PARASITOLOGY:
PROTOZOA & ECTOPARASITES

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These study guides are my personal notes & materials that I used to study for my veterinary school courses. Illustrations are not necessarily drawn to scale but rather conceptually to better understand how everything connects and where they are. I do not claim to be an expert and can not guarantee the accuracy of all statements.

- Sydney Day

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PROTOZOA
AMOEBA

Phylum: Heterolobosea

Entamoebidae are NOT free living

Entamoeba histolytica

Species: primates, dogs, pigs

Life Cycle

Small intestine
- excystation → trophozoites

Large intestine
- multiplication
- form precyst
- migrate internally
- 1st liver
- 10-20 μm diameter
- distinct cyst wall
- 1-4 nuclei

Pathology
- Invasive amebiasis

Diagnosis
- Fecal float +/- immunofluorescence or iodine
  - 1D of cysts
  - Trophozoites may be present, can be hard to find
- Serology

Treatment
- Metronidazole
**FLAGELLATED PROTOZOA**

**Giardia lamblia**

**SPECIES** dogs (esp. kennels), cats + HUMANS!

**LIFE CYCLE**
- trophozoite
- encysted trophozoite

**PATHOLOGY**
- trophozoites cause D+
- also asymptomatic carriers
- fecal-oral route
- often water-borne
- cysts are frequently seen in dogs + other domestic spp.

**ZOONOTIC!**

**DIAGNOSIS**
- ID of cysts in feces
  - if trophozoites detected, probably a pretty significant infection

**TREATMENT**
- Metronidazole: 25-50 mg/kg
- Albendazole: 25 mg/kg
- Fenbendazole: 50 mg/kg
- Quinacrine: 6.6 mg/kg

**ZOONOTIC CONSIDERATIONS**
- immune compromised
- back packers (untreated H2O)
- children

prevent by treating drinking H2O
(physical, chemical, UV)
**Tritrichomonas / Trichomonas**

**LIFE CYCLE**
Sexually Transmitted
DIRECT Transmission, no cyst stage
* doesn’t have to live in environment!

**DIAGNOSIS**
ID trophozoites in vaginal secretions
in cats - ID in fecal, or fecal PCR

**PATHOLOGY**
*T. foetus*

Bovine Genital Trichomonosis
→ vaginitis
→ early abortion
→ endometritis
→ pyometra
→ Bulls asymptomatic

Feline Trichomonal Diarrhea
→ weirdly found in GI only in cats
→ chronic waxing and waning D+
→ D+ is abx responsive but recurs

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**Histomonas**

"blackhead" or "infectious enterohepatitis"

**SPECIES**
avian species

**LIFE CYCLE**

**PATHOLOGY**
thickened mucosa

CECUM

ulcer

hard, caseous core inside

histomonads may be carried to LIVER
cause significant pathology in the liver
KINETOPLASTIDS | Tropical + Subtropical Infections

**Trypanosoma** | "blood flagellates"

**SPECIES**
- equines, some ruminants, dogs - acute infections
- cattle - slower progression

**AFRICAN**
- Trypanosoma brucei
- Trypanosoma congolense

**AMERICAN**
- Trypanosoma cruzi
  - Chagas Disease

**LIFE CYCLE**
- Glossina spp. FLIES transmitted via saliva
  - enter thru bite
- Reduviid spp. FLIES transmitted via feces
  - enter thru wounds

**PATHOLOGY**
- Antigenic variation leads to chronic infection + progression in some cattle
  - → anemia
  - → weight loss
  - → edema
  - → paralysis
  - → fever
  - → death
  - → eye + nose discharge
- N’Dama + Boer cattle tolerant
- Zebu cattle notably susceptible

