Dermatopathology
Skin Pathology - Introduction

- Limited range of responses
  - Many things appear similar grossly
- 1° changes more useful
- 2° changes are common
  - Especially if chronic or if pruritic → self trauma
- Need histology!
- Ancillary tests
Primary versus Secondary skin lesions

Primary
- Macule/patch
- Papule/Plaque
- Nodule
- Tumour
- Vesicle/bulla
- Pustule
- Abscess

Primary or Secondary
- Scales
- Crusts
- Alopecia
- Erythema
- Hyper or hypo-pigmentation

Secondary
- Epidermal collarette
- Erosion/Ulcer
- Excoriation
- Scar
- Lichenification
- Callus
Don’t forget the basics!

Step 1
• Look at the specimen: Is it normal or abnormal
Step 2
• What’s the abnormal part?
Step 3
• Describe the abnormal part
Step 4
• Interpret the changes (give a morphologic diagnosis)

• Description:
  – Distribution
  – Contour
  – Shape
  – Size
  – Consistency/texture
  – Special features
  – Extent

• Morphologic Diagnosis:
  – Organ
  – Exudate (if present)
  – Distribution
  – Duration
  – Extent

So what’s new?? More emphasis on ETIOLOGY
Example:

Multiple 6 week old pigs on a single farm have developed skin lesions. The farmer wants to know what is causing the lesions.
Scattered randomly over the body are numerous, multifocal to coalescing skin lesions, the majority of which range in size from 0.3 cm to 1 cm in diameter.
Description:
Affected areas are round to irregular, raised, and often have a central region of depression, a surrounding rim of red discoloration, and are covered by a crust.
Morphologic Diagnosis

Dermatitis, hyperplastic and ulcerative, multifocal to coalescing, chronic, moderate, with papules, pustules, and crusting

Example:

- Papule
- Pustule (ruptured) covered by a crust
Etiology?

For many cases you begin with a differential list which you narrow down to a diagnosis with additional testing: histology, bacteriology, virology, etc.

Example:

- Differential Diagnoses
  - Swinepox
  - Vesicular diseases
  - Allergic skin reactions
  - Bacterial skin disease
  - Sunburn
  - Ringworm

Tissues can be sent for histology and virological testing to confirm.
Etiology? Swinepox – caused by Swinepox virus (*Suipoxvirus*)

Typical progression of pox lesions:

- Macule
- Papule
- Vesicle
- Umbilicated pustule
- Crust
“Case 1” : Basic skin lesions: multiple skin samples from different species

**Macule** = circumscribed area of discolouration $\leq 1$ cm

If $> 1$ cm = patch
“Case 1” : Basic skin lesions: multiple skin samples from different species

**Cyst** = an epithelial lined cavity containing fluid or solid material
“Case 1” : Basic skin lesions: multiple skin samples from different species

**Tumour** = a mass (neoplasia implied) that may involve any structure of the skin or subcutis (or any other organ)
“Case 1” : Basic skin lesions: multiple skin samples from different species

Callus = A thickened, rough, hyperkeratotic, alopecic, often lichenified plaque that develops on the skin
“Case 1”: Basic skin lesions: multiple skin samples from different species

**Lichenification** = a thickening and hardening of the skin with exaggeration of the superficial markings.
“Case 1”:
Basic skin lesions: multiple skin samples from different species

Alopecia = loss of hair

Alternatively, this could represent hypotrichosis – failure to develop hair (history is important!)
Case 1: Basic skin lesions: multiple skin samples from different species

**Crust** = an accumulation of dried exudate, blood / serum, scale or medications adherent to the skin surface
“Case 1” : Basic skin lesions: multiple skin samples from different species

Hypermelanosiosis = Black pigmentation of the skin
Erythema = Reddening of the skin
“Case 1” : Basic skin lesions: multiple skin samples from different species

**Abscess** = A well demarcated fluctuant lesion resulting from dermal / subcutaneous accumulation of pus
“Case 1” : Basic skin lesions: multiple skin samples from different species

Ulcer = A break in the epidermis with exposure of the underlying dermis.
**History**: A 6 month old mixed breed dog developed ocular discharge, vomiting, diarrhea one week ago. It then developed muscle twitching and lesions on all of the foot pads.

