Descriptive pathology is the recognition, characterization and interpretation of pathologic lesions or abnormalities. [The proportions of each of these components may vary according to the purpose of the reporting format i.e. autopsy report, surgical biopsy report, certification examination, scientific publications or reports of new diseases and technical reports]. Gross pathology concentrates on the organ or whole animal; histopathology on changes in organs, tissues and cells as seen through a microscope. Description provides a rapid and inexpensive determination of potential problems which could correlate with clinical disease and support a presumptive diagnosis. The lesions of some diseases are sufficiently distinct in their pattern to be presumptively diagnostic based upon autopsy alone. For many disorders, the lesions are highly suggestive of a particular disease or class of related diseases. Often the pattern of lesions suggests a pathogenesis or mechanisms of the clinical disease. Related disease agents or mechanisms often display similar patterns and for comparative biomedical scientists such as veterinarians who must deal with a wide spectrum of species, learning to interpret these patterns can be extremely useful in arriving at diagnoses in rare or unusual species. Commonly, the autopsy lesions are not distinct or specific and require additional diagnostic modalities to confirm or establish a diagnosis definitively. In this regard, descriptive pathology is the "road map" for what should be done next. It also provides a permanent, written and legal record of the medical problems of the patient.

The role of the postmortem examination ("autopsy" literally means “self examination" but the context for this Latin phrase was intended to mean “to examine for yourself” ) is to identify, characterize and record pathologic abnormalities at the clinical level, arrive at a presumptive diagnosis in light of the accompanying history and serve as a spring board for additional investigations if needed. This tradition is handed down to us from 2 seminal works dating from the Renaissance when dissecting human bodies became acceptable practice. Andreas Vesalius, the Flemish anatomist wrote De Humani Corporis Fabrica (known as “De Fabrica”) and Giovanni Morgagni, an Italian pathologist began associating clinical signs with pathologic changes in De Sedibus et Causis Morborum (called “De Sedibus”). Performance of the autopsy in veterinary medicine, (frequently called "necropsy" which means "death examination") is
unique in its execution when compared to human medicine. Except for clinicians practicing in training institutions where a resident staff of pathologists performs the autopsies, most private veterinary practitioners must do the autopsy themselves. Thus, it is important to understand the fundamentals of the autopsy to get the most out of it. The autopsy is an ephemeral event and when it's over, “it's over!” This makes the accurate description and interpretation of the autopsy findings critical because that is what remains in the permanent record as the basis for later historical, medical and legal review and interpretation. A principal limitation of retrospective clinical studies is a lack of or poorly conducted autopsy with inconsistent or incomplete characterization of the lesions. Although our human counterparts often have the opportunity to exhume a body for re-examination at a later date that option is rarely open to veterinary pathologists.

**Description versus Interpretation**

Gross observations are objective and should never change. Interpretations are subjective, open to discussion and can be altered retrospectively. Interpretation is always a guess but with proper training and experience it can be a very very good guess. Interpretation is what pathologists get paid to do but they should always justify their interpretation by accurate descriptions.

**Description:**

The lung was diffuse dark red to plum colored, heavy, wet and foamy fluid freely ran from the cut surface. It felt firmer than normal and not

**Interpretation:**

Diffuse pulmonary congestion and edema

Diffuse acute interstitial pneumonia

“The style of writing should be suited to the purpose and needs of the reporting format”
Probably the first descriptive pathology most of us read was that found in textbooks and technical journals while we were veterinary students or at least early in our residency training. The purpose for writing in these media is to report for the first time a pathologic entity in the case of journal articles or provide a reference standard for a disease or process. In either case, the writing should be detailed and descriptive at gross, microscopic and even ultra structural level if appropriate. It should describe enough detail to characterize the process so that future pathologists can compare the description with their case of interest. The task is archival in that it sets the standard. Therefore, emphasis should on descriptive detail and not interpretation. The need for accuracy is high as these descriptions set the standard for diagnosis and the original slides are not generally available for review. But the task can usually be done somewhat at the author’s pace so time and fatigue are not factors.

Adenomas of the pars intermedia in horses can be large tumors that extend out of the sella turcica and severely compress the overlying hypothalamus (Fig 3.12C). The adenomas are yellow to white, multinodular, and incorporate the pars nervosa. On sectioning of the pituitary mass, the pars distalis usually can be identified as a compressed subcapsular rim of tissue on the rostral margin. A sharp line of demarcation remains between the neoplasm, which is partly encapsulated, and the compressed and atrophic pars distalis. The tumors are subdivided into nodules or compartments by fine septa of connective tissue that contains numerous capillaries and rare inflammatory cells. Tumor cells are large cylindrical, spindle-shaped or polyhedral, with an oval hyper chromatic nucleus (Fig 3.12D). The histological pattern is often reminiscent of the prominent pars intermedia of normal horses. Occasionally, cuboidal cells form follicular structures that contain dense eosinophilic colloid. In other areas, the spindle-shaped cells may assume a more sarcomatous pattern and palisade around vessels. The cytoplasm is lightly eosinophilic and granular. From Pathology of Domestic Animals Vol 3 5th Edition Ed Grant Maxie 2007

The Purpose of Histopathology on the Certification Examinations. The purpose of the histopathology section of the certification examinations in the United States and Europe is to test the skill of the observer at recognizing and describing alterations in cells and tissues associated with pathologic processes and their causes at the level of the light microscope. It includes the ability to summarize the observed processes into a morphologic diagnosis, relate that to possible mechanisms and hypothesize a potential pathogenic sequence of events. Although it may also test recognition of specific clinical disease diagnoses,
its emphasis is clearly on the details of lesion recognition not bottom-line diagnosis. The examination is rigorous in the testing of these details because it is a “Core Skill” that defines veterinary pathologists in the biomedical community and rigor is necessary to ensure a high standard of ability. High standards promote high achievement which fosters excellence in the discipline. The histopathology examination is primarily descriptive and less interpretive. In this aspect, it most resembles description seen in textbooks and journals. The principle difference is that it is done under rigorous conditions in which time and therefore fatigue are important factors. Accuracy is assessed by objective grading and is reflected in the results of the examination; certification or not. Training programs place great emphasis and effort on developing this skill in their students. Pathologists are justifiably proud of their ability to perform this skill and often are eager to demonstrate it when faced with descriptive tasks. But the style required for the certification examination while perfectly suited for the certification purpose, can be unnecessarily time consuming, cumbersome in its application, inefficient and impractical for every day use in some reporting formats and in some cases may interfere with the goal of the report. Nevertheless, young pathologists are often eager to demonstrate their unique skills and with time, the exam style becomes habit in other descriptive tasks. Without much thought we lapse into the “Board exam description” style because it is what we know how to do, we are proud of it and there are no guidelines about how to alter the style for different post certification reporting tasks. A fundamental philosophical tenet of descriptive pathology is that style should fit the purpose of the reporting format.

