CPD article

Dermatological diseases of small mammals

This article covers the investigation of skin disease in small mammals. Just as in other cases, different dermatopathies may appear very similar so intricate (and invasive) investigations may be needed to obtain a definitive diagnosis. However, financial constraints are very common in these species, meaning that full investigation is simply not possible. As such, reliance on more basic veterinary techniques, presumptive diagnoses, and trial therapies may be needed in these cases. This article looks at what may be obtained from history and clinical examination, rather than laboratory tests, to enable greater accuracy in these presumptive diagnoses, as well as better assessment of underlying factors – both of which will give better results from trial therapies.

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Small mammalian pets frequently present with dermatological conditions. Just as in dogs and cats, these can be complex conditions with primary, secondary and perpetuating factors. Where there is pruritus or severe underlying systemic disease, there may also be welfare issues for the animal. With some parasitic diseases and dermatophytosis, there may also be zoonotic implications for the owners, especially as small mammals are often handled by relatively immune-naive children.

Therefore, there is a need to perform a thorough investigation in all these cases, as would be the norm in canine and feline medicine. Unfortunately, such investigations may often not be possible in these species. First, their small size and increased anaesthetic mortality risk can make procedures, such as skin biopsy, much higher risk, and there are often cost limitations on these investigations. This does not mean that clinical investigations should not be offered, but there is commonly at least a degree of restriction on what can be done. At this point, communicating with owners is very important in terms of managing their expectations. Restriction on investigation hampers diagnostic capability and therefore lessens the chances of successful management or cure. However, finances may simply not be available (and most of the patients are uninsured), so it is rarely helpful to induce feelings of guilt in an owner.

Nonetheless, there is a lot that can be accomplished via taking a good history, a thorough clinical examination and a knowledge of both the species and the old clinician's mantra of 'common things are seen commonly'. This article focuses on how to make dermatological consultations more successful using the history, examination findings and limited or inexpensive laboratory tests (*Figure 1*). It is worth noting that this will exclude ferrets, as these animals have a considerably different disease range from the rodents and rabbits more commonly presented as small mammal pets, the discussion of which will form the focus of this article.

History

As Osler said, 'Listen to your patient, he is telling you the diagnosis'. This is no less true in veterinary medicine. As such, the following should always be noted:

Signalment

There are differences across the biology small mammal species and this should be reflected in their husbandry and diet (Nowak, 1999; Keeble, 2009; Saunders, 2014).

Species

Different species have different disease susceptibilities and what may be common in a rat, for example, may not be common in a hamster. Conversely, parasitic diseases (especially burrowing mite infestations) are common in almost all species.

While some diseases are universally common across species, there will also be local factors linked to individual breeder issues or issues with genetic lines. Similarly, what may be common in an exotics referral practice is not necessarily common in first opinion practice. 'Standard' texts and review articles can help to form lists of what is common, but these should always be modified by personal experiences and those of senior colleagues in any locality.

Table 1 provides a basic guide to what is commonly seen as first opinion in the author's practice.

Age

Certain diseases are more common in younger animals (linked to immune-naivety, or more recent passage through dealers and pet shops with mixing of groups). Both mite infestations and

Table 1. Species-related common differential (not in order of frequency)

