24, 25: Answers

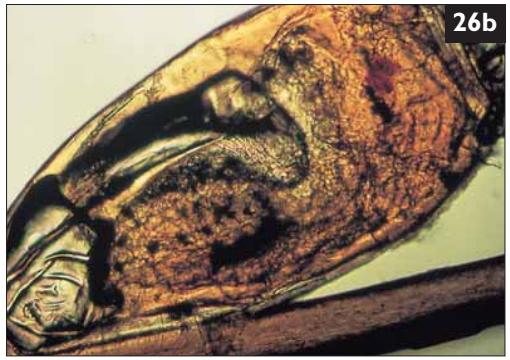
24 i. *Staphylococcus intermedius*. This is a Gram-positive, beta hemolytic, coagulase-positive cocci. This organism is probably the primary cutaneous pathogen of cats too. Bacteria cultured from normal skin are considered to be normal inhabitants of the skin. They may be resident flora (organisms that successfully multiply on healthy skin) or transients (organisms that do not usually multiply on normal skin). There is debate as to whether or not *S. intermedius* is part of the resident or transient flora. Regardless, overgrowth of normal bacterial flora that results in clinical disease requires medical treatment.
ii. Toxins and enzymes produced by pathogenic staphylococci include toxin TSS-1 (toxic shock syndrome-1), which causes toxic syndrome in people; protein A, which is able to bind the Fc portion of immunoglobulins with pro-inflammatory effects; the enzyme coagulase, which allows for the deposition of fibrin on bacterial cells inhibiting the ability of neutrophils and macrophages; and beta-lactamase, which is responsive for resistance against nonprotected penicillins (Noli, 2002).
iii. To date, no difference has been found between the toxins and enzymes from bacterial isolates from healthy dogs and dogs with bacterial pyoderma. However, a difference in the production of a virulence factor that facilitates the adherence of bacteria to host skin has been noted. Pathogenic bacteria show increased adhesion to extracellular matrix proteins when compared to bacteria from normal dogs (McEwan, 2000; Noli, 2002).

25 i. Superficial bacterial pyoderma. The clinical signs are classic for bacterial pyoderma. In this patient all of the clinical stages of a pyoderma are present: papule, pustule, crusted papule/pustule, and epidermal collarette. The most common clinical signs of deep pyoderma are blood, pus, matting of the hair coat, and cutaneous pain. These are absent, as are hemorrhagic bullae; therefore, a deep bacterial infection is not present.
ii. Antibiotics should have a spectrum of activity that includes *Staphylococcus intermedius*, reach high skin concentrations, be bactericidal, have few adverse effects, should be easy to administer, unlikely to cause bacterial resistance, and be inexpensive (Noli, 2002).
iii. First occurrence superficial bacterial pyoderma cases can almost always be treated empirically. The two most common reasons to do a bacterial culture and sensitivity in these patients are the finding of a mixed bacterial population on cytological examination, or knowledge that the animal has a previous history of antibiotic therapy for other reasons. Erythromycin, lincomycin, clindamycin, and trimethoprim-sulfa are common first choice antibiotics for empirical therapy. Cephalosporin, amoxicillin with clavulanic acid, and fluoroquinolone antibiotics are used in cases of deep pyoderma. Treatment should be based upon culture and sensitivity in these cases.

26, 27: Questions

26 A 9-month-old cat was presented for a routine health examination after being adopted from an animal shelter. The unique coloring of the cat's hair coat especially impressed the owners, particularly the 'white tips' on the ends of the hairs (**26a**). The owners reported the cat to be mildly pruritic. Flea combings were done, and an organism was found; several of the hairs with white tips were examined microscopically. The only other pet in the house was a dog, which was unaffected.
i. A microscopic view of a 'white tip' on the cat's coat is shown (**26b**), and of an organism (**26c**) found on flea combing of the hair coat. What are these organisms, and how should the cat be treated?
ii. Three days after treating the cat, the owner calls. Both of her children have been diagnosed with 'what the cat has'! The owner is very agitated that she was not warned of the zoonotic implications. What are the zoonotic implications of this cat's infestation?
iii. What is the genus and species of this organism, and what is unique about it in cats? Why is this parasite more common in the winter than in the summer?