The Purpose of the Gross Pathology Portion of the Certification Examinations

Gross pathology on certification examinations is designed to test your knowledge of interpretation, not description. In its current form, the gross pathology section presents images of lesions and with limited additional information besides species, expects the candidate to make a diagnosis of a specific disease condition or give a DDx and then ask additional related questions that depend on getting the diagnosis correct. Alternately it may request a morphologic diagnosis based on what the candidate can see and knows about such processes in that particular species. Detailed characterization of the lesion is not requested. In other words, the gross pathology portion of certification exams is interpretive, not descriptive. The examiners want to know if you can recognize disease conditions at the gross level which is an important skill. You still do the lesion characterization in your head but the examiners presume you learned that in vet school and are more focused on your ability to make an interpretation of observations which is the mark of an expert or specialist in pathology. Currently training environments teach both description and interpretation as part of the skill set of a pathologist. Under examination conditions gross pathology is performed under time limitations so moderate stress and fatigue are a consideration that could affect accuracy. Accuracy is assessed by objective grading with success or failure for the candidate as the outcome; an important but limited and personal outcome.
In autopsy reports, it is the **gross findings that dominate the report** because they provide the *only permanent record of what was found.* Microscopic changes are generally described in support of the gross findings and together make a powerful data combination with which to interpret the facts and arrive at conclusion about the causes and mechanisms of the events surrounding the animal’s death or disease process. Gross lesion characterization is enormously useful and important to pathologists evaluating histopathology because

**Knowledge of the gross lesions orients the pathologist and “Frames” the case** when interpreting the microscopic changes in the collected tissues. Hydrostatic edema in the lungs can be difficult to appreciate in histological sections but if the gross report indicates the lungs were heavy, pale, wet and had copious clear fluid running off the cut surface, you can confidently confirm it on the microscopic examination. In academic medical centers and animal disease diagnostic laboratories, autopsies are performed by highly trained pathologists who see both the gross and microscopic lesions and they can correlate them when finalizing the case. Gross observations set up the microscopic descriptions so that the histological characterization is often confirming what was suspected on gross. Complete and thorough evaluation of autopsy material may also discover microscopic lesions not seen on gross examination.

In the western world many animal autopsies are performed by clinicians and submitted as “necropsies-in-a-jar” to diagnostic laboratories. The final report on such cases is immeasurably enhanced if the clinician provides at least a summary of the gross findings. Necropsy-in-a-jar cases without knowledge of the gross findings are limited in their interpretative power, often complicated by autolysis or poor fixation and occasionally useless if the microscopic evaluation revealed nothing and the clinician failed to properly frame the case. Necropsy-in-a-jar is truly a team effort or a partnership but too often its power is diminished by lack of information about the gross findings. In all cases good autopsy reports contain useful, accurate and complete information about both the gross and microscopic findings. In necropsy-in-a-jar cases, it is the clinician’s responsibility to provide the gross description and frame the case. Failure to provide this can place significant constraints on the value of an autopsy. It’s a situation somewhat unique to veterinary medicine because in human medicine nearly all autopsies are performed by trained pathologists not family practitioners.

**The Purpose of Gross Pathology in an Autopsy Report**

The style of reporting in an autopsy report should be congruent with the purpose of the autopsy. It should provide the information to satisfy the needs of those reading the report. The stakeholders in this task are pathologists, clinicians, epidemiologists, animal owners, regulatory officials, and increasingly attorneys. Autopsy reports have 2 components with respect to
anatomic findings; 1) description of the gross lesions observed and 2) description of the 
microscopic changes associated with the gross observations as well as other tissues and organs 
deemed important but apparently normal during the gross examination. Autopsies are generally 
performed for two reasons; 1) explain the cause of death or confirm the presence or absence of 
disease; 2) create a permanent record of the anatomic findings, both gross and microscopic. 
The autopsy itself is an ephemeral event. When it is over, it is over. The carcass is disposed of 
and very little physical evidence remains besides the collected tissue samples on which the 
histopathology is based. Even formalin fixed tissues have limited shelf life. The only permanent 
record of the autopsy is the written report, the histopathology slides and the paraffin blocks with 
embedded tissue. Occasionally selected gross lesions are photographed but these often are not 
part of the permanent record.

**Autopsy pathology is retrospective medicine.** The animal is dead and nothing in the report has 
any further use in the treatment of that animal. Its use is in the accurate characterization of the 
findings to establish the certainty of the diagnosis. Such data are helpful in disease surveillance, 
investigation of outbreaks, epidemiological analysis, the reporting of new diseases. In addition it 
has enormous teaching value in the correlation of clinical medicine with pathologic anatomy.

The one aspect of the autopsy record not available to those reading the report is the gross 
findings. The description of gross lesions in an autopsy report, then, should **aim to create a 
mental image of the findings** ("Painting with words") so that there is no doubt about what was 
present. Then the findings should be interpreted into a pathologic process or morphologic 
diagnosis. However, there should be a detailed description of what was observed using the lesion 
attributes that apply to the changes and then an interpretation. A person reading the report 
subsequently should be able to visualize the gross lesion and conclude that the interpretation was 
consistent with the findings. If there is some doubt, the microscopic slides can always be 
reviewed. Indeed in every retrospective study of autopsy material, nobody relies on just the 
written report but always reviews the histopathology slides.

**Interpretations** of observed lesions are **subjective evaluations**, can be wrong and often are 
changed after evaluation of the histopathology but **descriptions are objective assessments** which 
should never change even if later the "abscess" turned out to be a "necrotic neoplasm". This is 
best done in the text of the narrative by listing the relevant lesion attributes and following that by 
the interpretation in parentheses or a statement like “interpreted as…. “

```
“The lung was “diffuse dark red to plum colored, 
heavy, wet and clear foamy serous fluid flowed from the cut surface

(pulmonary congestion and edema)
```

This is descriptive and objective creating a mental image of the lung.
The lung was hemorhagic”

is interpretative and does not record what was observed to elicit the diagnosis of “hemorrhage”. It is subjective and in this case wrong because in fact histopathologic examination later revealed that there was no hemorrhage and that the gross appearance was caused entirely by congestion and edema alone. A good check on your description is to close your eyes and ask if you can see what you described in its precise anatomic location (“The Carpenter Test”). This approach provides the detail that recreates what the operator saw during the autopsy and may provide confidence in the report by the reader that the conclusion of the report was correct. These are important considerations in epidemiological investigations, monitoring for disease outbreaks and in legal proceedings. It also supports the purpose of the autopsy. So the rule should be that you must provide at least some characterization of the gross appearance to give the reader a basis for your interpretation. The description should only use the lesion attributes that are applicable to the case (not necessarily all) and enough to justify your interpretation. First and foremost gross pathology in autopsy reports is a descriptive exercise that forms a rational basis for the interpretation of the observation which is secondary to accurate documentation of the lesions.

**DESCRIBE FIRST, THEN INTERPRET**

All veterinary students are taught how to perform an autopsy and how to describe gross lesions. By emphasizing the recording of objective findings, autopsy reports should become more uniform in their content. The interpretation of findings is subjective and the skill deployed in this aspect of the autopsy report varies considerably. Specialists trained in veterinary pathology are naturally more skilled and accurate in this task than general practitioners. However, unique to veterinary medicine, a significant percentage of autopsies performed on animals will be done by non pathologists whose ability to interpret may vary markedly. Because in most cases of practitioner performed autopsies, the histopathology will be read by a pathologist, practitioners do not need to be purely interpretative but should focus on what they know best and that is objective description of gross findings and communication of them to the pathologist reading the histopathology. It’s a partnership but sadly in veterinary medicine today this is a dysfunctional
partnership where it is common for practitioners to perform an autopsy and send little or no meaningful information to the pathologist. One can argue it does not matter because the animal is dead but the incomplete data can easily impede an accurate diagnosis of the problem.