**DIAGNOSIS**
- ID of parasites in blood
  - need to concentrate blood to find

**TREATMENT**
- few drugs available, some toxic
- not much financial incentive to produce new + better drugs

**Zoonotic in Southern US**
- infects many wild + domestic animals

**DOGS**
- pseudocysts in muscles
- congestive heart failure

**HUMANS**
- "mega" syndromes
- dilated hearts
  - (20-30 years to manifest)

opossum + armadillos are zoonotic reservoirs for Chagas Disease
Leishmaniasis

**SPECIES**
- dogs + rodents are reservoirs

**LIFE CYCLE**
- Sandfly
  - promastigote
  - consumed by + reproduces inside macrophages
  - taken up
  - off to infect other cells

**PATHOLOGY**
- Canine Leishmaniasis
  - peripheral lymphadenopathy
  - skin lesions
  - conjunctivitis
  - onychogryphosis (abn. nail growth)

**TREATMENT**
- Antimonials

**DIAGNOSIS**

**Regional Differences**
- *L. infantum* - Mediterranean basin
  - Greece, Italy, S. France, Portugal
- Indian Region
  - Visceral Leishmaniasia
- *L. chagasi* - New World
  - Central + South America
  - Mucocutaneous Leishmaniasia

20-30 species all across the world
spread by different vectors
APICOMPLEXA

- These are all obligate parasites
- Direct or indirect life cycles
  - Reproduce by alternating sexual and asexual generations
- APICAL COMPLEX - unique organelle for attachment + invasion

Eimeria

SPECIES  various species

LIFE CYCLE
- Simplest Eimeria life cycle example
  - Epithelial rupture from reproductive stages causes the pathology
  - Sexual
  - Asexual
  - 1st Generation Asexual
  - 2nd Generation Asexual

PATHOLOGY

Bovine Coccidiosis
  - E. zuernii
  - E. bovis
  - D+ and malabsorption

Chicken Coccidiosis
  - E. tenella
    - Cecal or bloody coccidiosis
  - E. necatrix
    - Bloody intestinal coccidiosis
  - E. acervulina, E. maxima
    - Chronic intestinal coccidiosis

DIAGNOSIS

1D of oocysts in feces

TREATMENT

Reduce environmental contamination; immunity will control infection

Prophylactic anticoccidials vaccination?

Good husbandry + hygiene
very similar life cycles to Eimeria

**Cystoisospora**

**Cryptosporidium** important in newborn ruminants

**Sarcocystis**

**INDIRECT Life Cycles**
- Definitive Hosts are Predators
- Intermediate Hosts are Prey

Encyst in muscle (incl. cardiac muscle)

**Sarcocystis neurona**

- **Definitive Host:** Opossum
- **Intermediate Host:** Cats, Skunks, Raccoons, Sea Otters
- **Accidental Host:** HORSES! Equine Protozoal Myelitis

**Toxoplasma**

**SPECIES**
- **Definitive Host:** felids
- **Intermediate Hosts:** any warm-blooded animal, incl. cats!

**LIFE CYCLE**
- asexual phase occurs in Intermediate Host
- sexual phase occurs in Definitive Host

**PATHOLOGY**
- abortion in sheep + goats
- congenital malformations in humans
- danger to AIDS + immunocompromised humans

**TREATMENT** for cats
- Clindamycin 50 mg/kg/day in 2 doses
- Pyrimethamine 1 mg/kg/day usually with sulfadiazine
**Haemosporids | Malaria**

**SPECIES**
- **HUMAN** - *Plasmodium falciparum*, *P. vivax*, *P. ovale*, *P. malariae*
- **Ducks, Geese, Hawks, Chickens, Turkeys** - *Leucocytozoan spp.*
- **Pigeons, Doves, Quails, Swans, Turkeys, Ducks, Geese** - *Haemoproteus spp.*
- **Chickens** - *Plasmodium gallinaceum*, *P. circumflexum*

**VECTORS**
- Anopholes mosquito
- Simulium fly
- Culicoides, Hippobiscud, + Chrysops flies
- Culex, Aedes, etc. mosquitos

