How to Get the Most Out of Your Skin Biopsies

Donna Hertzke, DVM, PhD, Diplomate ACVP; Veterinary Pathologist & Assistant Director; Marshfield Labs Veterinary Services

Skin issues are among the most common reasons pet owners seek veterinary care (1). Most will respond to treatment, but when treatment fails, a skin biopsy is often the next step. Skin biopsies are a very useful tool and have the potential to provide a great deal of information to make a specific diagnosis and to guide treatment. Unfortunately many biopsies come back “non-specific findings” or “inconclusive”. This scenario is frustrating for all involved (owner, veterinarian, and pathologist). The following information will help you get the most out of your skin biopsies.

When

The time to biopsy is often the most difficult, and sometimes the most important, decision. There are no hard and fast rules as to when to biopsy. However, after the animal has been to six different veterinarians and on a cornucopia of drugs may not be the best time to biopsy, but it may be the only opportunity. Ideally, one should biopsy prior to any medications but that is not always possible. Response to treatment (including the lack of response and exacerbation while on treatment) is an important aspect of your diagnostic schema. Glucocorticoids, in particular, can change the histologic picture. Ideally, the animal should be withdrawn from glucocorticoids prior to biopsy, but this is not always possible. The length of withdrawal is not a fixed time period. In general, the longer the treatment and the higher the dose, the longer the withdrawal period. General guidelines are: oral steroids for relatively short time, 10-14 days; long acting, injectable steroids, up to 6 weeks. It is not always possible to totally eliminate steroids. That extremely pruritic dog may cause more histologic changes by scratching than the steroids mask by reducing the eosinophilic inflammation. If the animal is on treatment, especially steroids, it is very important to let the dermatopathologist know so he or she can “read through” the changes. Newer antipruritic therapies such as oclacitinib (Apoquel®) do not alter the histologic picture as much as corticosteroids and can be used during the steroid withdrawal.

Secondary pyodermas often obscure the “real” problem. Appropriate systemic antibiotic therapy prior to biopsy to eliminate (or at least decrease) the pyoderma often helps to arrive at the primary problem. Not all skin problems require antibiotics. Always use antibiotics appropriately.
Suggested general guidelines in the decision to biopsy (2):

1. Persistent lesions
2. Any neoplastic or suspected neoplastic disorder
3. Any scaling dermatosis
4. Vesicular dermatosis
5. Undiagnosed alopecia
6. Any unusual dermatosis

WHERE

Site selection is very important to success, but often one of the most difficult decisions to make. Sampling the margin of normal and abnormal (like many of us were taught) may not always be the best method. It may be better to select multiple lesions of variable duration and/or character. No matter how experienced the clinician is in selecting sites, the definitive lesion is not always present in all areas. “The more, the better.” Multiple biopsies will greatly increase the likelihood of an accurate diagnosis. At Marshfield Labs, you may submit up to 6 punch biopsy samples for the same price.

General guidelines for where to biopsy:

1. Multiple sites from a variety of lesions—early, middle and late
2. Primary lesions such as pustules, vesicles, petechiae, macules and papules
3. Secondary lesions such as crusts, alopecia, scales, ulcers and erosions
4. Avoid the center of chronic ulcers

HOW TO BIOPSY

In most cases, 6-mm punch biopsies are preferred over 8-mm punches which may have increased risk of infection. Punch biopsy specimens of 3-4 mm are often too small and do not contain enough of the lesion for a diagnosis. They should be reserved for very small lesions or difficult to biopsy areas such as the nasal planum and footpads.

Always use SHARP punches. Dull punches often cause crush and tearing artifact which can leave much if not all the sample nondiagnostic. Some recommend not to biopsy pustules and vesicles with punches because the twisting motion will rupture them; small ellipses or wedges may be better for very fragile lesions. Be careful not to crush the specimen with forceps. Handle the tissues very gently. Use cautery sparingly and only after the punch has been taken. Even a little cautery can cause extensive artifact.