26a


26b


26c

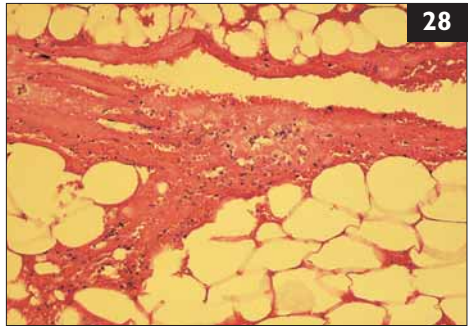
27 What are the three major categories of animal shampoos?

26, 27: Answers

26 i. Louse and louse egg or 'nit' cemented to the hair shaft. This cat has pediculosis. The cat should be washed to remove mechanically as many of the lice and louse nits as possible prior to treatment. Removal of the louse nits can be facilitated with a rinse of a 1:4 dilution of household white vinegar in water; this loosens the cement attachment of the nit to the hair. A thorough washing with a flea shampoo should follow. After the cat is dry, it should be treated for 30 days with a flea control product labeled for use in cats. Topical spot-on products as sole therapy are best avoided; a thorough spraying of the hair coat is needed. The author has found fipronil spray repeated again in 30 days is very effective. Ivermectin is effective if used at a dose of 200 µg/kg orally or subcutaneously every 2 weeks for 6 weeks. Imidacloprid spot-on is effective, but it is important to repeat treatments and to remove mechanically lice and louse eggs from the hairs to ensure eradication.
ii. Lice are host specific, and the children were not infested from the cat. Lice can act as an intermediate host for *Dipylidium caninum*, the dog tapeworm. Although rare, people can become infected with *D. caninum*; this most commonly occurs in children that play with infected dogs or cats (Turner, 1962). Infected people may develop abdominal pain, anorexia, diarrhea, and anal pruritus.
iii. Cats have only one species of louse that infests them, the biting louse, *Felicola subrostratuas*. The reproductive system of the louse is affected by temperature. In the winter, the temperature in the hair coat and on the skin surface is most conducive to louse fecundity. In the summer, the temperature at the surface of the skin can be significantly higher than the ambient temperature; the higher temperature at the skin surface has an inhibitory effect on reproduction of lice.

27 Cleansing, antiparasiticidal, and 'medicated' shampoos. The purpose of cleansing shampoos is to remove dirt and debris from the hair coat. These are commonly sold over the counter as 'grooming shampoos'. Antiparasiticidal shampoos are essentially 'flea shampoos'. They are essentially a cleansing shampoo with an added antiparasiticidal drug (e.g. pyrethrins). The amount of insecticide in the shampoo is too small to be effective as a primary method of parasite control. 'Medicated' shampoos can be subdivided into several groups depending upon the primary activity or active ingredient. Antimicrobial shampoos are used to treat bacterial or fungal (usually *Malassezia*) infections. Common antibacterial agents are chlorhexidine and benzoyl peroxide. Common antifungal shampoos may contain chlorhexidine, ketoconazole, or miconazole. Antipruritic shampoos are usually a combination of a cleansing shampoo and an anti-inflammatory agent such as 1% hydrocortisone, 2% diphenhydramine, 1% pramoxine, or colloidal oatmeal. Antiseborrheic shampoos contain salicylic acid, sulfur, tar, or selenium sulfide.

28, 29: Questions



28 A 10-year-old male mixed breed dog is presented for evaluation of a mass in the right axilla. The owners report that the mass has been slow to develop and has been bothersome to the dog only recently. The location and size of the mass are making it difficult for the dog to walk. Physical examination reveals a firm 10 cm diameter mass in the right caudal axilla. The skin over the mass is freely moveable; however, the mass is firmly attached to the tissue beneath. A FNA is performed and it is noted that the specimen disappears after being dipped into the fixative. A tissue biopsy of the mass is obtained prior to surgical removal. A photomicrograph of a section of the skin biopsy is shown (**28**).
i. Based upon the history, FNA findings, and skin biopsy, what is the diagnosis, and what is the treatment of choice? A tentative diagnosis can often be made in-house. How is that done?
ii. What is an infiltrative lipoma, and how does it differ from a 'lipoma'?
iii. Is calcium chloride a treatment option in this case?