**LIFE CYCLE**

**Plasmodium**
- Sporozoites migrate to salivary glands → saliva

**SEXUAL Reproduction**
- Inside mosquitos

**ASEXUAL Reproduction**

**PATHOLOGY**
- Erythrocyte damage

Haemoproteus columbae has a similar life cycle, except the asexual phase of reproduction occurs in the LUNG endothelium rather than the LIVER like Plasmodium.
**Piroplasms**

**Babesia**

**SPECIES**  Cattle + Dogs (and Humans!)

**LIFE CYCLE**

SEXUAL Reproduction in tick

ASEXUAL Reproduction in host RBCs

**DIAGNOSIS**

ID of protozoa in infected cells or Ab detection

**TREATMENT**

Imidocarb IM

**PATHOLOGY**

→ Erythrocyte destruction
  "release of toxic parasite products"
  • fever
  • hemolytic anemia
  • hemoglobinuria
  • jaundice
  • death frequent

**Bovine Piroplasmosis** - older animals more susceptible eradicated from US

**Canine Piroplasmosis** - typically a mild infection in US

**Theileria**

**SPECIES**  Cattle

**LIFE CYCLE**

Some unknown, but relatively similar to Babesia except infects WBCs of host

**PATHOLOGY**

cause excessive proliferation of lymphocytes

→ lung edema

→ dx at DAY 14, treat by DAY 16 or Death by DAY 21

**East Coast Fever** important in East Africa
ECTOPARASITES
**Phylum Arthropods**

**Class Crustacea**
- Intermediate hosts for helminths
- Ecotoparasites of fish, marine mammals, etc.
- Fused head + thorax

**Class Insecta**
- 75% of all terrestrial animals!
- One pair of antennae
- One pair of legs per thoracic segment
- Thorax (3 segments)
- Abdomen (1-7 segments)
- +/− wings

**Class Arachnida**
- Spiders, scorpions, whip scorpions, mites, ticks

**Generic morphology**
- Holometabolous: complete metamorphosis
- Hemimetabolous: incomplete metamorphosis

**Control + Treatment**
1) Prevention!
2) Remove them from hosts
3) Kill them on hosts or environment

**Spiders, Scorpions, Whip Scorpions, Mites, Ticks**
- Chelicerae: mouthparts
- 4 pairs of legs (adults)
- No wings or antennae

**Generic morphology**
- Bilateral symmetry
- Chitinous exoskeleton
- Jointed appendages
- Segmented body
- Mouthparts adapted for chewing or sucking
- Open circulatory system
**Ticks**

**Argasids**

- Extremely long-lived (10-15 yrs w/o feeding)
- Nest parasites
- Take many short feeds (at least one per stage)
  - can lay a batch of eggs per bloodmeal

Multiple small batches of eggs

EGGS

LARVAE

ADULTS

NEIMPH

up to 5 stages!

**Ixodids**

Some are host-seeking

All are nest-dwelling

- Nidicolous

- Nest in burrows, cracks in walls or floors, bird nests, etc.

**Some are Nest-Dwelling**

All are Host-Seeking

- Passive (ambush)
- Active (seek out)

**Ambush questing** - host brushes up against where the tick is waiting

**Hunting** - ticks can detect hosts by sight, heat, odor, CO₂ output & RUN to them

**Prostriate**

Ixodes spp.

**Metastriate**

Amblyomma, Dermacentor, Rhipicephalus, Hyalomma, Haemaphysalis

**Survival is enhanced by the hard shield**

- Take a single, long feed (per stage)

  - requires strong attachment +
  - cementing in

  - makes the whole process take time
CAUSE DIRECT INJURY

1. Cellulitis
2. Granulomatous Dermal Reactions
3. Tick Paralysis
   - acute, ascending flaccid paralysis (like Guillain-Barre)
   - patients become atoxic and may require ventilation
   - a small protein toxin produced by particular species
   - act presynaptically and inhibit ACh release
4. Red Meat Allergy - relatively newly described