	Main clinical signs	Common differential diagnoses and systemic signs
Rabbit	Pruritus	• Ear mites (Psoroptess); bacterial pyoderma, including skin fold and facial or chin pyoderma linked to dental disease
	Ulceration	• Myiasis; bacterial pyoderma, including skin fold and facial or chin pyoderma linked to dental disease; pododermatitis
	Crusts	• Ear mites; treponemiasis; bacterial pyoderma, including skin fold and facial or chin pyoderma linked to dental disease
	Scaling/scurf	• Fur mite/cheyletiellosis; sebaceous adenitis
	Hair loss	• Self-barbering – watch for hormonal signs and nesting; coccidiosis – weight loss; urine scalding – possible polyuria/polydipsia; possible paresis of hind limbs
	Masses/thickenings	• Bacterial abscesses, neoplasia
Guinea pig	Pruritus	• Burrowing mites
	Ulceration	• Burrowing mites, pododermatitis
	Crusts	• Burrowing mites, dermatophytosis, poxvirus
	Scaling/scurf	• Lice
	Hair loss	• Dermatophytosis, ovarian cyst-related (usually barbering rather than hormone-related)
	Masses/thickenings	• Sebaceous cysts, neoplasia
Rat	Pruritus	• Burrowing mites, inflammatory skin disease – likely allergic; lice
	Ulceration	• Burrowing mites, wounds, inflammatory skin disease – likely allergic
	Crusts	• Burrowing mites
	Scaling/scurf	• Lice
	Masses/thickenings	• Bacterial abscesses, neoplasia
Mouse	Pruritus	• Burrowing mites, epitheliotropic lymphoma
	Ulceration	
	Crusts	
Syrian hamster	Pruritus	• Burrowing mites
	Ulceration	• Burrowing mites, neoplasia
	Crusts	• Dermatophytosis, burrowing mites
	Hair loss	• Neoplasia; hyperadrenocorticism – also usually polyuria/ polydipsia; demodicosis
	Masses/thickening	• Neoplasia
Degu	Ulceration	• Tail degloving
	Crusts	• Dermatophytosis
	Hair loss	• Dermatophytosis; barbering – by self or others
Gerbil	Pruritus	• Burrowing mites
	Ulceration	• Burrowing mites, nasal pyoderma
	Crusts	
	Masses/thickening	• Neoplasia

dermatophytosis would fall into this category, although this can also be linked to stress-related factors such as changes in home, husbandry and social groups or mixing. These factors also mean that wounds and bacterial abscesses may be more likely in these groups. Whatever the age of an animal, it is certainly useful to know how long the pet has been with the owner, especially as older animals may have also been rehomed.

Neoplasia is obviously more common in older animals. However, we have to be aware of what we mean by 'older' age in small animals; for rabbits, this may be considered from 5–6 years onwards (younger for giant or dwarf breeds); in guinea pigs, 3 years onwards and diseases associated with older age can be seen over the age of 1 year in smaller species. As an exception, lymphoma may be seen in younger (although not very young) individuals.

Figure 1. a) A hair pluck can be used to distinguish barbering of hair ends from genuine hair loss alopecia, as well as detecting some parasites, such as lice. B) An acetate can be used to collect hair as well as crusts and scale, and is a good means to collect and identify parasites, such as a fur mite from a rabbit (c).

Sex

Most of the aforementioned diseases have little predilection for one sex or the other. However, as examples, bilaterally symmetrical alopecia in a female guinea pig over 18 months will commonly be associated with ovarian cysts, and barbering of the ventrum in a mature female rabbit who is also aggressive and showing nesting signs will often be linked to false pregnancy.

Number of animals affected

It may be expected that infectious diseases will affect several in a group, whereas non-infectious diseases will be seen only in individuals.

To an extent, this is true in younger animals where dermatophytosis and parasitic infections will often affect multiple animals. However, in mature animals, infectious diseases may be seen only in immunosuppressed individuals and others may not express clinical signs. For example, in older rats, mite infestations are commonly seen in individuals of a colony. In these animals, this may be an indication of immunosuppression as a result of underlying disease or low social status (*Figure 2*).

Conversely, non-infectious disease may be seen where individuals share common husbandry or stressors. It may also be seen where related individuals are of similar age, such as lymphoma in mice or ovarian cysts in guinea pigs.

Husbandry

Husbandry may often be an underlying or perpetuating factor in dermatopathies. This may be as a result of stress and immunosuppression or becuase of irritation, allergy, or poor hygiene.

Diet

Direct dietary effects on skin are unusual in small species, although there may be indirect effects, such as diet-related dental disease and subsequently poor grooming, and these may act as another factor in immunosuppression. Similarly, obese individuals may struggle to groom, or be more prone to arthritis and pododermatitis or urine scalding. Urine scalding may often be seen alongside bladder sludging in rabbits, although this is more likely to be a result of underlying spinal arthritis and issues with emptying the bladder, rather than direct dietary problems.

Urine scalding may also be associated with polyuria in rabbits, so it is also advisable to check drinking levels in these animals.

