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Overview: deep
Pyoderma and
atypical bacterial
Infections

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 **WCVD 10**
WORLD CONGRESS
OF VETERINARY DERMATOLOGY
BOSTON | JULY 25-29 | 2024

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Welcome to the 10th World Congress of Veterinary Dermatology
July 25-29, 2024 | Boston, Massachusetts

6 Themes

- Atopic Disease and Allergy
- Dermatology and One Health
- Immunodermatology
- Innovations in Dermatology
- Otology
- Skin Biology in Health and Disease

 We invite you to join us!
WAVD
WORLD ASSOCIATION FOR
VETERINARY DERMATOLOGY

Overview

- Deep Pyoderma
- Atypical Bacteria
 - Non-Tuberculous Mycobacteria
 - Cat
 - Dog
 - Actinomyces
 - Nocardia



Deep Pyoderma

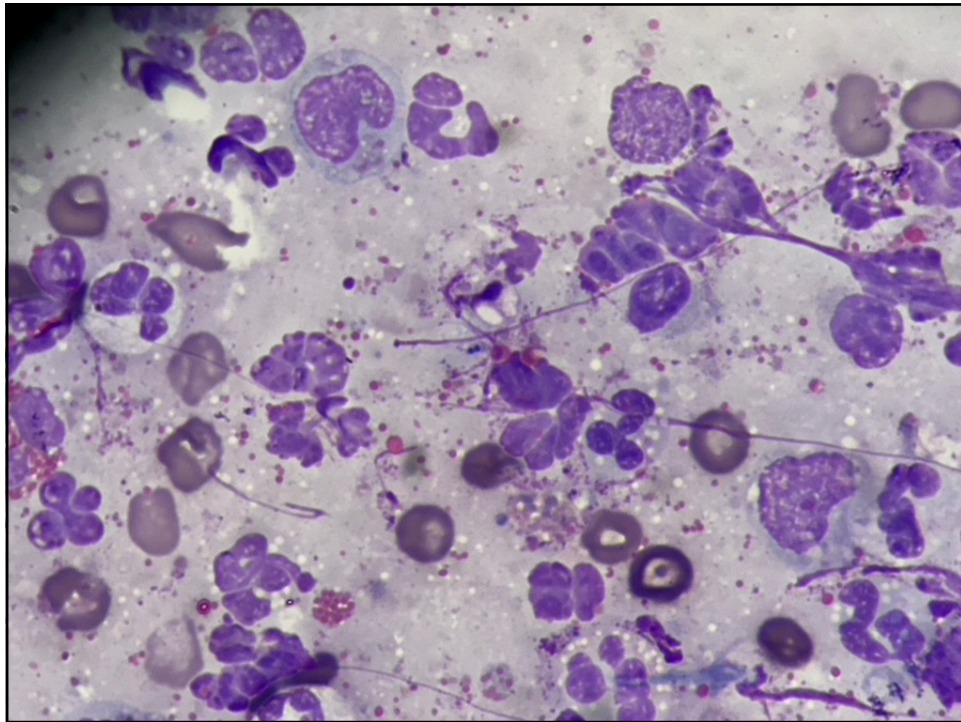
- Bacterial infection deeper than Hair follicle:
 - Dermis, Subcutis
 - **Often starts superficially**
- *Staph. pseudintermedius* common
 - Less common: Gram (-) rods: *Proteus*, *E.coli*, *Pseudomonas*
 - *Burkholderia cepacia* (Ciclosporin immunosuppression)
- Symptoms:
 - Furunculosis, fistules, ulceration, cellulitis
 - Purulent/serous discharge
 - +/- Fever, Lethargy, Pain, Anorexia, Lymphadenopathy

Folliculitis → Furunculosis → Carbuncle → Cellulitis



Diagnosis: Deep Pyoderma

- Cytology
 - many Neutrophils & Macrophages
 - +/- Eosinophils: Hair fragments = foreign body
 - Bacteria
 - Cocci >> rods; both
 - Number cocci < than superficial pyoderma
- **Culture & sensitivity -> Antibiotic**
- Other Tests – causes of folliculitis specifically:
 - Skin scrape: Demodex canis
 - Fungal culture: Dermatophytosis
 - Underlying causes....many