**GROSS PATHOLOGY DESCRIPTIONS IN AUTOPSY REPORTS**

**Examples**

10-1742
The liver was enlarged, weighing 2.47 kg (18.4% of body weight), and contained many firm, tan, raised, umbilicated and lobulated masses ranging in size from 0.5 cm to 3 cm; on cut section, these masses were tan and solid (hepatocellular carcinoma). In the right lateral liver lobe, there was a single large firm, tan to dark red, raised, umbilicated and lobulated mass that measured 18 x 12 x 6 cm; on cut section, the mass contained firm tan areas (hepatocellular carcinoma) and soft, dark red to black soft friable areas (central necrosis). The caudal edge of the left lateral liver lobe contained a 4 x 3.5 x 3 cm dark red to black area with an irregular surface and an overlying thin, dark red friable material (hematoma with fibrin clot).

10-1746
The right temporalis muscle was mottled red to dark red (hemorrhage), enlarged and soft (necrosis). A small amount (<0.2 mL) of clotted blood was present between the right temporalis muscle and the calvarium. The right dorsolateral parietal bone contains two fractured areas, which consist of a point from which three linear, minimally-displaced fractures radiate. The larger of these is located craniadorsal to the smaller one; the linear fractures measure 15 mm from the central point to dorsal midline, 3 mm from the central point rostrally, and 7 mm from the central point caudally. The linear fractures in the smaller area measure 5 mm, 2 mm and 2 mm respectively. The right frontal and maxillary sinuses contain clotted blood. Approximately 90% of the dorsal surface of the right cerebral cortex was covered with a thin dark red friable material (hemorrhage), and the cortex beneath was softer than the left cortex (encephalomalacia).

10-1756
There was a large shaved area over the right stifle that included a large open wound with irregular dark red margins measuring 20 cm x 10 cm x 6 cm. There was a large infiltrative mass extending from the stifle (proximal margin) to just above the hock (distal margin) on the medial surface of the right pelvic limb. The mass was approximately 25 x 30 cm, irregular, dark red to black, firm to friable, and contained a large vessel with firm dark purple material (hemangiosarcoma with hemorrhage and thrombosis); the mass was surrounded by small amount of soft gray to tan muscles (myonecrosis) and large amount of firm tan muscles and fascia (myofibrosis and fibrosis).

**HISTOPATHOLOGY**

**The Purpose of Histopathology in an Autopsy Report**

The purpose of an autopsy report remains 1) to explain the cause of death or confirm the presence or absence of a disease condition and 2) create a permanent record of the gross and microscopic findings. However, unlike surgical biopsies, autopsy histopathology is almost never done in isolation but in conjunction with gross finding and a presumptive diagnosis. Properly done, the autopsy contains an objective detailed description of the gross findings with interpretation and a presumptive diagnosis. This frames the case and adds considerably to your
power to make an interpretation or diagnosis when you review the histopathology. Histopathology is often confirmatory or establishes another diagnoses consistent with the gross findings and occasionally additional or unexpected lesions. It offers the advantage of knowing the gross when interpreting the histopathology and therefore leads to a conclusion with corroborative evidence from two levels of organization. **Exhaustive detail of the gross is needed in autopsy because that data is gone once the autopsy is over. Histopathology does not need to be so exhaustive because the slides are available for review** if there is some question about the diagnosis. Furthermore much of the important detail appropriate for a biopsy report is to give the clinicians what they need to manage the case, a condition that does not apply to dead animals. Histopathology needs only to be sufficiently detailed to verify the gross interpretation, document critical findings that justify your interpretation or verify the presumptive diagnosis made during the post mortem examination. Exhaustive board exam descriptions recounting minute detail of changes that are not contributory to understanding the pathologic process are not necessary in this reporting format because they add nothing of value, are time consuming and indeed can be difficult to read through. One can argue that board descriptions provide a complete archival evaluation but for whom? Retrospective evaluation of the case should not be accepted without looking at the glass slides regardless of what is written in the report. More microscopic description may be needed to document significant histopathologic lesions not detected grossly as this is the only basis for the diagnosis.

Histopathology for the certification examination is designed to test the candidate’s ability to **recognize and characterize basic pathologic processes in minute detail** (What did you **SEE** to diagnose fibrin or amyloid?). The style is exhaustive but may be redundant and time consuming and includes details not necessary to meet the purpose of an autopsy report. (The reader does not care if you can describe fibrin or amyloid, only that it is present.). Writing autopsy reports is an important task in student learning but it should not be a medium to practice histopathology descriptions for the certification examination. Likewise, writing autopsy reports is an important task for working pathologists but some thought should be given to efficiency, the value of your effort and the ultimate purpose of your report. The most important goal is to confirm morphologic diagnoses observed grossly or be able to diagnose a specific disease based on what else was observed at the examination or known from the history. It should include the presence of etiological agents not visible at the gross level and distinct changes that may be unusual, atypical or uncommon but does not need to document every important detail of those agents as would be done in the examination setting. Following the principle espoused previously,

**Describe enough to justify your diagnosis or interpretation or document unusual, unique aspects of the microscopic lesions**

```
“Bronchial epithelial cells contained eosinophilic intranuclear inclusions with marginated chromatin consistent with herpes virus”.
```

Or if you are sufficiently confident just say “**herpesviral inclusions were present in the sloughed epithelium**”
Nematodes identified at gross examination as strongyles need not be described at all as a definitive identification was made based on direct observation. There is no need to detail “platymyarian body musculature with a body cavity, gut and reproductive structures consistent with an adult nematode parasite” as would be appropriate for the certification examination. The recognition of demodecid mites in hair follicles which is diagnostic for a disease entity is the important event that meets the purpose of the report. The diagnosis would be readily agreed upon by experienced veterinary pathologists. Descriptive detail of the mites to justify your diagnosis and assure the clinician of the accuracy of your interpretation is not necessary in autopsy material. If there is doubt about the diagnosis, the slides can be reviewed at leisure by someone else because time is not a factor. Indeed, within reasonable limits, time is your ally in autopsy reports. Compared to the pressure in the surgical arena, autopsy pathology is often “Country Club Pathology”. It has the advantage of being reflective and if need be you can develop consensus diagnoses. Much of what is recorded in the histopathology sections of the report can often be simple morphologic diagnoses and could include unique or standout qualifiers. The content of the report will not satisfy everyone because there is no way to anticipate every need. No retrospective study is going to be based on just reading a written report. If missing details are needed by some individuals reviewing the report, they can go back, look at the slides and verify for themselves their presence or absence. But the report should meet the purpose of the autopsy report with respect to disease or morphologic diagnosis and creating a useful permanent record. Histopathology in the autopsy report should be more interpretative with enough description of unique or diagnostic details to support the conclusion. The extent of this will vary with the experience and confidence of the pathologist reading the case.