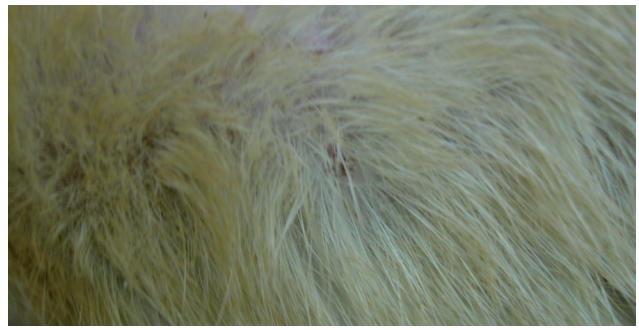

Figure 2. Mange in a rat. This case is typical of the 'miliary' appearance in older rats. It is usually seen in single individuals and usually at the bottom of the social hierarchy. The scabbing can sometimes be difficult to differentiate from bite wounds, although the underlying factors of both are often the same.

Poor quality, dusty hay can also be associated with skin irritation in some animals.

Housing and environment

Foot problems may be seen in rabbits and Guinea pigs where non-grass or hay substrates are used. Poor hygiene and lack of substrate changes may result in damp rotting bedding, making skin maceration and bacterial infection likely.

Use of household sprays and other airborne irritants may also cause skin irritation. In general, the hot dry atmospheres in most centrally heated homes are not a huge factor in driving dermatological disease in small mammals, although the lack of an annual cycle in indoor rabbits certainly appears to drive a continual malt in these animals. Beddings do seem to play a part in irritant or allergic disease, and synthetic materials should be avoided in favour of good quality dust-free hay or paper. Where material bedding (towels or mats) is used, these should be washed regularly at high temperature without washing powders, as these may also be inked to skin irritation in some cases.

Poor husbandry may also be a factor in immunosuppression.

Social grouping and behaviour

In the author's opinion, social grouping and behaviour is one of the main drivers in immunosuppression in group-kept animals, especially rats and mice. A particularly common presentation in older rats is signs of small scabs on the skin, often caused by fight wounds or pruritus as a result of burrowing mites. It can be hard to tell the difference and skin scrapes are often negative. In either event, the underlying cause is often that this rat is bottom of the

Figure 3. A). A younger (anaesthetised) animal with pruritus, erythema and skin thickening responded well to an ivermectin trial as a case of mange. B) In an older animal skin thinning, abdominal swelling and polyuria-polydipsia are typical of hyperadrenocorticism. C) A middle-older age animal with skin thickening and masses as well as crusting, with no systemic signs. While there is excoriation or scabbing of the scent gland, this is likely to be the result of a superficial pyoderma linked to exposure and not generalised pyoderma. In this case, a round cell tumour was diagnosed on biopsy after being suspected clinically.

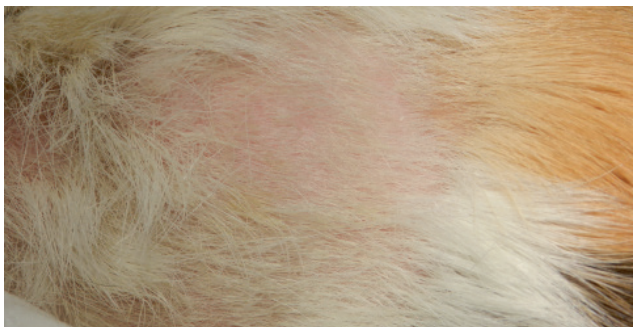

Figure 4. Flank alopecia typical of ovarian cyst disease in guinea pigs.

Figure 5. Extensive crusting in a guinea pig with mange. In this case there was only a moderate response to an ivermectin trial and a skin scrape was required for diagnosis. There was also intense pruritus and therapy with short-term corticosteroids was needed to control this.

social hierarchy and without correction of the social grouping, usually by splitting the group (if large enough – for social rodents, solitary housing is rarely less stressful) and moving less dominant individuals away from the more dominant.

Prevention of these issues relies on husbandry, where there must always be sufficient hiding places, water bowls or drinkers and food bowls for all – the old rule of one per animal plus one is a good starting point. These must be spread around the caging unit (which should be of sufficient size) and not grouped in one part. This is especially true of multitiered units, where dominant animals may control ramps and access to different levels. This can be a difficult area of the history to obtain, as many owners do not like to think of their pets behaving in this way and may misinterpret their behaviours. For example, a rat that only lives on the highest level may not be the dominant animal – it may be unable to exit this level because of the dominant animal controlling the ramp.