Causes focal deep Pyoderma

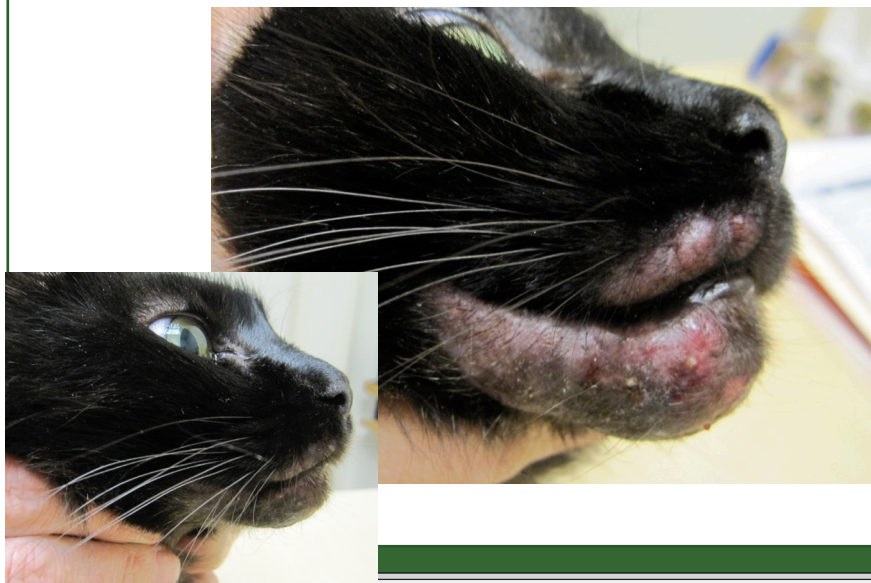
- Allergy
 - Lick granuloma
 - Furunculosis chin dog/cat
 - Interdigital Cysts
 - +/- abnormal weight bearing
 - Furunculosis Pressure points (callous)
 - +/- abnormal weight bearing
- Foreign body (grass awn)
- Lip Ulcer: cat





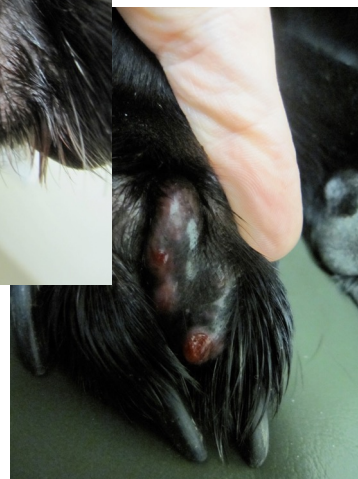
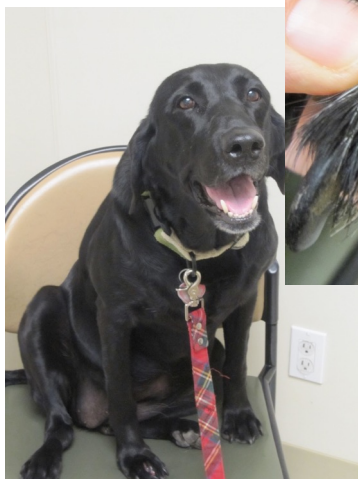
Chin Acne

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Feline Lip Ulcer

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Interdigital cyst -abnormal weight-bearing



Lick Granuloma



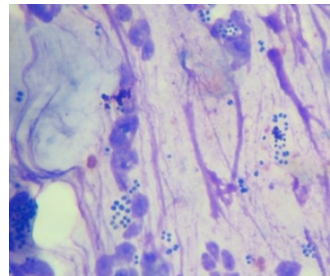
- Microbiological and histopathological features of canine acral lick dermatitis
 - AK Shumaker Vet Dermatol. 2008 Oct;19(5):288-98.
- Very often infected
 - Can have different bacteria & sensitivity, superficially vs. deep

Causes Generalised Deep Pyoderma



- Demodicosis
- Atopie
- Food Allergy
- Flea allergy dermatitis
- Dermatophyte
- Actinic (solar) Dermatitis
- Immunosuppression
 - Steroids, Ciclosporine
 - Hypothyroidism
 - Cushing's Syndrom
 - Calcinosis cutis
 - Leishmaniasis
 - Neoplasia (rare)
- Contaminated Shampoo
 - Pseudomonas folliculitis