DO NOT PREP the area. Scrubbing the area removes the superficial layers where the answer lies in many dermatologic conditions such as pustules with acantholytic cells for pemphigus foliaceous. (Image 1) Even with the most gentle of hands, sometimes the superficial crusts dislodge. If this happens, submit the crusts along with the tissue (and indicate on form). Many conditions can be only diagnosed by what is in the crusts (mites, bacteria, fungus acantholytic cells). However, do not submit ONLY the crusts.

Many skin biopsies can be taken with a local anesthetic. If you are using a local anesthetic

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agent, be sure to place it in the subcutis and not intradermal. This may give a false impression of dermal edema and may distort the tissues. If panniculitis is suspected, local anesthesia may not be the best choice. Also, punches often do not get deep enough to fully evaluate the panniculus.

Thin specimens can be placed on a small piece of tongue depressor or thick paper and placed upside down in formalin. This will help keep the specimens flat while fixing and will help get good sections. However, do not use this as a labelling method—labels rarely stay on the tongue depressor during transit to the laboratory. It is often important to know the anatomical sites of the biopsy specimens. Epidermal thickness varies by anatomic location from thin (ventral abdomen) to thick (dorsum). Separate labeled formalin containers, labeled cassettes, and/or different colored surgical inks are the preferred methods of identification. Formalin containers and cassettes are available through Marshfield Labs Customer Service, Ph. 1-800-222-5835.

Place biopsies into buffered formalin immediately. Do not allow to dry out or freeze. Fixation delay, drying, and freezing may cause significant artifacts, making a diagnosis difficult or impossible. Special staining techniques may also be affected.

WHAT NEXT?

Signalment is important in obtaining a useful interpretation of skin biopsies. Many skin conditions occur in specific breeds, ages or age of onset, coat colors, sex, etc. (Image 2)

Concise medical and dermatological histories are crucial. When did the problem first develop; how rapidly has it progressed; is it pruritic and level of pruritus; is it seasonal; are other animals affected? Does the animal have any underlying medical conditions? Travel history?

Treatment history and type of medication are very important, not only whether treatment “failed” but was there an initial response that then leveled off.

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or did the problem actually worsen? (Image 3) Did the character of lesions change?

Previous testing results should be included: CBC, serum chemistries, skin scraping, skin cytology, culture results, thyroid testing, food trials, allergy testing, etc.

A good description of lesions and distribution is a MUST. Using accurate dermatological terms aids the dermatopathologist to get a mental picture of the animal. There are several text books of veterinary dermatology with comprehensive lists and descriptions of dermatologic lesions (3). “A picture is worth a thousand words” and we encourage submission of photographs with skin biopsies. Photographs can be emailed to: lab.vetpath@marshfieldclinic.org.

A list of clinical differential diagnoses should be included with all skin biopsies (4). The dermatopathologist does not limit their diagnoses to this list, but knowing what the clinician is suspecting helps us to tailor our comments to their specific concerns. Sometimes knowing what it’s not is as important as knowing what it is.

Marshfield Labs has a Dermatopathology Supplemental History Form (page 6) to aid in skin biopsy submission. This form can be downloaded from our website or obtained by calling Marshfield Labs Customer Service, Ph. 1-800-222-5835.

DERMATOPATHOLOGY TEST CODE: VDT

By using this derm specific test code, your skin biopsies will be directed to a pathologist with specific interest in dermatopathology. You may submit up to 6 skin punches at the same cost. The dermatopathologist will examine multiple step sections and apply routine special stains for infectious agents when appropriate at no extra cost. (There is additional cost for immunohistochemistry.)

