup>®</sup> Oto can be used to cleanse and prepare the ear canal to receive any treatment.

**Can it be used in case of tympanic rupture?**

The precautionary principle to be applied in case of tympanic rupture is to exclude any topical product until the eardrum has healed.

### INDICATION

- **Hygiene of healthy ears:** excess earwax, bad odors, predisposed breeds
- **Before clinical examination to clean the canal**

#### Helps:

- Cleanse
- Deodorize
- Hydrate



- « Twist-off » service cap for a practical single-handed application
- Transparent bottle to observe product integrity



100 ml

*Once to twice a week depending upon ear canal dirtiness*

## 100% NATURAL ACTIVE INGREDIENTS

### Deodorizing active ingredients

Lichen extract  
Niaouli essential oil



### Cleansing active ingredients

Lipoaminoacid of green apple  
Saponaria extract

### Repairing & soothing active ingredients

Hemp seed oil,  
*Pumpkin seed extract*



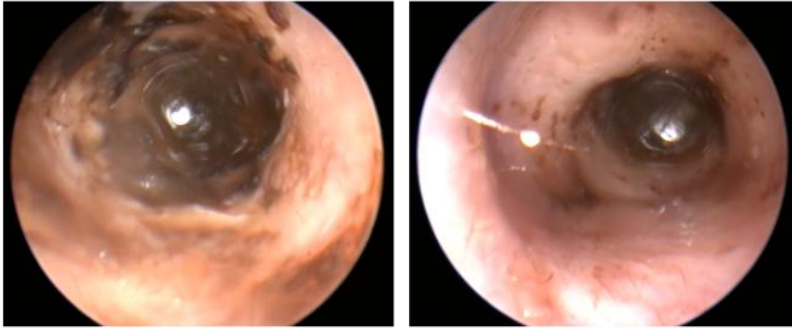
## SCIENTIFIC EVIDENCE

### Before/after cleansing

BEFORE

AFTER

@Dr. L. Fabriès



BEFORE

AFTER



@Dr W. J. Xu

## When to use it ?

Healthy ears (no infection)



AT HOME

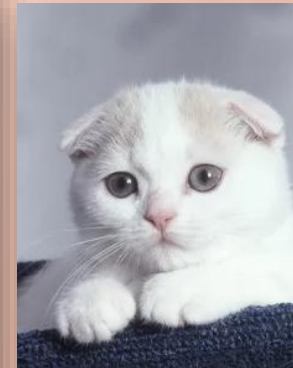
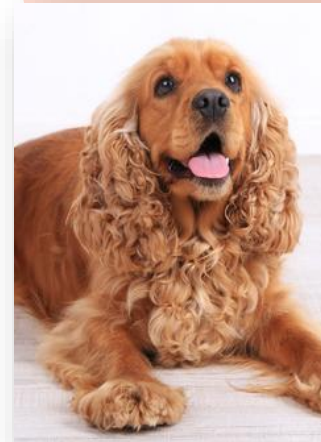
Excess earwax, cellular debris



Bad odors



Medical training  
Predisposed breed : Hair in the ears (Poodle, etc.) Droopy ears (Cocker, Setter, ram rabbits, etc.),  
Narrow ear canals (Shar-Pei, etc.)





Thanks for your attention !

Questions ?



Naturally efficient

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