Discussions of this subject should be approached carefully. Ask what owners have observed; how the other animals behave and who eats what and where. Pictures of the housing are also invaluable, as are videos of the animals moving around and interacting with one another.

Dermatological history

See *Table 1* for the differential diagnoses and common systemic signs of dermatological disease in smaller mammals.

Pets are often presented after signs have been evident for a while, and may have changed. As such, it is useful to know:

- If lesions have changed (photographs can be very helpful)
- How they looked originally and if they have spread
- Whether signs wax and wane, and is there any regular pattern or seasonality to this?
- Whether other animals have been affected and recovered.

It is unusual for animals not to have received prior medication, usually from a pet shop. It is worth asking if these had any effect and to find out what they were (often owners do not remember, so it may be worth asking them to email pictures of the packets). While failure to respond to a certain medication can be a useful indicator, it is worth bearing in mind that cases of burrowing mite infestation will often not respond, or only partially respond to spot-on ivermectin. This is because they often require higher doses via this route (McKellar et al, 1992).

Systemic sign history

Dermatopathies can be manifestations of systemic disease, or underlying systemic disease may be an immunosuppressant allowing recrudescence of a mite infestation. In some cases, systemic signs may also be an indicator of metastasis of a skin tumour. These may be reported on the history or detected on examination, which should never be restricted solely to the skin.

Important signs may include weight loss and anorexia. These may be seen together or separately, and both may indicate systemic disease, dental disease, or even a low status animal that is unable to feed properly. Other signs may include:

- Polyuria or polydipsia. If seen in a Syrian hamster, with alopecia and skin thinning, hyperadrenocorticism may be strongly suspected (*Figures 3a–3c*).

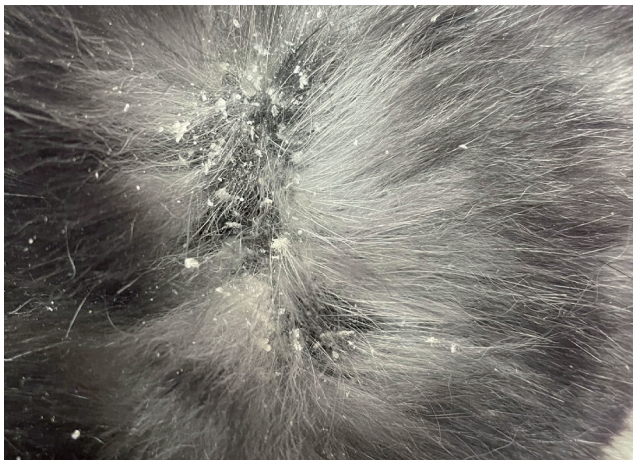

Figure 6. Scurf typical of cheyletiellosis in a rabbit.

Figure 7. A mild case of sebaceous adenitis in a rabbit with scaling/scurf around the eyes and ears.

- Loose feces/diarrhoea. In young rabbits, if accompanied by ill thrift and fur loss or fur thinning this may indicate coccidiosis and faecal floatation test is therefore indicated.
- Hormonal behaviours such as aggression and nesting in does, or aggression and 'rumble-strutting' in guinea pigs.
- Masses such as ovarian cysts in guinea pigs; enlargements of lymph nodes; abdominal or subcutaneous masses.
- General lethargy, ill health, signs of pain (please note, these can be nebulous and non-specific in rabbits and small mammals).

The dermatological examination

The next phase is to examine the skin and assess the extent and type of lesion. It is important to note that lesions may not be solely of one type and combinations may exist, for example, a mass may be ulcerated and crusted. See *Table 1* for the most common first opinion diagnoses.

Pruritus

Owners do not always detect pruritus or may interpret pruritus as painful, but sometimes they will describe increased scratching or grooming. On examination, this may be suspected with signs of skin trauma and self-excoriation. However, in rats these may be very similar to the appearance of old bite wounds. One test is to gently stroke the animals dorsum, stroking against the lie of the coat, which may elicit a scratch or nibbling response. Care should be taken doing this in guinea pigs, especially as intensely pruritic animals may 'faint' or seizure. The absence of this response does not indicate a non-pruritic case, as animals are often very stressed in the consultation room.

Where pruritis is present an ivermectin trial or skin scraping may be indicated, as burrowing mite infestations are the most common differential diagnosis.