**Describe the changes:**
“Case 2”: Distal limb of a dog

Description: There is thickening of the digital pads of the paw. The affected pads are covered by a brown crust.
“Case 2”: Distal limb of a dog

Morpholologic Diagnosis: Pododermatitis, proliferative and hyperkeratotic, diffuse, moderate, chronic or Hyperkeratosis of the digital pads
“Case 2”: Distal limb of a dog

**Etiology?**

**Differential Diagnoses**

- Canine Distemper
- Nasodigital hyperkeratosis
- Familial pawpad hyperkeratosis
- +/- Pemphigus foliaceus

Given the history with nasal discharge, etc. Canine distemper is considered most likely. Tissues can be sent for histology and virological testing to confirm.

<table>
<thead>
<tr>
<th>Morphologic Diagnosis</th>
<th>Pododermatitis, proliferative and hyperkeratotic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disease Name</td>
<td>Canine distemper (Hard pad disease)</td>
</tr>
<tr>
<td>Etiologic Diagnosis</td>
<td>Viral pododermatitis (or distemper pododermatitis)</td>
</tr>
<tr>
<td>Etiology</td>
<td>Canine distemper virus</td>
</tr>
</tbody>
</table>
“Case 3”:
Skin from an 8 month old Holstein heifer

**History:**
3 months ago: Animal purchased with scabby lesions over the face and back. The owner thought it had mange and treated with ivermectin (3 times). Now lesions are much more severe and the animal is pruritic. The animal was donated to AVC for teaching.

Describe the changes:

From Cornell Veterinary Medicine: Necropsy show and tell: veterinary pathology images
Description:
Several round to irregular, often coalescing, raised, thick, yellow-tan crusts are present on the skin. The skin is thickened.

Morphologic Diagnosis:
Dermatitis, multifocal to coalescing (or locally extensive), chronic, severe, with marked crusting

Etiology?
**“Case 3”: Skin from a cow**

**Differential Diagnoses**
- Dermatophilosis
- Mange (Sarcoptes)
- Ringworm (Dermatophytosis)

**Can do skin scrapings, histopathology and bacterial culture to confirm**

<table>
<thead>
<tr>
<th>Morphologic Diagnosis</th>
<th>Dermatitis with extensive crusting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disease Name</td>
<td>Dermatophilosis (Rain scald)</td>
</tr>
<tr>
<td>Etiologic Diagnosis</td>
<td>Bacterial dermatitis</td>
</tr>
<tr>
<td>Etiology</td>
<td><em>Dermatophilus conglobensis</em></td>
</tr>
</tbody>
</table>
**Case 4**: Skin (ears) from a young female moose

**History:** Two moose were found dead in Kouchibouguac National Park (NB). One of the animals had a high number of external parasites and a poor haircoat. The head was submitted for examination.

Photo by Rick Price: http://www.treknature.com/gallery/North_America/Canada/photo148971.htm
“Case 4”: Skin (ears) from a young female moose

**Description:**
Locally extensive areas of alopecia and thickened skin are present on the head and ears. These areas are partially covered by a tan-brown crust with numerous ticks present in the affected region.

**Morphologic Diagnosis:**
Dermatitis, locally extensive, chronic, severe, with alopecia and crusting.
“Case 4”: Skin (ears) from a young female moose

Etiology:

Tick infestation! Specifically, *Dermacentor albipictus* (the winter tick). Affected animals are often called ghost moose.
“Case 5”: Skin from a pig

**History:** A pig with multiple raised black masses in the skin was submitted for postmortem.
"Case 5": Skin from a pig

History: A pig with multiple masses in the skin was submitted for postmortem.
“Case 5”: Skin from a pig

Description:
Several masses measuring up to 10 – 15 cm are present in the skin. The masses are firm, black, nodular to irregular, and occasionally ulcerated. On cut section they are solid and relatively homogeneous and appear to invade the dermis.

Morphologic Diagnosis:
Skin, melanoma, multifocal
“Case 5”: Skin from a pig

Etiology?

Like most tumours – etiology is unknown, but melanocytic tumours in pigs are often seen as an inherited congenital lesion.