**HISTOPATHOLOGY DESCRIPTIONS IN AUTOPSY REPORTS**

**Examples**

**MICROPATHOLOGY AND SLIDE SUBNUMBER:**

1. Trachea: Mild focal necrospurative tracheitis  
   Lung: Mild multifocal suppurative bronchopneumonia (abscess) with widespread congestion and atelectasis;  
   Bacterial overgrowth (post-mortem)
2. Liver: Autolysis; Emphysema and bacterial overgrowth (post-mortem)  
   Umbilicus: No significant microscopic lesions (NSML)
3. Lymph node, mesenteric: Autolysis; NSML  
   Kidneys: Autolysis; NSML
4. Heart: Autolysis; NSML  
   Rumen: Focal full-thickness coagulation rumenal necrosis with multiple fibrin thrombi and serosal granulation tissue formation  
   Reticulum: Focal full thickness reticular necrosis with multiple fibrin thrombi and serosal granulation tissue formation
5. Cerebrum: Marked multifocal suppurative vasculitis and encephalitis with marked meningeal and perivascular hemorrhage and multiple septic fibrin thrombi
6. Cerebrum: Moderate multifocal suppurative vasculitis and encephalitis and multiple septic fibrin thrombi
7. Cerebrum: Marked multifocal suppurative vasculitis and encephalitis with moderate meningeal and perivascular hemorrhage and multiple septic fibrin thrombi
8. Cerebrum: NSML
9. Cerebrum: Marked multifocal suppurative vasculitis and encephalitis with marked meningeal and perivascular hemorrhage and multiple septic fibrin thrombi
Brainstem, Cerebellum: Moderate multifocal meningeal and perivascular hemorrhage and multiple septic fibrin thrombi

DESCRIPTIVE PATHOLOGY IN TOXICOLOGIC PATHOLOGY AND SAFETY ASSESSMENT STUDIES

Descriptive pathology in safety assessment studies is “Herd Pathology”. The purpose of the autopsy report is similar to that for individual animals but the focus is on recording the incidence as well as the types of pathologic responses in a group of animals. Although accurate description of findings is important, often the range of lesions present in a group of rodents is well defined by historical databases. The interest is less in recording the individual unique characteristics of each lesion and more in the similarities and grouping of lesions that can be fit into a computer database. Long detailed descriptions of both gross and microscopic features do not suit the purpose of the report unless it is a truly new unique lesion not previously reported in which case the style becomes similar to a journal article. The gross descriptions are short and serve to notify the tissue trimmer to look for a lesion in the tissue jar and ensure it gets cut in. The critical evaluation is done microscopically. Histopathology tries to categorize the lesions into groups that can then be statistically analyzed between groups of animals. As long as the lesion falls within the range of say chronic progressive nephropathy, the individual differences among the rats with the disease are less important. The purpose then becomes one of accurately recording the number of rats with chronic nephropathy in the control, low, intermediate and high dose groups so you can assess the effect of the drug on the condition. Accuracy is extremely important in this reporting format because both financial cost and public safety are at risk. However, the studies are generally not done under the pressure of time constraints so fatigue is not usually a factor impacting accuracy. There is a long interval, usually years, before the results and conclusions of the report are acted on. In addition, most studies are peered, often multiple times so accuracy is assured.
HISTOPATHOLOGY IN TOXICOLOGIC PATHOLOGY REPORTS
Examples

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**GENERAL BODY SYSTEM**

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*... Total animals with tissue examined microscopically; Total animals with tumor
+... Tissue examined microscopically
X... Lesion present
I... Insufficient tissue
M... Missing tissue
A... Autolysis precludes evaluation
BLANK... Not examined microscopically

Page 4
Descriptive pathology in surgical biopsy reports is dominated by microscopic lesions. Descriptive gross pathology of the lesion is important but usually not performed by the pathologist. It should be included but just to orient the pathologist and verify what the lab received. It is very useful but it is the responsibility of the clinician. So biopsy report pathology is mainly histopathology. However, it is almost always performed under the pressure of time as a rapid turn around is required. Therefore fatigue is an important factor impacting accuracy. Accuracy is critical because the patient is still alive and the clinician is going to act on the diagnosis quickly. There is relatively time for reflection and no peer review as most reports are evaluated and generated by a single pathologist. The consequences of a mistake could be significant both legally as well as medically. Surgical pathology is high pressure pathology usually performed under less than ideal conditions. A clear concise unambiguous writing style is important to meet the needs of the report.
The Purpose of a Surgical Pathology Report

The purpose of a surgical biopsy is to diagnose a disease or pathologic process in a living animal under medical care so the clinician can make a management decision. The emphasis should be more on the bottom line diagnosis because that is the reason for performing the biopsy. It should be rapid, accurate with respect to the diagnosis and effectively communicated. It should be less about archival documentation of the lesions not germane to diagnosis and prognosis. The style should be based on sound medical reasons to document what is needed for the individual case at hand. It should not be about demonstrating the pathologist’s observational skill, pride in his/her expository prose to document minutia or to satisfy some clinicians’ preference to read long descriptions. The purpose should not be about creating an archival document for others but communicating quickly and unambiguously to a clinician because time is short and the animal is still alive and needs disease management. Practitioners should be able to quickly find what is important to know about the case. The biopsy report is a communication device, not an archival record.

THE “PRIME DIRECTIVE”

“Give the clinicians what they need to manage the case”

What Clinicians Need in the Biopsy Report

What is needed in the biopsy report is dictated by the case management requirements and varies from organ to organ. Generally all clinicians want a Diagnosis so this is the most important entry in the report.

Fundamental Principle of Surgical Pathology Reporting

“First Get a Diagnosis”

The overriding objective of the biopsy is to get a diagnosis and before anything else that is the most important task of the surgical pathologist. After that, most everything else is “gravy”. In fact, given the inherent problems with variability in many biopsy evaluations, diagnosis may be the consistently most valuable information in the report. You should always give a “Morphologic Diagnosis” first. That step should set off a cascade of differential diagnoses in your mind for you to consider. That approach slows the interpretation process and opens your mind. By forcing you to consider alternatives to your first impression you create a check on pattern recognition or so called “Gestalt” diagnoses and decrease the chances that you will make an error in cognitive thinking that could lead to an error in interpretation. We teach our students
to do this and we test for it on the certification examinations. Accuracy and the correct diagnosis are more important in this reporting format because the animal is still alive and a mistake could be critical in case management. The potential for an incorrect diagnosis is a unique risk in surgical biopsy not found in most other reporting formats.

The most desirable diagnosis is a “Specific Clinical Disease” diagnosis. Clinicians live in the world of clinical medicine. They want pathologists to translate, whenever possible, the findings to the world of disease entities, not pathologic processes. Often that is not possible because of “biopsy quality” and when it is not, the pathologist should tell the clinician what he/she thinks the morphologic diagnosis may mean. Morphologic diagnosis is the pathologist’s stock in trade. The skill is emphasized in training programs and tested for on the certification examinations. But, pathologists are much more enamored with descriptive detail and morphologic diagnoses than are clinicians. For many it has limited value beyond the distinction between “neoplasia” and something else or “benign” vs. “malignant”.