29 The head and neck of a middle-aged cocker spaniel dog with a history of seborrhea are shown (**29**). The dog was presented for evaluation of multifocal areas of hair loss and pigmentation. The hyperpigmentation is, in fact, an area of thick crusting that can be peeled off to reveal an erythematous moist area. Careful examination revealed numerous other lesions like this on the dorsum. Pustules, papules, and epidermal collarettes are present on the ventrum. This lesion is common in cocker spaniel dogs, especially those with primary seborrhea.
i. What is the clinical diagnosis? What diagnostic tests are indicated? The owner has financial constraints and refuses diagnostic tests; what therapy should be recommended based upon the clinical diagnosis?
ii. What would the histological description of a biopsy specimen from a dog with primary seborrhea be expected to report?
iii. What adverse effects can occur with the use of tar-based shampoos?

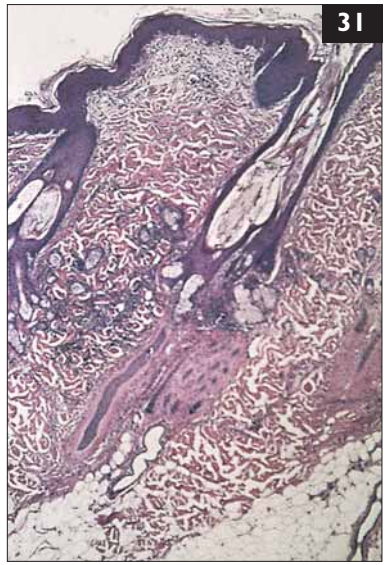
28 i. Lipoma. This is the most common skin tumor of dogs with surgical removal being the treatment of choice. Lipomas do not need to be surgically removed unless the mass is causing a mechanical problem for the dog. Lipomas in the caudal axillary area are common in dogs and can cause difficulties with locomotion. FNA of a lipoma will often reveal an acellular aspirate that glistens. When the specimen is placed into routine fixative, the lipid dissolves.
ii. An infiltrative lipoma is an uncommon neoplasm with a predilection for the limbs. These tumors, unlike the typical lipoma, are large, poorly circumscribed, soft, deep masses that invade between muscles, fascial planes, tendons, and even into joint capsules. These tumors are associated with dysfunction and pain. They are most common in the Labrador retriever and doberman pinscher breeds. Complete surgical excision is difficult.
iii. Intralesional injection of 10% calcium chloride will cause regression of the lesion, but it is not recommended as a treatment because it causes irritation and necrosis.

29 i. Superficial bacterial pyoderma causing a 'seborrheic plaque'. Diagnostic tests should include skin scrapings for mites, impression smears to look for concurrent yeast infections and, possibly, a dermatophyte culture. Treating skin diseases without adequate confirmation of the diagnosis is always a less than satisfactory approach to patient care. Canine pyoderma frequently is a clinical diagnosis; impression smears are needed to see if there are concurrent yeast infections.

The most likely diagnosis in this dog is a bacterial infection with a possible secondary yeast infection. These hyperpigmented seborrheic plaques are very common in dogs with primary seborrhea and are caused by bacterial infections. Careful examination of the patient may reveal scales piercing hairs, another common clinical sign of a bacterial infection. One cost effective strategy would be to treat the dog with oral cephalexin for 30 days and have the owner bathe the dog daily in ketoconazole or a combination antibacterial/antifungal shampoo to treat for the presumed secondary yeast infection. If there is inadequate response to therapy in 30 days, diagnostic testing will be needed.
ii. In an uncomplicated case of primary seborrhea, the most common histological findings would include: hyperplastic, superficial, perivascular dermatitis with ortho- or parakeratotic hyperkeratosis. The thickness of the basal cell layer is usually disproportionate to the thickness of the cornified epitheilium; the basal cell layer is only 1–3 cells thick while there is marked hyperkeratosis present. None of these key clinical signs may be seen if the skin site surface is wiped, scrubbed, or tampered with prior to biopsy.
iii. Tar is odorous, potentially irritating, photosensitizing, and carcinogenic (Scott *et al.*, 2001d).

30 A 5-year-old dachshund dog with bilateral pinnal alopecia is shown (**30**). The hair loss has been slowly progressive, is limited to the ear pinnae, and the dog is nonpruritic. Skin scrapings are negative, as are fungal cultures. A skin biopsy revealed dimunitive hair follicles.
i. What is the most likely cause?
ii. There are four classic syndromes in dogs with this disorder. What are they?