Ulceration

Ulceration may be seen in conjunction with pruritus and/or skin-thickening or masses. It can be the result of trauma, self-trauma or invasive skin lesions. This is a severe sign and when accompanied by systemic signs, may be a sign of significantly compromised welfare.

When accompanied by pruritus, skin scraping or an ivermectin trial are indicated. When seen in mice, if the trial is unsuccessful, epithelitropic lymphoma is a common differential diagnosis and a biopsy should thus be offered. Alternatively, a corticosteroid trial may attempted (given the common side effects of corticosteroids in small mammals, concurrent antibiosis should be given and owners warned of side effects) and euthanasia may be considered. In all cases, impression smears of fresh lesions may be of assistance. In non-pruritic rabbits, pyoderma appears a common differential in the author's practice.

Crusting

Crusting is frequently linked to pruritus and sometimes to ulceration. In pruritic Guinea pigs, this is often linked to burrowing mite infestation, especially if lesions are generalised, so skin scrapings or ivermectin trials are indicated (*Figure 5)*. In rabbits, crusting lesions in the ears (and also on the flanks where the ears may lie) can be linked to Psoroptes infestations. Again, ivermectin trials are indicated.

In non-pruritic animals of all species, dermatophytosis is a primary differential especially if lesions are discrete. Cytology may show characteristic fungi and culture may be useful. Given the zoonotic nature of dermatophytosis, therapy should be commenced on suspicion rather than awaiting culture results. In Guinea pigs, crusting around the mouth is commonly associated with pox virus infection, with or without secondary yeast infection.

Scaling/surf

Increased scaling is common in rabbits and usually on the dorsum. This is most commonly linked to fur mite or Cheyletiella infestation (*Figure 6*). These may be seen in rabbits of any age and may be linked to reduced grooming and/or immunosuppression. Skin tapings are easily performed and easily show the mites and/or their eggs. It is worth differentiating the two to determine the need for environmental therapy.

In rabbits, extensive skin scurf (crusting in severe cases) is seen in sebaceous adenitis. In the author's experience this is particularly indicated if lesions are around the eyes and ears (*Figure 7*). If mites are not found or if there is no response to ivermectin trials, biopsy

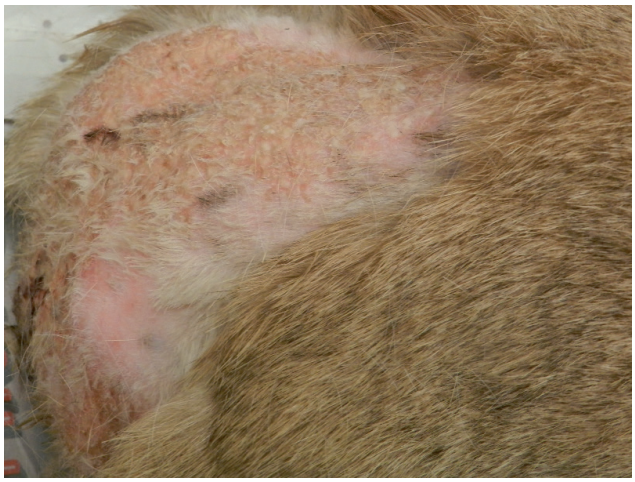

Figure 8. Bacterial pyoderma in a rabbit. While there is extensive ulceration of the skin. The animal was overgrooming at time of examination, although it was felt this sign of pruritus was a secondary change as overgrooming was not noted until later in disease progression. Crusting also appeared secondary to ulceration. Impression smears assisted in identifying bacteria and an associated cellular response. There was a good response to medium-term antibiosis, and an underlying cause was not identified.

Figure 9. Alopecia areata in a guinea pig. In this case the unusual appearance meant progression direct to biopsy. Use of more invasive tests does increase the range of diagnoses identified.

is indicated. If diagnosed thoracic imaging should be performed as some cases are linked to thymic adenoma. In guinea pigs and rats, the finding of white flakes is most commonly linked to lice – again, tape strips are useful to identify parasites and eggs and ideally, to determine the presence of biting or chewing lice and therefore the correct route of therapy.

Skin scaling associated with hair loss may be a sign of dermatophytosis and, if pruritic, burrowing mites and/or pyoderma where there has been long term skin exposure following hair loss.