VECTORS of DISEASE

WHY THEY'RE GOOD VECTORS

- extended life cycle
- multiple opportunities to acquire and spread infection (with each blood meal)
- long duration of feeding = ↑ possibility of transmission
- high reproductive potential
- exploit anthropogenic (disturbed) environments to get exposure to hosts

SPECIAL SALIVA

- contains pharmacopoeia that PREVENTS humostasis and immune attack
- able to keep feeding

Theileriosis - a mechanism pathogens use to go dormant inside the tick and await regeneration/activation when it takes a blood meal

So, bacteria can hang inside the tick for a long time (without nutrients) until the next blood meal from a host

TICK-BORNE DIFFERENTIAL DIAGNOSES (Massachusetts)

- Lyme Disease
- Borrelia miyamotoi
- Babesia
- Ehrlichia/Anaplasma
- Deer Tick Encephalitis
- Dog Tick
- Tularemia
- Rocky Mountain Spotted Fever
- Powassan Encephalitis
- Woodchuck Tick
- Lone Star Tick
- Masters' Disease "Spotted Fever"
- Monocytic Ehrlichiosis
FLEAS

MANY different host species
- dogs, cats, horses, ruminants, rabbits, rodents, hedgehogs, fox, rats, oppossums, etc.

VERY common ectoparasite worldwide

LIFE CYCLE
depends on environment, temperature + humidity

must feed continuously for mating

ADULT

PUPAE

L1

L2

L3

~20 eggs/day

eggs

feed on host

LARVAE like the dark + hiding
- negative phototropism, positive geotropism

Species ID by MORPHOLOGY

Ctenocephalides sp.
- CAT FLEA

Cediopsylla sp.
- EASTERN RABBIT FLEA

Echidnophaga sp.
- POULTRY STICKTIGHT FLEA

Pulex sp.
- HUMAN FLEA

mouth comb extends dorsally above head midline

angulated head

no angulation of head

VECTORS of DISEASE

Rickettsia felis, R typhi (zoonose)
Bartonella henselae (Cat scratch Disease)
Yersinia pestis (zoonose)
Dipylidium caninum (tapeworm)
Acanthocheilonema (filarid nematode)
Myxoma and Shope Fibroma in RABBITS

CAT Flea
CAT Flea
CAT Flea
CAT Flea
CAT Flea
CAT Flea
FLEA INFESTATION

1. ANEMIA
   - 1 gravid female flea consumes 1.6 µL blood per day
   - 74 females (×1.6 µL) = 1 mL of blood per day!
   - Heavy infestations can clearly lead to anemia, esp. in smaller host animals

2. IRRITATION = pruritus + skin inflammation
   - NOT immune-mediated

FLEA BITE HYPERSENSITIVITY

Type I (or IV) Hypersensitivity Reaction associated with even a “single flea bite”

- One of THE most common hypersensitivity disorders in DOGS + CATS
  - Often associated with Atopic Dermatitis
  - ALLERGEN = flea saliva allergen 18kd (Cte f 1)
  - No predisposition by breed, age, or sex

DIAGNOSIS

HISTORY:
- Physical Exam:
- Problem List:

DIFFERENTIAL DIAGNOSIS LIST:
- Ectoparasites
- Allergies
- Neoplasia (cutaneous lymphoma)
- Infections

DIAGNOSTIC / RULE OUT TESTS:
- Flea comb + wet paper, cytology
- Tape prep/Cytology
- Skin scrape
- Hair plucking
- Fecal (ID flea tapeworm eggs)
- Serology + Intradermal allergy test
- Therapeutic trial - treat animal AND environment

TREATMENTS:
- Spot-on (dogs, cats, small mammals), Collars (dogs + cats), Oral Chews (dogs)
INSECT BITE HYPERSENSITIVITIES