When considering clinician needs in the biopsy report, pathologists should recognize that clinical veterinary medicine has become more diverse and that practitioners are splitting into groups along the lines of “Family Physicians” and “Specialists” with the attendant variable diversity in their depth of knowledge. Internists, ophthalmologists, dermatologists and some other specialists are often quite knowledgeable about the histology in their area of specialization and understand the meaning of various patterns of disease pathologists observe. Their needs may be different from the needs of traditional primary care veterinarians. Patients referred to specialists often come with their biopsy report. What you write in some biopsy reports to a general practitioner may not be sufficient for the specialist. A surgical pathologist should anticipate what is potentially needed to manage the case, anticipate possible referral, and include that in the report, whether or not the practitioner expects it. The specialists, then, have what is needed when they take over the case. So pathologists should be cognizant of what is needed to manage each type of case and provide that. What is needed for liver biopsies and skin biopsies may not be the same as benign tumors.

Beyond diagnosis, what is needed are descriptive elements that have mechanistic therapeutic and prognostic significance. Besides being important to the clinician in terms of how to proceed with the case, their inclusion may reassure the clinician that what you saw in the slide correlates with their clinical assessment. I write longer descriptions in renal and liver biopsies not to document lesions for an archive but because the clinician often needs to know if the renal failure or liver disease is acute or chronic. There may be little time to answer questions or clear up ambiguity so I try to anticipate that and provide what is needed to reassure them. Oncologists increasingly seem interested in the presence of potentially prognostic features of
neoplasia that might predict behavior, reaction to different treatments or refine the prognosis. The desire to squeeze more out of the H&E slide borders on obsession and frequently results in requests for detail whose usefulness is not supported by scientific studies. If we are going to be asked to provide more detail, we must insist on “evidence based medicine” when considering what oncologists want in the report. At the other end of the spectrum many surgeons are content with just the diagnosis and completeness of their excision. This is often because a previous biopsy already established the diagnosis and the need for surgery. Beyond prognostic features many are not interested in another detailed description of a process that has already been characterized.

“I already know it’s a Grade 3 soft tissue sarcoma that was not completely excised. I don’t care about another description. Just tell me if I have completely excised it this time.”

Another description is a waste of your time and the client’s money with no added benefit for the patient. Yet some clinicians request a complete description on these re-excision cases, so the pathologist is contractually bound to describe the tumor all over again.

What clinicians want in the biopsy report varies widely according to their taste and what they are used to.

“We will never satisfy everyone’s wants, but we should meet everyone’s needs”

Some laboratories offer clinicians the choice, for an increased fee, to have the pathologist write a long detailed description or a short diagnosis. This is unprecedented in medicine where a marketing decision rather than medical principles determines the standard of practice. In these laboratories, veterinary pathologists have lost control of their own reporting process. The production of longer detailed pathology reports has conditioned some clinicians to think they are getting more for their money. The standard to emulate then becomes “length of the report” rather then usefulness of the content. “Biopsy report escalation” ensues with the laboratory that writes the longest reports seeming to be better and gain an edge in the market place. This appeals to some pathologists pride in their expository skill. But if clinicians get what they need in a shorter report, what can be the medical value of extra long elaborate descriptions of the lesions? Naturally they expect to pay more for this but pass the increased cost along to the pet owner. Pathologists at the whim of the clinician have to apply a 2 tiered standard without medical justification. In some reports there is insufficient information and in others excess verbiage with no medical value. This choice is not offered to physicians by human pathologists.
or to veterinarians by veterinary radiologists. Under no circumstances should a laboratory require a practitioner to pay more to get essential or needed information that could be placed in a short report. Let the case determine what you write, not the whim of the clinician.

The lack of a professional standard set by pathologists has resulted in some of the inconsistency in biopsy reports. The unnecessary extra effort, uncontrolled by pathologists, may have a hidden impact that nobody wants to admit; the error rate in medical diagnosis. A somewhat unique aspect of surgical pathology that cases are almost always done under time constraints and therefore fatigue becomes a factor that could impact accuracy. Although much has been studied and written about this in human medicine, no comparable studies are known in veterinary medicine. The overall rate of diagnostic error in human medicine is in the 10-20% range and there is every reason to believe it is not lower in veterinary medicine. Detailed studies among human radiologists and pathologists, which are highly relevant to veterinary pathologists (and radiologists!), have shown that among other factors work load and fatigue are major contributors to errors in medical diagnosis. Given the manpower shortages we already face in veterinary pathology, work loads are likely to continue to strain our capacity. Currently human pathologists working in commercial diagnostic labs read about 25% of the case load that similar veterinary pathologists read because they fully understand the impact of fatigue and the need to manage it. In addition they do not write long detailed descriptions of their cases. Because veterinarians including pathologists have been flying under the legal radar for a long time, there has been no pressure to examine this but that may be changing. Law suits against veterinarians have increased 10 fold recently. Many factors are driving this but the changing status of animals in many states is permitting the awarding of non economic damages in veterinary cases that may bring more law suits. Although law suits against veterinary pathologists have been rare, they will likely increase as they do against other veterinary specialists. “Misdiagnosis” and “negligence” will be common accusations just as they are now against human pathologists. The evidence used against us will be the biopsy reports we generate.

Veterinary pathologists, not clinicians, attorneys, pet owners or accountants, should control the process and set the standard of practice in surgical pathology and it should be guided by the principle of giving the clinicians what they need to manage their cases. The construction of “board exam-like” histopathology descriptions whenever the clinician requests it, including cases where it is not needed, can take considerable time and effort and when applied to a large number of cases may add to fatigue and error rate. The best of the best in human diagnostic medicine have an error rate of 5%. The average is much higher. That means for busy diagnostic veterinary pathologists reading 300-400 cases per week, they are making errors 15-20 times per week at best! The average pathologist may be making more. While description can be a valuable process in organizing a pathologist’s thoughts in difficult cases, too often a simple straight forward case is complicated because a clinician requests a description and the pathologists has to waste time and effort providing one when it is not needed. As a first step in managing this problem, it
seems reasonable to let pathologists determine what needs to be described and how detailed it should be so they can manage their own work flow, time and effort and thus help to control errors.

Because what is needed to manage the case varies with the tissue and will change as new information becomes available, what is important and useful content should be developed in consultation with clinicians so they get just what they need. It means some compromises on everyone’s part; more description in some cases and less in others than everyone may be used to. This should increase consistency in pathology reporting. In addition it may maximize the effectiveness of the pathologist by conserving his or her time and effort. In summary, free the pathologist to describe the tissues that need it or when the partial characterization of observations will add materially to the case management and allow them to short hand those entities that do not meet those criteria. “Give the clinicians what they need to manage the case” but not excessively more.

What Does Not Need Detailed Description?

Anything that is easily recognized by a veterinary pathologist of average skill in the field. In other words, anything that is not open to a broad range of interpretation by skilled pathologists. Likewise, you can omit details that are not needed to justify interpretation or in which the details have no management or prognostic significance.