Hair loss

Hair loss is common, so an important assessment is whether or not this is associated with pruritus . If pruritus is present, then it is commonly associated with mite infestations.

Without pruritus, dermatophytosis is a differential diagnosis, although generally with crusting (and sometimes scaling). It may also be a sign of hormonal or systemic disease. In polydipsic/-uric hamsters it may be a sign of hyperadrenocorticism especially if there is skin thinning. Where there is no polydipsic/-uric (and no skin thinning) demodicosis is a common differential diagnosis. Hair plucks or deep skin scrapings will confirm. In these generalised cases, internal disease (especially neoplasia) should be suspected (*Figures 8a–8c*).

In these cases, a tape strip trichogram typically reveals bitten ends of hairs showing the alopecia to be linked to barbering usually linked to serosal stretch and pain linked to the cyst, rather than hormone-linked hair loss. In any case of hair loss a trichogram is useful to show the bitten hair ends and to commence investigation of whether this is self-barbering or barbering by others, and of any medical or social factors involved. Distribution of hair loss may assist in determining if self-barbering or not.

Thickenings and masses

Discrete masses or thickenings may be tumours, cysts or abscesses. Needle aspiration may reveal pus in the latter cases but for others, fine-needle aspiration, biopsy or excision are indicated.

Generalised skin thickening associated with pruritus may be seen in chronic mite infestations. Otherwise, generalised skin thickening and/or multiple skin masses will convey a guarded prognosis, with epitheliotropic lymphoma seen in smaller species.

Matted coat/failure to groom

Poor grooming usually demonstrates that an animal with systemic illness is either too weak to groom, is unable to turn to groom, or has dental disease that restricts free movement of the tongue.

When can you not avoid complex/expensive investigation?

Some presentations are simply unusual, or what appears to be a 'routine' diagnosis does not respond as expected. In these cases, the original diagnosis should be re-evaluated in case a factor has been omitted, or a treatment trial has been unsuccessful meaning alternative differential diagnoses have become more likely.

However, there are occasions where a full investigation is essential to provide management guidance or to confirm the need for more 'risky' therapies such as corticosteroids. This underlines the importance of having an initial conversation with the owner about how you intend to proceed, in order to manage their expectations – it is always worth making clear that a trial is just that, and that they can be unsuccessful!

For the non-responsive cases, it is worth leaving an interval without therapy before any sampling is performed; this is usually around 5–7 days depending on the drug used. Owners should be warned that the condition may worsen, but that it will greatly reduce the chances of the therapy affecting the results of further tests and hindering diagnosis. In these cases, and where there may only be one affordable test, the author favours skin biopsy as it gives the most useful guidance as to future management (*Figure 9*).

Conclusions

Effective use of the dermatological examination can be very rewarding in providing successful diagnosis of the more common dermatological conditions. Investigating underlying factors, especially husbandry and social structure, enables more effective control of the primary drivers of disease and therefore, more successful long-term management.

Conflicts of interest

The author has no conflicts of interest to declare.

References

Keeble E. Rodents: biology and husbandry. In: Keeble E, Meredith A (eds). BSAVA Manual of Rodents and Ferrets. BSAVA; Gloucester (UK): 2009

McKellar QA, Midgley DM, Galbraith EA, Scott EW, Bradley A. Clinical and pharmacological properties of ivermectin in rabbits and guinea pigs. Vet Rec. 1992;130(4):71–73. https://doi.org/10.1136/vr.130.4.71

Nowak R. Walker's Mammals of the World. John Hopkins University Press; 1999

Saunders R. Husbandry. In: Meredith A, Lord B (eds). BSAVA Manual of Rabbit Medicine. BSAVA, Gloucester: BSAVA; 2014

KEY POINTS

- When dealing with small mammal cases budgets are often limited, placing more emphasis on the clinical examination and history.
- Knowledge of likely differential diagnoses and how common they are is essential when not relying on diagnostic testing.
- Husbandry plays a role in the development of dermatoses in small mammals.
- Social structure also plays a role in the development of disease, so it is worth gathering evidence, ideally in the form of video or pictures, to any contributing factors are not missed.
- Identification of lesion type (primary and secondary) assists in narrowing down differential diagnoses and providing a likely diagnosis.