Diagnosing Disorders of the Skin
By Erica Noland, DVM, MS, Dipl. ACVP

Skin issues are some of the most common presenting complaints of pet owners. You may decide to take skin biopsies because of an unusual presentation of skin lesions, skin lesions that are failing to respond to appropriate treatment, or for histologic confirmation of expected disease. Accurate histopathologic interpretation of skin biopsies requires an individual with a strong familiarity of the organ. At the MSU VDL, pathologists with a dedicated interest in skin are available to meet your dermatopathology needs.

Making the Most Out of Your Skin Biopsies:
Please indicate on the MSU VDL sample submission form that the case is for dermatopathology review. When submitting your cases, keep in mind that the more you provide to your pathologist, the more the pathologist can provide to you. The following are general guidelines for receiving the most accurate diagnosis/interpretation of your dermatologic submissions:

- A thorough clinical history is essential. This includes information such as the location of the lesion or distribution of the lesions, description of the lesions (crusts, papules, edema, erythema, etc.), duration, current and past treatment, and responses to treatment.
- Tell us what your primary differentials are, and what you are expecting to obtain from the biopsy specimen(s).
- Please indicate clearly where the biopsies were taken on the animal.
- Well-developed, non-chronic lesions will often contain the most diagnostic information. Avoid sampling the center of ulcerated regions.
- For punch biopsies, 6-8mm punches are preferred unless 4mm is your only option.
- Submitting three to four punches for histopathologic review is preferred, unless the lesion is very localized.
- Taking an ellipse of the skin rather than a punch biopsy may be helpful in cases with a sharp line of demarcation between affected and non-affected areas, cases of alopecia, or cases of suspected vasculitis.
- If labeling of the specimens is necessary, placing them in separate jars or separate cassettes is recommended.

While tongue depressors may be used to prevent folding of thin specimens, they are not recommended for labeling as specimens often fall off in transit.

- Most skin biopsies can be taken with just local anesthetic.
- Do not prep the skin, as crusts or fragile pustules are critical for some diagnoses (see Figure 1). If the crust falls off during sampling, place the crust in the formalin and indicate that on the submission form. If you must clip the hair, do not touch the clipper blade to the skin surface.

Photographs of the animal and affected areas (see Figure 2a) are welcomed and much appreciated, as they provide correlation between histopathologic changes (Figure 2b) with clinical findings. Hard copies of photos can be attached to the submission form. Digital images can be submitted to dermpath@cvm.msu.edu.

Figure 1. Intact subcorneal pustule containing acantholytic cells, consistent with a diagnosis of pemphigus foliaceus.
Figure 2a. This 12-month-old dog had generalized scaling (below) since she was a puppy (Photograph courtesy of Dr. Vanderclear, Animal Skin Ear & Allergy Clinic of St. Louis, MO).

Figure 2b. The histologic lesions (below), including suprabasilar keratinocyte ballooning degeneration and lysis, variably sized and irregular keratohyalin granules, and compact and laminated orthokeratosis, in conjunction with the provided clinical history are consistent with epidermolytic ichthyosis, a congenital keratinization disorder.

**Tissue Processing:**
Submitted formalin fixed punch biopsies (Figure 3a) are bisected in the direction of the hair growth (Figure 3b), processed, and completely embedded on edge in paraffin blocks.

Five (5) micrometer sections of the embedded tissues are then placed on glass slides and routinely stained with hematoxylin and eosin before arriving to your pathologist for examination.

**Special Stains:**
While, in general, culture is more sensitive at detecting infectious agents, the MSU VDL offers a number of special histochemical stains to aid the pathologist in detecting suspected microorganisms (see Figure 4). This testing will be performed at the pathologist’s discretion at no additional charge to your clients.