Most benign neoplasms and nevi or hamartomas require little if any descriptive detail. Likewise, I see no medical reason to exhaustively differentiate between lesions when there is no clinical significance in the distinction i.e. sebaceous adenoma vs. sebaceous hyperplasia. Make a decision and write a diagnosis. Later your colleagues can discuss why you were right or wrong if they wish but it makes no difference to the clinical case management. You should conserve your time and effort for the difficult cases where the difference may matter (Is it lymphoma or lymphoid hyperplasia? THAT may make a difference!). When the diagnosis is clear cut and would be agreed on by your peers, make a diagnosis and abbreviate or eliminate the description. Yet I see paragraph long descriptions of lipomas and hepatoid gland adenomas because they are requested by clinicians who have no medical use for the detailed knowledge that would justify the pathologist’s added effort. Occasionally I have received phone calls from clinicians who tell me they expected a long description and that the “other lab” used to provide them. In every case when I asked the purpose of such a description or if I missed a publication documenting the need for such information they admit it is a preference only and that as long as I provide what they need, they understand the shortened reporting style. I always do what they ask for, of course, but I have captured the teaching moment and used it to clarify what we are doing. Clinical expectations can be altered and shorter reports accepted when the essential information is included. Efficiency, work load, fatigue and diagnostic error are sound reasons to permit pathologists to control their reporting style.
Normal tissues and cells do not require description. If there are no significant lesions, just say so. You do not need to document this observation. Remember that the purpose of the biopsy is to provide accurate diagnosis, effectively communicated in a timely manner. What can be more unambiguous than “No significant lesions” or the statement “Normal”?

<table>
<thead>
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<th>The Uncertainty Principles</th>
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<tr>
<td>“Uncertainty stimulates description”</td>
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<tr>
<td>{“Anything the pathologist is uncertain of or is open to interpretation by others Should at least be partially characterized}</td>
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<tr>
<td>“The amount written is inversely proportional to the certainty of the diagnosis”</td>
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<tr>
<td>“Write enough to justify your interpretation ....when needed”</td>
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<tr>
<td>“Anticipate a clinician’s uncertainty”</td>
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For me, the need for description begins with or is stimulated by uncertainty. Anything that looks a little different or unusual or might be open to discussion among my peers, I justify by at least some description. The principle to follow is “the amount written is inversely proportional to the certainty of the diagnosis”. A useful byproduct of this principle is that describing what you are uncertain of slows the interpretation process, clears the mind and may help to avoid a cognitive error in thinking that would mislead you and result in a diagnostic error. When a pathologist of average skill in the field would clearly agree with your diagnosis, there is no need to provide a lengthy description. The “Mona Lisa” is probably the most recognized piece of art in the world. If you sent me this picture and asked for identification, I would just say, “It’s the Mona Lisa by Leonardo DaVinci. No description is needed. But many people might not recognize the Jackson Pollock painting. At first, I might not even think this was “art” and so would start by describing the tangled lines in multiple colors, almost haphazard scrawls of paint that look like the artist flung or sprayed it on the canvas and the total lack of any image beyond the “feeling” it conveys. After my description, I might conclude it was in the “Post modern style” of early 20th century modern art and eventually decide it was a Jackson Pollock painting; uncertain at first, described, then “interpreted”. But there might be some “discussion” about the interpretation among my peers so I provide enough detail to support my conclusion but not an exhaustive detailed description as
you might expect in the first published report of this “painting”. In the same way, most “lipomas” (the “Mona Lisa lesion” of pathology) would be agreed upon by my colleagues thus no description is needed. But many other lesions of uncertain nature might benefit by some detail to help me come to a conclusion and justify the diagnosis. The key is providing just enough detail to efficiently get to the correct diagnosis but not more than is needed to support your rationale. That is in keeping with the objective of a biopsy report.

**Anticipate clinician uncertainty** to decrease ambiguity in the report and perhaps save the need for a phone call. If the submitted fatty mass was thought to be a lipoma by the submitting clinician and you diagnosed traumatic panniculitis, you might write just enough detail to justify why you diagnosed traumatic panniculitis so that a colleague (or you when looking at the report later!) could subsequently follow your thought process to that conclusion. It is useful in this regard to remember that often your report is not read by just one clinician. Even though the primary care veterinarian may not be interested in the details, the case may be referred to a specialist who may want such information and will phone you to provide it. Anticipate that need and provide such information in the report. The documentation of crusts and acantholytic cells with eosinophils may be enough to reassure the dermatologist of the correctness of the diagnosis and may save a phone call. (“Clinically this did not look like pemphigus. Are you sure? What did you see to lead you to that diagnosis?”). I write the detail I think the case requires whether or not it’s requested.

In describing this painting to someone who asked me to identify it I would just say “Starry Night” because it is pretty recognizable by most people interested in art. But if the clinician who sent it to me said they thought it was a painting of the Spanish country side by Pablo Picasso, I might then describe the bold colors, surreal confluent star light, cypress trees of the French country side all rendered in a somewhat schizophrenic style characteristic of Vincent Van Gogh’s impressionism. The clinician was expecting a “Picasso” and I diagnosed a “Van Gogh” so I included just enough detail to explain to him why I thought differently and if he were somewhat knowledgeable about “art” he would see the rational in my interpretation and be satisfied I was correct. That is anticipating clinician uncertainty and reducing the ambiguity in the report.

What is important to describe is changing as clinical veterinary medicine changes and we need a constant dialogue with clinicians to keep pace. If we have these discussions, eventually a consensus will emerge not so much about what some clinicians want but what most or all of them need. I document what I think are important changes in many tissues even when no description is requested because I think it is the right thing to do. In some cases referred to specialists at the OSU Veterinary Medical Center our clinicians complain about the difficulty in finding the useful information buried in the “Packing Popcorn” of needlessly detailed reports or the lack of clear cut commitments to a diagnosis. If we consistently document the important
changes and explain honestly what we think those changes mean, we will streamline and improve our reporting. Equally as important, I look at reports for OSU specialists who need some critical information that was not provided in a first report by another pathologist. Clinicians are a diverse group. We will not satisfy everyone. But if we set a standard of focusing on what they all need, we can defend our reporting style. After that, it your discretion as to what to write.

**What Needs To Be Described?**

At least some description of *clinically significant lesions open to interpretation by different pathologists* of average skill in the field should be included in the narrative in enough detail to justify your diagnosis. If most pathologists would agree the lesion is a carcinoma, detailed characterization of cell shape and color, position of nuclei, the form of the chromatin, acini or papillary fronds are of limited additional value. If there is uncertainty the cells represent a carcinoma, then enough detail to establish your interpretation of “carcinoma” is needed. The more certain you are of your diagnosis, the less you need to justify. Beyond these features that establish the diagnosis of an aggressive process you should document the presence of *lesions and changes that may have an impact on the clinical course*. Many malignant neoplasms (but not necessarily all) require some detail when its presence will help a clinician or oncologist make a management decision. The distinction between malignant and benign is often sufficient with respect to the need for follow up therapy. The grading of mast cell tumors and soft tissues sarcomas are excellent examples in which evidence base medicine provides a rationale for certain descriptive details because they are predictive of behavior. What may also be important is *Evidence of aggressiveness* such as the degree of differentiation, measures of invasiveness, host reactions, the extent of invasion, completeness of excision or evidence of metastasis. In all cases, the pathologist is in the best position to make that decision. When there are new studies indicating that some new characteristic correlates with prognosis or response to treatment and predicts the length of the disease free interval, we should include that detail but until then, we should confine our remarks to important changes as determined by evidence based medicine. Veterinary pathologists in general and the ACVP in particular should take the lead in setting the standards of practice according to rational evidence based medical principles of what is useful and effective. We should insist on these criteria when setting the standard of practice in order to promote the proper scientific research that will advance veterinary medicine.