Demodicosis



Demodicosis



Photos: Kerstin Wildermuth

Pododemodicosis





Bakterial Folliculitis, Furunculosis: Allergy

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Enterobacter Folliculitis

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Calcinosis cutis

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Actinic Dermatitis

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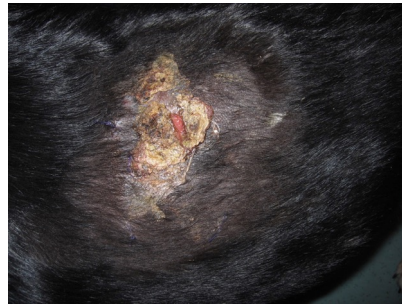
Deep Pyoderma Differential Diagnoses

- Autoimmune
 - Sterile Panniculitis
 - Sterile granulomatous/pyogranulomatous dermatitis
 - Vasculitis
 - Juvenile Cellulitis
 - Erythema multiforme
 - Opportunistic fungal infections
 - Deep Mycoses
- Insect-bite hypersensitivity (bridge of the nose)
- Demodex
- Dermatophytosis

Sterile Panniculitis



Sterile granuloma pyogranuloma syndrome



Insect-bite Hypersensitivity



Deep Pyoderma Therapie: *Staph. pseudintermedius*

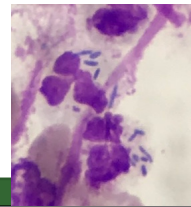
- Systemic Antibiotics until completely healed C & S Test
 - 3-8 weeks
- Resistance not suspected:
 - Cefalexin (22-30mg/kg 2x daily)
 - Amoxiclav (22-30mg/kg 2x daily)
 - Clindamycin (5mg/kg twice daily)
- Local Therapy
 - Shampoo: Chlorhexidine 2-4%
- Pain control may be needed (NSAID, Tramadol)

Deep Pyodermie Therapie: *Staph pseudintermedius*

- Level 2: Doxycycline 5mg/kg twice daily
- Level 3: C & S
 - **Cefovecin**
 - **Fluoroquinolone** (Enrofloxacin, Marbofloxacin, Pradofloxacin)
 - Chloramphenicol
 - Rifampicin (Hepatotoxicity)
 - Trimethoprim oder Ormetoprim-potentiated sulphonamide
 - KCS, Leukopenia, Anemia
 - Aminoglycoside: Gentamicin, Amikacin Renal Toxicity

Deep Pyoderma Therapy: Gram negativ

- **C & S**
- Proteus, E.coli C & S
- *Pseudomonas spp.*
 - Fluoroquinolone (Enrofloxacin, Marbofloxacin, Pradofloxacin)
 - Rarely is Doxycyclin effective
 - Aminoglycosides: Gentamicin, Amikacin (Renal toxicity)



Deep Pyoderma – clip & clean



Feline Mycobacteria

- Rod shaped intracellular bacteria
 - Gram negative, acid fast +
- Classified: phylogen./pathogen./Labor
 - Mycobacteria tuberculosis Complex (MTC)
 - *M. microti* (small mammal)
 - *M. bovis* (cow adapted; People)
 - *M. tuberculosis* (Human): cat is resistant
 - **Non-tuberculous Mycobacterien (NTM)**
 - **Fast growing NTM**
 - **Slow growing NTM**
 - *Mycobacterium avium-intracellulare* Komplex
 - *Mycobacterium leprae* Komplex

Nontuberculous Mycobacteria (NTM)

- Opportunistic Pathogens-> inoculated wound
 - Environment: soil, water, vegetation
 - **Fast growing NTM**
 - **Slow growing NTM**
- Symptoms overlapping
 - SQ or cutaneous nodules
 - Granulomatous Panniculitis: fistules, discharge +/- fever, pain
 - Disseminated