**INSECTA**

**REMEMBER:** other arachnids + insects also serve as vectors of disease (numerous viruses, parasites, bacteria)

**FELINE MOSQUITO BITE HYPERSENSITIVITY**

- **Type I Hypersensitivity**
  - demonstrated to be caused by mosquitoes
  - Median Age: 3yo
  - no breed, age, or sex predisposition
  - **IMPORTANT R/Os:**
    - Herpesvirus or fungal diseases
    - Demodicosis
    - Other allergies
    - Squamous Cell Carcinoma, Mast Cell Tumors

- **TREATMENT**
  1) avoidance (indoors, screens, repellent)
  2) short term steroids

**EQUINE INSECT BITE HYPERSENSITIVITY**

**MOST COMMON** allergic skin disease of horses

- **Type I and IV Hypersensitivity**
  - reaction to Culicoides spp. saliva + Ags
  - Median Age: 3-4 years

- **Seasonal** = differs by climate ("Culicoides" season)

**Diagnosis:** R/O others + response to insect control

**TREATMENT**

1) insect control (housing, fans, fly masks, body sheets +/- permethrin)

2) anti-pruritic drugs
   - antihistamines
   - topical steroids
   - systemic steroids?
   - **ORAL Oclacitinib** - off label in cats and horses
   - shown to help manage in clinical setting

3) **Immunotherapy** - allergen specific vs. IL-5 vaccine vs. oral allergen admin

**ALL over the world except ICELAND**

(no Culicoides spp.)

**BREEDS at ↑ Risk**

- Icelandic
- German Shire
- Welsh Ponies
- Shetland Ponies
- Arabians
- Swiss Warmblood
- Quarter Horse
- Connemara
EQUINE VENTRAL MIDLINE DERMATITIS

Distinctive + common disease

Hematobia + Culicoides FLIES = SEASONAL

Lesions along ventral midline - alopecia, crusts, ulcers

TREATMENT

1) cleansing
2) topicals for Z infections
3) insect control - fly repellants
Demodex spp. (except D. gatoi) are considered commensal! In terms of disease, they are OPPORTUNISTIC Pathogens.

**Demodicosis in Young Animals**

1. **Generalized** - genetic predisposition
2. **Localized** - can recover spontaneously
   - usually < 18mo

**PATHOLOGY**

*Cutaneous barrier rupture → inflammation* (sometimes Type IV Rxns) potential for 2nd bacterial infections

**TREATMENT**

*2nd infections, underlying conditions, new evidence of using isoxazolines, avermectins, + spot-ons in dogs*
Demodicosis in Large Animals + Exotic Animals

uncommon to very rare, can be a 2° infection
if seen, often immune compromised / suppressed animals

RARE + Pruritic
Immunosuppressed
confirm D. cani w/ PCR
Ivermectin-PO, daily
Moxidectin + Imidacloprid topical

RARE + NON-Pruritic
Immunosuppressed
D. bovis
Avermectins - Pour-on

BOVINE

FERRETS
Can. not Visualize
see it.well.

RARE + NON-Pruritic
Immunosuppressed
D. ovis & D. caprae
Avermectins - Pour-on

OVINE + CAPRINE

HAMSTERS

RARE + Pruritic
Immunosuppressed
D. criceti, aurati, phodopi
Ivermectin SQ
Moxidectin + Imidacloprid topical

SWINE

VERY RARE + NON-Pruritic
Immunosuppressed
D. phylloides
Ivermectin PO

CAMELID

EXTREMELY RARE + Pruritic
Demodex spp.
Amitraz dips - tx difficulty and potential resistance related to coat
"Walking dandruff" not particularly host specific, can be zoonotic.

Species can be identified by shape of a certain sensory organ, the "solenidion".