When a clinician insists on a detailed report and agrees to pay for it, the laboratory is contractually obligated to provide one. Most clinicians would agree they do not read descriptions of lipomas but they do not know ahead of time if the lesion is a lipoma or a mast cell tumor. If we create a standard of care and clinicians will trust us to provide what is needed, everyone wins.
When the decision is taken out of the pathologists hands the biopsy process becomes inefficient. The flaw in the practice is giving clinicians the choice. By permitting clinicians to make the decision of what they want without knowing the value of what they will get, they generate needless work and inefficiency at the pathologist’s and pet owner’s expense. Surely the clinician is not telling the pathologist, “I do not trust your judgment and want to see why you diagnosed a lipoma”. In no case is there a sound medical reason for long detailed reports on clinician demand. Nearly all the clinicians I have worked with are reasonable and understanding and when given sound reasons to change their expectations, they have done so. I have lost very few clients over the years because of this approach to pathology reporting. If we agree on what the standard of care is in surgical pathology in consultation with clinicians and that standard is based on sound medical principles we will be on solid ground in justifying what we do and provide more consistency to clinicians.

**SUMMARY**

1. “Give the clinicians what they need to manage the case”
2. “First get a diagnosis”, worry about the gravy later
3. Morphologic diagnosis
4. Generate a differential diagnosis list
5. Name a **specific clinical disease** when possible; if not suggest possible meaning for the Mx
6. **What does not need description**
   a. Any clinically insignificant process easily recognized by your peers
      Benign neoplasia, nevi, hamartomas
   b. Normal cells and tissues
7. **What needs some description?**
   a. Malignant neoplasms need some description
   b. **Uncertainty; unusual or out of the ordinary processes**
   c. Clinically **significant lesions open to interpretation by your peers**
   d. **Lesions** that may suggest **mechanisms and pathogenesis**
      Dermatitis, hepatitis, enteritis, nephritis, pneumonia
   e. **Lesions** that may affect **clinical course or prognosis** – evidence of aggressive behavior in malignant neoplasms
8. **Anticipate clinician uncertainty**, decrease ambiguity and save the need for a phone call if possible
9. **Pathologists** set the standard of reporting and **control the process** based on what is needed in the individual case
HISTOPATHOLOGY DESCRIPTIONS IN SURGICAL BIOPSY REPORTS
Examples

#10-2436 Canine
Skin, bridge of nose: The epidermis is thickened by acanthosis and a dense serocellular crust of neutrophils and fibrin over erosion and ulcerations accompanied by subjacent dense lymphoplasmacytic lichenoid and interface dermatitis. Scattered apoptotic basal keratinocytes (civatte bodies) are noted as well as multifocal segmental basal layer vacuolar degeneration. (Diagnosis = Discoid lupus erythematosus)

#PL10-1982 Canine
Skin, perineum: Perianal (hepatoid) gland adenoma with diffuse ulceration, hemorrhage and secondary suppurative inflammation. No evidence of malignancy.

#10101872 Feline
Mammary gland, Lt caudal: Specimen consists of a multilobular mass of well differentiated tubulopapillary glands with extensive central coagulation necrosis and foci of both suppurative inflammation as well as tumor infiltrating lymphocytes. Extensive local tissue invasion including vascular space invasion into dermal lymphatics is noted and accompanied by marked reactive fibrosis or desmoplasia. Neoplastic cells extend to the deep specimen margins. (Diagnosis = Well differentiated simple mammary adenocarcinoma)

CL10-1972 Canine
Subcutaneous, Lt thorax: There is a large mass of moderately differentiated spindle cells making whorls around central capillaries as well as dense streams of cells. Moderate cellular atypia is noted with occasion prominent nucleoli. The interstitium is loose and edematous and approximately 50% of the tumor exhibits coagulation necrosis with foci of hemorrhage. Scattered throughout the tumor mass are small dense aggregates of mature lymphocytes. The mitotic index is 14. Excision appears complete but the margin is 2-5mm and there are elongate extensions of tumor toward the surgical margin so I suspect this is not completely resected. (Diagnosis = Moderately differentiated hemangiopericytoma Grade 2)

K10-187982 Feline
Liver (Tru cut): Specimen consists of 4 needle cores of hepatic parenchyma featuring diffuse severe hepatocellular swelling accompanied by vacuolar degeneration. The sinusoids are collapsed or compressed. No necrosis or inflammation is noted and there is no indication of hepatic fibrosis (Diagnosis = Diffuse severe Feline hepatic lipidosis)

CL10-0124 Canine
Subcutaneous, Lt axilla: Lipoma.
## RISK FACTORS AND ERROR IN DESCRIPTIVE PATHOLOGY TASKS

<table>
<thead>
<tr>
<th>Time constraints</th>
<th>Journal/Textbook</th>
<th>Autopsy Reports</th>
<th>Bioassay</th>
<th>Surgical Biopsy</th>
<th>Board Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatigue</td>
<td>Minimal</td>
<td>Minimal</td>
<td>Minimal</td>
<td>Marked</td>
<td>Severe</td>
</tr>
<tr>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Consultation</td>
<td>Available</td>
<td>Available</td>
<td>Available</td>
<td>Infrequent</td>
<td>None</td>
</tr>
<tr>
<td>Total Patient Evaluation</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Peer Review</td>
<td>Always</td>
<td>Common</td>
<td>Always</td>
<td>Infrequent</td>
<td>None</td>
</tr>
<tr>
<td>Error Potential</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>Very High</td>
</tr>
<tr>
<td>Impact of Error</td>
<td>Low</td>
<td>Low-moderate</td>
<td>High</td>
<td>High Widespread</td>
<td>Very High</td>
</tr>
<tr>
<td>Consequences</td>
<td>Modest Professional embarrassment</td>
<td>Modest Bioterrorism Epidemics</td>
<td>Significant Public health</td>
<td>Significant Patient harm Financial</td>
<td>Significant but personal Failure to certify</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Public health</td>
<td>Financial damage</td>
<td>Legal liability Professional embarrassment</td>
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It is easy to see that the potential for error is highest when there are significant time constraints which potentiate fatigue and therefore increases the likelihood of making errors. This is compounded by the lack of additional information where it could help to guide cognitive thinking toward the correct diagnosis. Error is likely to be lowest when the task permits consultation, peer review and there is supplemental information. Although the impact and consequences of an error in toxicology testing are significant, they are mitigated by a rigorous peer review system. The impact of error and its consequences are most significant in surgical biopsy and certification examinations. The consequences of board examination failure are personal. The most harm is potentially caused in surgical biopsy error where patients, owners, clinicians and pathologists are at legal, financial and personal risk. Historically and currently, this is mitigated by the fact we are flying under the legal radar but that may be changing. We must look for other risk mitigation strategies to manage this. Managing your time, controlling fatigue and seeking consultation whenever possible offer the most promise but could be difficult to implement in many situations. Likewise clinicians could provide valuable help by providing the information about the patient that would allow a total patient evaluation.
GROSS PATHOLOGY FOR CERTIFICATION EXAMS

“How to Play the Game to Win”

A. EXAMINATION STRUCTURE & COMPOSITION

The gross pathology portion of the examinations is a projected gross image exam, not a practical.