Mycobacteria

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Mycobacteria simiae

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M.Linek

Mycobacteria setense

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Mycobacteria heidelbergense

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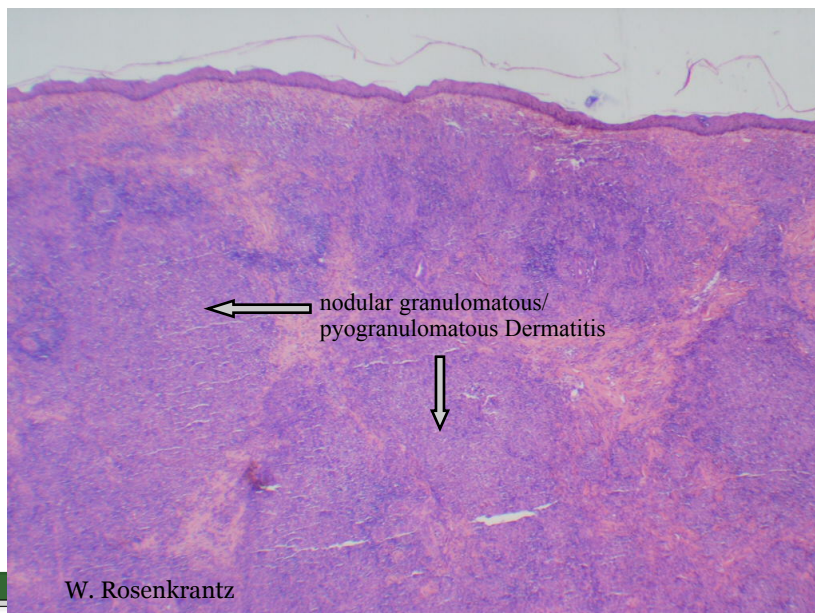


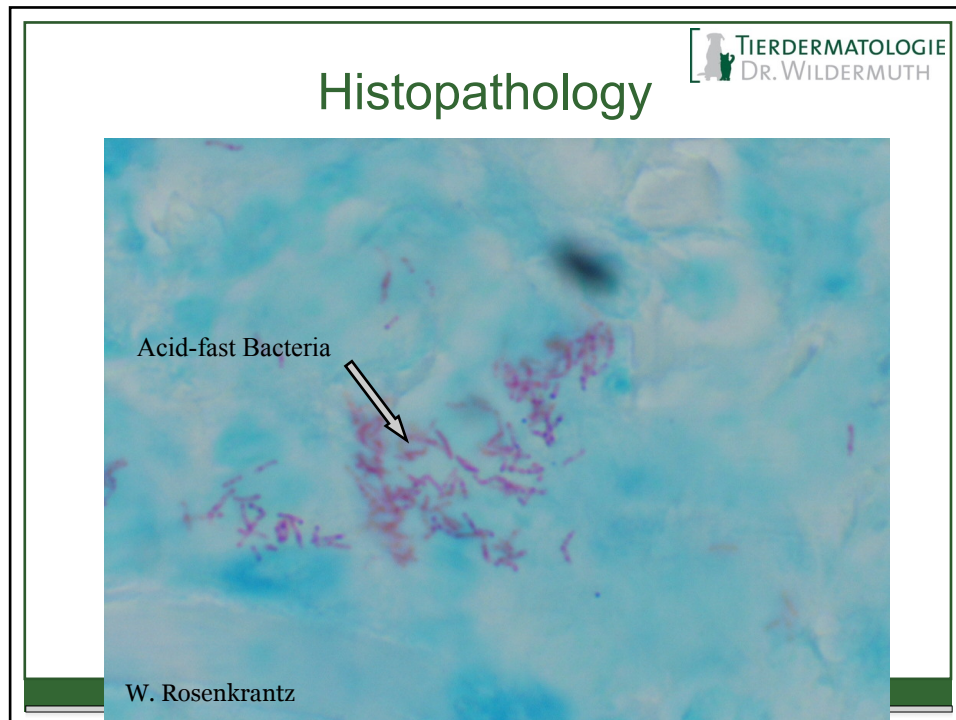
NTM Diagnosis

- Cytology: Diff-Quick: Macrophagen, Neutrophile
 - Ziehl-Neelsen (ZN): positive for acid fast Bacilli
- Biopsy: at least 3 pieces (!)
 - 1. Histopathology: Granulomatous Dermatitis to mixed cell Dermatitis
 - Can be ZN positiv, but not always!
 - 2. Mycobacterial culture „gold standard“ with sensitivity
 - Expensive(!), negative 50% of the time, can take months
 - 3. Mycobacterial PCR
 - Fresh tissue > formalin; can be negative
- Thorax radiograph