**Contagious**
Attach to hairs or epidermis

**Pathology**
Inflammation + irritation
Hypersensitivity
Damage to the skin barrier - directly or indirectly (scratching)

**Treatement**
Avermectins (PO, SQ, or topical) NO Fipronil in Rabbits!
Isoxazolines off-label but seem to work!

**Life Cycle**
21 Days

Diagnose with ID by Tape prep or Skin Scrape
MANGE

Species can be differentiated by MORPHOLOGY of "epimura"

**SARCOPTES** epimura
**OTODECTES**
**POPOPTES**
**CHORIONPTES**

**DIAGNOSIS**
- These all have similar lesions
- Different levels of pruritus
- Can have different anatomical distribution of lesions
- Same diagnostics as others
  - 1 EGG or 1 MITE = diagnosis
    - Very specific, poor sensitivity

- Pinnae-pedal reflex in dogs
  - ~90% specificity, ~80% sensitivity

**TREATMENT**

**DOGS & CATS:**
- Avermectins (PO, SQ)
- ISOxazolines
- Topicals
- Lime sulfur dips

**RUMINANTS:**
- Avermectins (SQ or Pour on)

**SMALL MAMMALS:**
- Avermectins (PO, SQ, topical)
- ISOxazolines

**Sarcoptes scabiei**

- Life cycle ~21 days
- Off-host (at room temp) mites can only survive for 2-6 hours
- Adults burrow under keratin layer of epidermis + lay EGGs while burrowing
- Larvae proceed to surface → Nymphs

**CLINICAL SIGNS:**
- Papule
- Erythema
- Scaling
- Crusts
- Lichenification
- Excoriation
- Alopecia
- Z + infections

**PRURITIS can be EXTREME!**
Notoedres cati

Similar morphology + life cycle as Sarcopites

SEVERE PRURITIS

CLINICAL SIGNS:
- alopecia
- erythema
- excoriation
- papules
- crusts
- scaling
- lichenification
- 2° infections

Otodectes cynotis

Variable PRURITIS

Dogs, Cats, Ferrets

"Coffee grounds" in ear canals may extend to neck, rump + tail

Psoroptes cuniculi

Variable PRURITIS

1° Rabbits

external ear canal

May affect Goats, Sheep, + Horses

Trixacarus caviae

Guinea Pigs

SEVERE PRURITIS

So intense, itching can be mistaken for seizure activity

MOST pathogenic ectoparasite of piggos

ventral abdomen, neck, shoulders or generalized

CLINICAL SIGNS:
- alopecia
- scaling/crusts

Psoroptes ovis

CONTAGIOUS!

Sheep, Goats, Cattle, Horses, + Rabbits

head, shoulders, back, rump, or entire body

SEVERE PRURITIS

CLINICAL SIGNS:
- alopecia
- erythema
- scaling
- yellow-green pustules
- thick yellowish crusts

Chorioptes bovis

CONTAGIOUS!

Sheep, Goats, Cattle, Horses, + Rabbits

Variable PRURITIS

CLINICAL SIGNS:
- alopecia
- erythema
- scaling/crusts
- papules

CAUDAL Distribution: tail, udder, legs, rump, perineum
MYASIS, BOTS, GRUBS

MYASIS

a parasitic infestation of the body of a live animal by fly larvae

PRIMARY - larvae feed on living host
SECONDARY - feed on already dead and decaying flesh

Calliphoridae and Sarcophagidae
“blowflies” and “flesh flies”

commonly seen examples:

WOOL STRIKE in Sheep

Lucilia cuprina + sericata

predisposing factors:
- soiled wool
- wounds, infections
- heavy rain
- high humidity + temp
- skin folds

all that stuff FLIES LOVE

TREATMENT
1) Clipping
2) Wound management
3) Appropriate drugs - pour on Pyrethroids, SQ Avermectins, Dips

FLY STRIKE in Rabbits a.k.a. URINE SCALDING

SEASONAL (high temps)
predisposing factors:
- outdoor life styles
- diarrhea
- urinary tract diseases
- obesity

TREATMENT
1) Clipping
2) Wound management
3) Supportive care
4) Topical or Systemic abx
5) Avermectins SQ or Nitenpyram
BOTS + GRUBS

Oestrinae - Sheep nasal bots
Hypoderminae - Cattle grubs
Cuterebrinae - Rodent bot fly

