

# Advanced Formula **ZYMOX PLUS** Otic Enzymatic Formulation

**Ear care for resistant otitis externa.  
Ideal for cases of repeated infection  
or the infection that won't resolve.**

Engineered to aid in the management of the toughest chronic otitis externa cases due to resistant organisms, such as those that form complex biofilms such as Pseudomonas and Methicillin-resistant Staphylococcus aureus. Features increased potency of the patented LP3 Enzyme System PLUS four additional biofilm-reducing enzymes formulated to destroy the hard-to-penetrate biofilm. When combined the results are antibacterial and antifungal and provide effective biofilm removal.



## REQUIRED ZYMOX OTIC PROTOCOL

Apply liberally to fill uncleaned ear

**Do not pre-clean** ear or enzymatic activity is disrupted

Gently massage the base of the ear

Wipe to remove excess

Allow pet to shake head

Apply once daily for 7 days

If needed, flush ear after course of use with  
ZYMOX Ear Cleanser



## CONTRAINDICATIONS

Do not use with any ear topicals while using Advanced Formula ZYMOX Plus Otic Enzymatic Solutions

Do not use on a ruptured ear drum

Do not use Advanced Formula ZYMOX Plus Otic with Hydrocortisone 1% on animals sensitive to corticosteroids



Features Four  
Additional  
Enzymes



## Advanced Formula **ZYMOX PLUS** Otic 1% Hydrocortisone

For use when additional itch relief is  
needed due to minor inflammation

Use on any age dog or cat

## Advanced Formula **ZYMOX PLUS** Otic

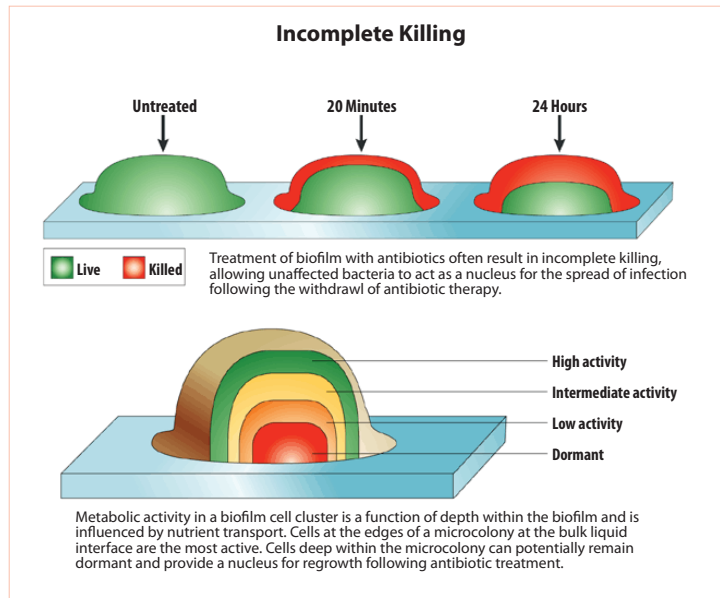
For use when no additional  
inflammation relief is needed

Use on any age dog, cat, rabbit, exotics

Use on pregnant or lactating females

# MANAGING BACTERIAL RESISTANCE

Biofilm-producing infections are 10x to 100x more resistant to the effects of antimicrobial agents.



Davies, David. "Understanding biofilm resistance to antibacterial agents." *Nature Reviews Drug Discovery* 2 (2003): 114-122.

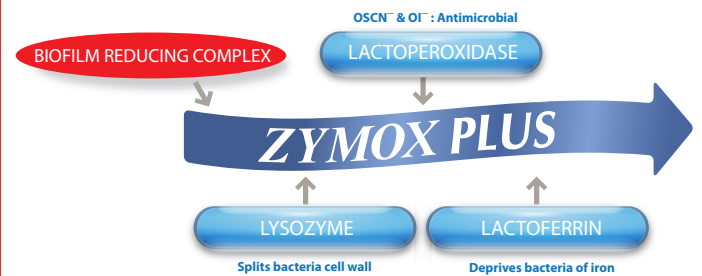
## WHAT IS BIOFILM?

Biofilm is an ill-defined mix of polysaccharides, nucleic acids and proteins encased in a slimy matrix created by microorganisms to house the DNA of the infection. Biofilm is the suspected culprit for antibiotic resistance and the reason many otitis cases are persistent or recurring. Due to incomplete killing of cells, bacteria can remain hidden in a complex biofilm even after the infection appears to be resolved, patiently waiting for ideal conditions to multiply and re-infect.

*Disruption of biofilm alone is unlikely to have a major impact unless the microbes within the biofilm are inhibited and destroyed.*

## HOW ADVANCED FORMULA ZYMOX® PLUS OTIC WORKS

The Advanced Formula ZYMOX PLUS Otic features the patented LP3 Enzyme System PLUS four additional enzymes. The combination of mutanase, dextranase, cellulase, and beta glucanase work to attack the complex biofilm structure, prevent adhesion and metabolize its components. When combined with the antimicrobial LP3 Enzyme System, the results are antibacterial and antifungal along with effective biofilm removal.



## SUCCESSFUL ENZYMATIC DISRUPTION OF A BIOFILM

- Antimicrobial enzymes possess many advantages over antibiotics. Many enzymes are specific for a particular pathogen and do not disturb the normal flora. Bacterial resistance to an antimicrobial enzyme is very rare. In addition, enzymes are natural, nonreactive and nontoxic without causing adverse health effects.
- Mutanase** can exhibit diverse action patterns, but fundamentally degrades B-1,3-glucan to glucose, making it water-soluble.
- Dextranase** is an enzyme which catalyzes the endohydrolysis of 1,6-a-glucosidic linkages in dextran resulting in damage to the biofilm.
- Cellulase** is critical to an antibiofilm enzyme preparation, as cellulose is found in most biofilms. Cellulase has been shown to significantly reduce biofilm formation by the pathogen *Pseudomonas aeruginosa*.
- Beta glucanase** is another important antibiofilm component that provides powerful anticandidal biofilm activity by lysing the glucans that are common in candida biofilms and compose up to 60% of fungal cell walls. Beta-glucan secreted by candida cells within biofilms significantly increases the organisms resistance to antifungals, and enzymatic breakdown of the beta-glucan can make candida more susceptible to destruction.