REFERENCES:
2. Blackwell’s Five-Minute Veterinary Consult: Clinical Companion Small Animal Dermatology, 2nd Ed.
3. Muller and Kirk’s Small Animal Dermatology, 7th Ed.
MEET OUR DERMATOPATHOLOGY TEAM

Donna Hertzke, DVM, PhD Diplomate ACVP
Assistant Director, Veterinary Services

Dr. Hertzke is a graduate of Colorado State University College of Veterinary Medicine. She was in small animal and equine practice prior to completing postdoctoral training at Kansas State University College of Veterinary Medicine where she received her PhD degree. She was a staff pathologist at Kansas State University prior to joining the staff at Marshfield Labs. Dr. Hertzke is a diplomate of the American College of Veterinary Pathologists in anatomic pathology.

Dr. Hertzke has been at Marshfield Labs since 1995.

Special Interests:
• General diagnostic pathology and cytology
• Dermatopathology
• Oncology - all species

Michael H. Goldschmidt, MSc, BVMS, MRCVS, Diplomate ACVP

Dr. Goldschmidt is renowned for his expertise in diagnostic pathology, especially in dermatopathology and oncological pathology. He has published more than 200 manuscripts and book chapters, held numerous positions with the American College of Veterinary Pathologists in the areas of surgical pathology and dermatopathology and serves on the editorial board for many veterinary medical and veterinary pathology journals. Dr. Goldschmidt is a member of the Royal College of Veterinary Surgeons. He is a Diplomate of the American College of Veterinary Pathologists in anatomic pathology.

Special Interests:
• General diagnostic pathology
• Dermatopathology
• Oncological pathology

Rob Foster, BVSc, PhD, MANZVCS, Diplomate ACVP

Dr. Foster is a graduate of the University of Queensland, Australia. He was in private practice in Australia prior to completing a PhD in reproductive pathology at James Cook University of North Queensland where he was subsequently a lecturer in pathology. He is currently a professor in a department of Pathobiology at a veterinary college in Canada where he has taught veterinary pathology in the DVM and residency programs since 1989. He is a member of the Australian and New Zealand College of Veterinary Scientists in pathobiology, is certified as a Specialist Pathologist in Australia and is a diplomate of the American College of Veterinary Pathologists.

Special Interests:
• General diagnostic pathology
• Reproductive pathology
• Oncologic Pathology
• Dermatopathology

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# Dermatopathology Supplemental History Form

**Marshfield Labs**

Dermatopathology Form (Test Code: VDT)

**Owner Name:**

**Account Name:**

**Address:**

**Phone:**

**Fax:**

**Animal Name/ID:**

**Species:**

**Breed:**

**Sex:**

**Age/DOB:**

**Collection Date/Time:**

**Veterinarian:**

**Apply patient label here:**

(Please also label all samples that accompany this form)

**Quantity of biopsy samples submitted:**

**Description of lesions:**

Circle all that apply:

- Alopecia
- Crusts
- Thickening
- Papules
- Ulcers
- Erythema
- Hyperpigmentation
- Lichenification
- Pustules
- Vesicles/Bullae
- Scales
- Plaque
- Hypopigmentation
- Macules
- Fissure
- Nodules/Mass

**Pruritus:**

- YES
- NO
- Unknown

**Duration of problem:**

**History / PE findings:**

**Shade affected areas and mark biopsy sites:**

**Diagnostic Tests:**

**Treatments, previous and/or current:**

**Differential clinical diagnosis:**

Email photos to: lab.vetpath@marshfieldclinic.org (please include pet and owner name with your account number in the subject line)
MEET OUR NEW PATHOLOGIST

Karen Trainor, DVM, Diplomate ACVP

Dr. Karen Trainor is a graduate of Cornell University College of Veterinary Medicine. She completed an internship at Veterinary Specialists and Emergency Services in Rochester New York and a pathology residency at Texas A&M University Department of Veterinary Pathobiology where she also was a research assistant professor of pathology and attained a Masters of Science degree in Veterinary Pathobiology. She is a diplomate in the American College of Veterinary Pathologists in anatomic pathology. She served as a diagnostic pathologist at Abaxis Veterinary Reference Laboratories in Olathe Kansas. Dr. Trainor joined the staff at Marshfield Labs in June, 2016.

**Special Interests:**
- General diagnostic pathology
- Dermatopathology