[Leibniz-Zentrum Borstel: Nationales Referenzzentrum für Mykobakterien](#)

Histopathology





Therapy Mycobacteria Cat

- First level: Combination 3 antibiotics is best:
 - 1. Rifampicin 10-15mg/kg 1x daily
 - Hepatitis 5%, Pruritus, Erythema, Orange: saliva, urine, tears
 - 2. Pradofloxacin 3mg/kg 1x daily
 - Vomiting, diarrhea (selten)
 - 3. Azithromycin 7-15mg/kg 1x daily
 - Vomiting, diarrhea

O'Halloran C., Gunn-Moore G. Mycobacteria in Cats: an Update. In Practice.

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Therapy Mycobacteria Cat

- 2nd level (NTM can become resistant)
 - Clarithromycin 7.5-15mg/kg 2x daily (instead of Azithromycin)
 - Vomiting, diarrhea, hepatitis
 - Doxycyclin 10mg/kg 2x daily (instead of Fluoroquinolone)
 - Vomiting, Esophagitis
- 3rd level Medication:
 - Isoniazid, Clofazimin: extreme toxicity, not allowed in Germany
- Prognosis variable (guarded to poor)

Mycobacterium leprae Komplex

- *Mycobacterium lepraemurium*
 - Worldwide – coastal areas
- 1-3 yo male, outdoor cats
 - 1-3 Nodules – legs with ulcerations
- Diagnosis: Cytology/Biopsy; Kultur negativ
- Therapy: Surgery +/- Clarithromycin & Rifampicin
- Prognosis: good, not zoonotic



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Tuberculous Mycobacterial Skin Infections in Cats

DANIËLLE GUNN-MOORE BSc(Hon), BVM&S, PhD, MANZCVS, FHEA, FRSB, FRCVS, RCVS Specialist in Feline Medicine

LEVEL 2




Daniëlle Gunn-Moore graduated from the University of Edinburgh with the Dick Vet Gold Medal in 1991. She undertook her residency in feline medicine at the University of Bristol and completed her PhD on Feline Infectious Peritonitis at the same institution.

She was a Lecturer in Pathology at Bristol, and became Professor of Feline Medicine at Edinburgh in 2006. She is an RCVS Specialist in Feline Medicine, being an internationally recognised expert in this area, having lectured extensively and published over a 130 peer-reviewed research papers, plus many reviews and book chapters.

She is the world authority on tuberculous mycobacterial disease in cats.





Canine Leproid Granulomas

- Australia, Brazil, USA, Zimbabwe
- Rare, saprophytic Mycobacteria
 - Inoculation – insect?
 - Culture not possible (won't grow)
- Nodule +/- Ulceration mainly Boxer & mixes
 - Lateral Pinnae > Head, limbs
 - Otherwise healthy
- Diagnosis: Cytology (variable) & Biopsy
- Therapy:
 - Heals in 1-3 months
 - Rifampicin 10-15mg/kg 1x daily & Clarithromycin 7.5-12.5mg/kg 2-3x tgl.
 - Surgery