31 A photomicrograph of normal dog skin is shown (**31**).
i. What are the three major layers of the skin and the layers of the epidermis?
ii. What adnexal structures are produced in the skin?
iii. What are tylotrich hairs, and where are they located?



30, 31: Answers

30 i. The most likely cause is canine pinnal alopecia or pattern baldness. This is a commonly observed condition in such breeds as dachshunds, chihuahuas, Boston terriers, whippets, and Italian greyhounds. It can also be seen in cats. The cause is unknown, but it is most likely a heritable condition. No treatment is needed, as this is considered a cosmetic disorder. There are anecdotal reports that the condition may respond to oral melatonin (3–6 mg q8h).
ii. The first syndrome is shown in this case, pinnal alopecia. The second syndrome occurs in American and Portuguese water spaniel dogs and is characterized by hair loss on the ventral neck, caudomedial thighs, and tail beginning about 6 months of age. The third syndrome occurs in greyhound dogs, and affected dogs lose their hair on the lateral thighs. This must be differentiated from bald thigh syndrome in greyhounds, which usually has an endocrine cause. The final syndrome is seen in breeds such as dachshunds, Boston terriers, chihuahuas, whippets, Manchester terriers, and greyhounds. At about 6 months of age, affected dogs lose their hair on the post-auricular area, ventral neck, and ventrum (Scott *et al.*, 2001h).

31 i. The three major layers of the skin are the epidermis, dermis, and hypodermis (subcutis or panniculus). The layers of the epidermis from proximal to distal are the stratum basale, stratum spinosum, stratum granulosum, stratum lucidum, and stratum corneum. The stratum basale, or basal layer rests upon the basement membrane and is responsible for the production of new epidermal cells. In the spinous or prickle cell layer, the keratinocyte cytoskeleton is produced. In the stratum granulosum or granular layer, keratohyalin is produced and deposited. Cells in this layer are flattened and basophilic, and 'granules' can be seen in the cytoplasm. Cells in the stratum lucidum or 'clear layer', are anuclear, and this layer is rich in protein-bound lipids. This layer is best developed in footpads and can also be seen in the nasal planum. It is not seen in other areas of the skin. The most distal layer or stratum corneum, is the skin layer in contact with the environment. It is the fully cornified layer and is made of flattened, anuclear, densely packed keratinocytes.
ii. The skin produces hairs and hair follicles, sebaceous glands, sweat glands, specialized glands (i.e. anal sacs, tail gland, glands of the external ear canal, and circumanal glands), claws, nails, and the horny layer of the skin.
iii. Tylotrich hairs are large hair follicles scattered throughout the body. The hairs are larger than normal hairs and contain one large hair surrounded by a complex of neurovascular tissue at the level of the sebaceous gland. They are believed to be rapid adapting mechanoreceptors.

32, 33: Questions

32 A 5-year-old mixed breed dog was presented for lameness and sloughing (onychomadesis) of all of the nails. The owner reported that the lesions started on one paw, and then gradually developed on all four paws over 2–3 months. Examination revealed the nails were separating at the claw bed exposing the vascular corium (quick) (**32a**, **b**). Nails that had sloughed and regrown were misshapen, soft (onychomalacia), and brittle. The footpads were normal and there were no other signs of skin disease. Previous fungal cultures were negative, and the condition did not respond to a 4 week course of oral antibiotics. The third digit of an affected dewclaw was amputated and submitted for histological examination. The biopsy report found lichenoid interface dermatitis.
i. What is the most likely diagnosis?
ii. How should this be treated?
iii. List the most common parasitic, infectious, immune-mediated, and neoplastic diseases that affect the claw.

33 The owner of the dog shown complained the dog's ear tips 'do not heal'. According to the owner, there is no history of trauma to the ear tip. However, the ear tips intermittently ulcerate, bleed, crust, and then heal very slowly. The ear margin is cracked, fissured, and slightly deformed although much of the lesion is hidden because of the hair coat (**33**). The dog has no other history of skin disease.
i. What is this lesion?
ii. What is the most common etiology?
iii. How should this lesion be managed?