These are HOST + SITE specific

CATTLE GRUBS

Hypoderma bovis
Hypoderma lineatum

CATTLE + European deer, occasionally horses, humans, alpacas

PATHOLOGY
- Irritation
- Larva migrans
  - "normal", thru skin
  - aberrant/ectopic (spinal cord, esophagus)
- Anaphylaxis w/ broken or dead larvae

significant economic losses:
- ↓ milk
- ↓ weight

TREATMENT
1) Mechanical removal
2) Avermectins (pour on), Organophosphates

CUTEREBRIASIS

Accidental Hosts:
- dogs, cats, + humans
- rodents + lagomorphs are the obligate hosts

NEMATODE DERMATITIS

Stephanofilariasis

adult worms produce microfilariae in skin

variable Pruritis
ventral distribution
→ papulocrustous dermatitis

Diagnose with skin scraping, hair plucking, or skin biopsy

Treat with Avermectins or Imidacloprid/Moxidectin spot-on

Pelodera strongyloides

L3 invade skin of dogs, swine, horses, bovina, rodents, humans

variable Pruritis
ventral distribution
→ erythema
→ alopecia
→ Scaling
→ crusting
→ pustules
Trying to answer practice cases (even without knowing all the right answers) helps to focus on the clinically relevant pieces of information and to present info in ways that makes sense to owners. If you think of all your practice cases as if you’re a mixed animal practitioner, it opens the door for having to explain lots of comparative medicine to clients who own or work with multiple species.

**YES, EVEN IF YOU DON'T SEE ANY:**

You're in a small animal general practice clinic and Martha has brought in her 2 year old cat (CM, DSH) Puddles because she thinks Puddles is overgrooming himself. Puddles is an "only child" and stays indoors all the time with Martha, they watch QVC together every day. You learn that this kitter has always been on the same food with no changes to that or anything else the apartment, according to Martha. Puddles' rump is nearly bare from alopecia, and he's clearly displeased.

What are you suspicious you'll find in your physical exam?

What steps/testing will you do to rule out suspected ectoparasites?

What ectoparasites are you thinking about?

*Fast Forward* Assume you’re working diagnosis is Flea Bite Hypersensitivity - how do you explain this to Martha and why she needs to start using flea preventative? How long should she use it?

Martha doesn't totally buy it - How can Puddles be THIS itchy from fleas when she hasn't seen any fleas in her house or on Puddles?
YES, EVEN IF YOU DON'T SEE ANY:
MUD GOT INTO SOMETHING...

One of your favorite, rambunctious, wackadoo yellow lab patients named Mud comes in for intense itching. Your little friend has alopecia on all 4 of his legs, and he is just incessantly itching, even in the exam room. He’s having a hard time taking treats from you because he can’t stop itching...but he’s a lab, he manages to take a couple.

What test(s) are you thinking of doing to start ruling out (or in) different ectoparasites?

How are you going to explain the *sarcopes scabiei* mites you find to Mud's dad? How'd he get them? How are you going to treat them? What about Boomer, Mud's chocolate lab "brother"?
AN AGGRESSIVELY ITCHING ARABIAN:

Your next appointment while you're on the road today is Sunny, a 4 year old arabian mare. Sunny's owner has noticed she has been super itchy around her chest and legs, she's been scratching herself on anything she can find especially over the past week - she already busted some stuff in the paddock from scratching on it! It's June, and the temps have certainly been increasing this week.

What ectoparasitic diseases are you suspicious of given what you know? Do you have more questions for Sunny's owner about management or environment to help you order your list of suspects?

Assuming you don't find physical evidence of ectoparasites, what are your recommendations for Sunny's owner to help treat and/or prevent this itchiness?
HI, I'M SYDNEY!

I always am thrilled to hear when these guides are helpful to others pursuing their own path in veterinary medicine. I hope we can connect, wherever you are in the world, so you can find me on social media and through my website at

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