**Immunohistochemistry and PCRs:**
Challenging cases may demand testing beyond histochemical staining and light microscopy. The MSU VDL has an unrivaled array of immunohistochemical markers as well as pathologists with the expertise to decide...
appropriate additional testing and interpretation of such testing. For example, in cutaneous lymphoma (Figure 5a), immunohistochemical markers (Figure 5b) can be used to phenotype the lymphoma (T- vs. B-cell) for treatment purposes or, alternatively, immunohistochemistry and PCR for antigen receptor rearrangement (PARR) may be recommended by your pathologist in order to confirm that there is a neoplastic population in the specimen in early or inflamed cutaneous lymphomas. This testing is available at the MSU VDL and can be performed on the formalin-fixed biopsy specimens submitted for histopathologic examination for an additional fee.

Figure 5a. Inflamed T-cell lymphoma. Mixed population of inflammatory cells and neoplastic lymphocytes.

Figure 5b. Neoplastic lymphocytes show strong perimembranous or cytoplasmic brown labeling for CD3, consistent with T-cells.

**Culture and Sensitivity:**
If an infectious process is suspected, you may want to take an additional skin punch for macerated tissue culture at the same time as your biopsies for histologic examination. This will avoid an additional potentially stressful procedure for your patients and the inconvenience of an additional trip to the veterinarian for your clients. The MSU VDL has a full service bacteriology section. For our laboratory, if multiple cultures are warranted (aerobic, anaerobic, mycobacterial, and fungal), one (1) 5mm punch is a sufficient amount of tissue for bacterial cultures; however, submitting an additional skin punch for fungal culture will yield the best results. Tissue can be submitted at the same time as your biopsies. If mailed to the laboratory in the same container as formalin fixed tissue, fresh tissue for culture should be double packaged separate from the formalin container to prevent sterilization of the fresh tissue by formalin fumes and submitted with ice packs to keep the tissue cool. Please indicate on the form if you would like cultures to proceed immediately or if you would like us to hold the fresh tissue until we know if biopsy indicates culture.

**Second Opinions and Collaboration:**
Besides receiving a detailed microscopic description and interpretation of your submitted specimens, an advantage of submission of your skin biopsies to the MSU VDL surgical pathology service is our bimonthly dermatology/dermatopathology round sessions. Any challenging or unique cases will be discussed with a group of dermatologists.

**Visit Us at Veterinary Conferences**
This winter we’ll be in the exhibit hall at the conferences listed below. If you’ll be there too, please stop by. Meet the people behind the testing you and your clients rely on. Ask us questions. Give us feedback. Pick up informational materials and giveaways. While you’re there, ask us how to get a free (yes, FREE) overnight shipping label so delivery for your next submission is on us!

We receive great ideas when we have the opportunity to interact with clients face-to-face. We’d love to meet you.

**Michigan Veterinary Conference**
Lansing, MI | January 26-27, 2018 | Booth 101-103

**VMX (formerly NAVC)**
Orlando, FL | February 3-7, 2018 | Booth 3009

**Attending VMX:**
Rachel Reams, DVM, PhD, DACVP | MSU VDL Director
Kent Refsal, DVM, PhD | Endocrinologist

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Letter from the Director: New Fees in Effect January 1, 2018

The MSU VDL will have new fees effective January 1, 2018. To offer our clients the most stable pricing possible, we review our fee structure every two years. Overall, fees will increase approximately 5% with some variation from test to test. While many test prices have increased, a significant number remain the same, and a few have decreased.

As always, we do not charge accession or out-of-state fees for any service. We make every effort to price our services fairly and competitively for our clients.

Fee increases are a necessary but unwelcome change for all of us. We know that these increases translate into higher costs for your clients whose animals rely on you for effective treatment based on reliable diagnostic results. We make every effort to contain costs where possible but we are not immune to increases in supply and labor expenses.

We remain committed to providing our clients the core diagnostics, innovative solutions, and expert service they’ve come to expect from our laboratory. Thank you for continuing to choose the MSU VDL for your diagnostic testing needs.

Sincerely,

[Signature]

As 2017 draws to a close and 2018 approaches, we will be leaving the Year of the Rooster and entering the Year of the Dog. Looking back at the last year, we have much to be thankful for, including you. Thank you for choosing the MSU VDL as your partner in protecting the animals entrusted to your care.


Your friends at the MSU VDL wish you a bright and healthy new year!