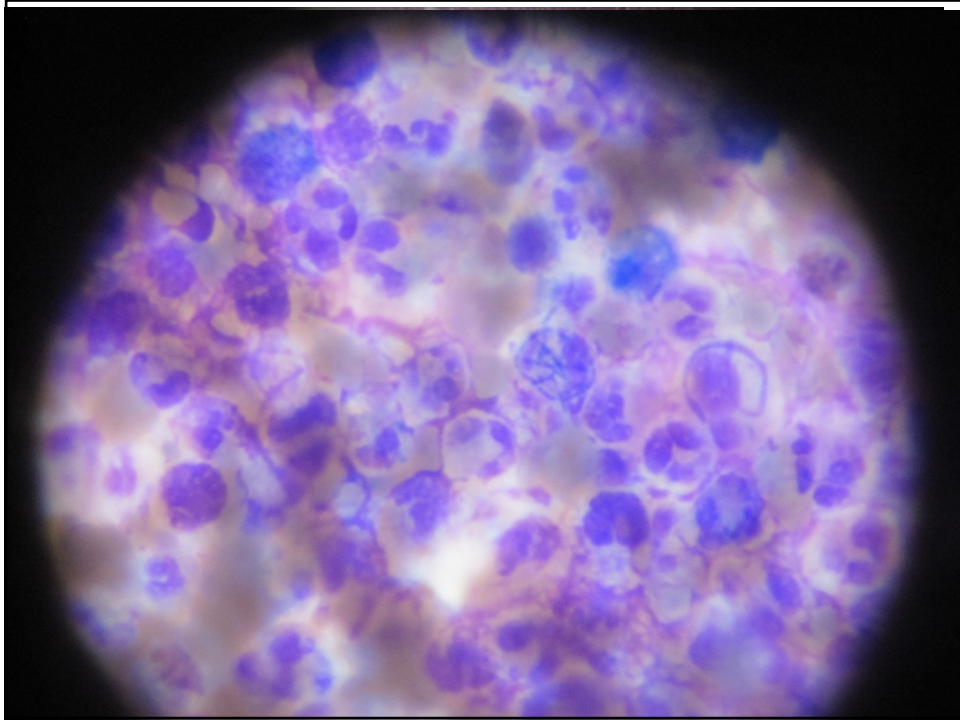


Actinomyces

- Anaerobic/Microaerophilic Bacteria
 - Gram+, acid-fast neg.
 - Filament; oral cavity, opportunistisch
- Inoculated via trauma: grass awn or bite
- Lesions: Abscess, Cellulitis, Fistula, Tumor
 - Pyothorax, pneumonia, pyoabdomen
- Diagnosis difficult --> difficult to culture
 - Cytology: Filaments (often together with cocci & rods)
 - ↑ Pathogenicity with concurrent organisms
 - Biopsy

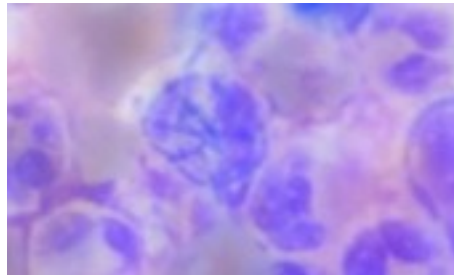
Actinomyces





Actinomyces Therapy

- Dog and cat:
 - **Amoxicillin 20-40mg/kg every 6 hours**
 - **Amoxiclav: first choice**
 - Clindamycin, Erythromycin
 - Chloramphenicol
- Dog
 - Rifampin



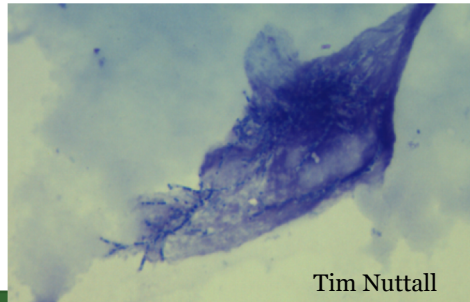
Nocardia

- Gram+, aerobic filament, partial/weak acid-fast
 - Dirt, water, dust, rotten vegetation, feces; claws, skin
- Infection -> puncture or bite (M > F); Inhalation
 - **Immunosuppression** common
 - Distemper, Diabetes, Lymphoma; Ciclosporin
- Cutaneous Lesions:
 - Cats: Abscess, granuloma, cellulitis, fistula
 - Dog: Fistula, wound, granuloma/tumor
- Disseminated or pulmonary (dog > cat)



Nocardia Diagnosis

- Cytology: Filamentous bacteria (0,5- 1µl), gram+, branching
- Culture & **sensitivity (!)**
 - Approx. 2 days, but can take 2-4 weeks when many bacteria are present
- PCR Test



Tim Nuttall

Nocardia Therapy

- Sulfonamide: first choice antibiotic
 - Trimethoprim Sulfa 30mg/kg oral, IV 2x daily
 - Duration Skin: 1-3 Months; Lung 6 - 12 (complicated, Immunsupp.)
 - Side-effects: anemia, leukopenia, KCS
- Prognosis: guarded - often immunocompromised
 - Review: ca. 50% Dogs euthanized; 16/36 Katzen euth.
- Owner: HIV, Immunocompromised: careful handling
 - No reports of infection from infected dog/cat

Literature 1

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