1. Short answer, fill in the blank format

2. Historically 2 x 2 Kodachrome slides but now becoming digital

3. One view of the organ; cannot manipulate specimen.

4. 1 ½ min time constraint

5. Species is the only given data

B. GROSS PATHOLOGY EXAMINATION COMPOSITION

100 images selected from about 250 submitted. SOP requires diversity with respect to species, organ, pathologic process so expect a wide variety. Emphasis on domestic species; dog, cat, horse, cow, pig, sheep, goats, lab animals, wildlife, zoo and lower vertebrates [fish, amphibians, reptiles, birds]. The examination is a subset of what images are available to the examiners. There are only so many diseases of animals. There are only so many images of these diseases. Images get recycled. Most of the examination will consist of common diseases; don’t necessarily look for “zebras” 1st if you” hear hoof beats”.

EXAMINATION CONDITIONS

It’s a short amount of time to see the image, get oriented, recognize the tissue and lesion, make a diagnosis and answer the questions.

Lesion recognition, mental description and diagnosis must occur quickly, almost intuitively. It’s “Shoot from the hip pathology” There is a premium on experience. Specific preparation for this part of the examination is the key.

C. GROSS PATHOLOGY EXAMINATION PHILOSOPHY

The gross pathology parts of the exams are intended to test your disease recognition skills
at the clinical, whole animal, organ and tissue level. They are all about **INTERPRETATION, not description.** You do the description subconsciously. Look at the lesion, collect the visual information, match the signalment given, interpret the lesions and answer the questions.

_Do Not Describe Lesions!!!_ The value of a pathologist is partly determined by his/her ability to interpret and explain, generate and test hypotheses based upon what they see.

### D. THE TYPES OF INTERPRETATION

**MORPHOLOGIC DIAGNOSIS**  
(Mx) = A phrase or short sentence summarizing the principal characteristic or dominant pathologic process present in the organ or tissue. It should include an organ and distribution modifier and a process. There is lots of latitude in Mx. Often there are many different correct ways to say the same thing.

**Chronicity and severity** modifiers are **NOT needed** in the examination arena.
- Segmental renal cortical necrosis (infarct)
- Bilaterally symmetrical hyperostotic maxillary fibrous osteodystrophy
- Diffuse granulomatous enteritis
- Osteochondrosis
- Bilateral multinodular thyroid follicular adenomas
- Leukoencephalomalacia
- Serous atrophy of fat
- Lymphoma

**THE CARPENTER TEST**

"*Can you close your eyes and see what you said or wrote?*"

It’s a good self evaluation for clarity and completeness

**CAUSE** = The specific cause of the lesion or disease depicted in the image

The same as “Etiology”.
Name a specific disease agent. A microbial agent, virus, bacteria, fungal, parasite, toxin, genetic defect (deletion, recessive gene, mutation etc) or metabolic disorder. Be specific as possible; genus and species for metazoans.

- Canine adenovirus Type I
- _Metastrongylus apri_
- _Sporodesmin or Pithomyces chartarum_
- _Rhodococcus equi_
- Uroporphyrinogen III cosynthetase deficiency
- Nutritional Ca/P imbalance.
**Don’t name a disease when cause is requested.**

_NAME THE DISEASE OR CONDITION_ = the medical or common usage term for the disease depicted in the image. Lots of latitude. Many different regional names of diseases.

**Sometimes Mx and Name the Disease can be the same.**

Leukoencephalomalacia
Osteopetrosis
Neoplasms – can be both
Fibrous osteodystrophy
Vesicular stomatitis
Pyometra
Palatoschisis
Cyclopia

_STEP DOWN QUESTIONS_ = Questions outside of the “main sequence” designed to test the depth of your knowledge about the disease or condition depicted.

These are intended to add discrimination to the gross pathology portion of the examination. How much more besides the obvious do you know about the disease?

This relates to the concept of **Integrative medicine.** As a pathologist looking at gross postmortem findings can you correlate other disease parameters, an understanding of important mechanisms in the disease or that perhaps contributed to the lesions and can you **anticipate additional findings.**

_“CORROBORATIVE TESTIMONY”_ = Additional information from another source that supports your findings or conclusions. i.e. in cases of pulpy kidney disease, there may be evidence of glucosuria and fibrinous pericardial effusion; focal symmetrical encephalomalacia?

a. **Name a Related Lesion** = name another pathologic lesion in another topographic location that may occur in this disease or condition. Once you have made a Dx, what else is characteristically found in animals with this lesion or disease? _Not necessarily always_ but often or typically.

  *Pituitary adenoma in dogs – bilateral adrenal cortical hyperplasia*
  *Chronic renal disease in cats – bilateral parathyroid hypertrophy*

  _Bovine osteogenesis imperfecti – blue sclera, fractured teeth, intrauterine rib fractures_
White muscle disease in ruminants – aspiration pneumonia

b. Name a Related Clinical or Clinicopathologic Abnormality = name a related clinical abnormality that is associated with the lesion or disease. Similar to above but the abnormality is hematologic, biochemical, clinical etc rather than an anatomic lesion.

K9 anal sac adenocarcinoma – hypercalcemia
Uroabdomen in foals – hypernatremia, hypochloroemia, hyperkalemia
Pars intermedia adenoma in horses – hyperhidrosis, hyperpyrexia, polyuria/polydipsia, hirsutism

c. Differential Diagnosis = given the image, name the several diseases that could present with this or a very similar lesion. **The lesion depicted is not necessarily pathognomonic but falls within the range of several different diseases. List the possible diseases. Generally you are asked for 2-3 other diseases. There may be 10 others; give only how many others they ask for. The committee has a list of acceptable responses. **Do not give more than is asked!

Multifocal petechia on the pig kidney –

*DDx = 1) Erysipelas  2) Salmonellosis  3) Classical swine fever [hog cholera]  4) African swine fever  5) Streptococcal septicemia

Bovine hemoglobinuria

*DDx = 1) Leptospirosis  2) Bacillary hemoglobinuria  3) Cu toxicity  4) Onion poisoning (n-propyl disulfide toxicity)  5) hypophosphatemia  6) Babesiosis  7) Brassica toxicity  8) Postparturient hemoglobinuria  9) Cold water hemoglobinuria  10) Cu deficiency

Be sure to “Name a Disease” not a “Cause”

d. Pathogenesis = trace an outline for the events that cause the disease or lesion

This is generally written as a series or words or short phrases with arrows separating them to show the progression of events from the initiation to the end stage or lesion.

Deep Pectoral Myopathy of Broilers

Edema of supracoracoid muscle → swelling → Increased pressure within the fascia → ischemia → coagulation necrosis
Atypical Interstitial Pneumonia of Cattle

Ingestion of excess L-tryptophane → circulation to lung → metabolism to 3-methyl indole by Clara cells → toxic intermediates → damage to Type I cells → interstitial inflammation → diffuse pulmonary edema → hypoxia → dyspnea → interstitial emphysema

ETIOLOGIC DIAGNOSIS = a word or phrase that captures a pathologic process with a reference of tissue and a cause or condition if possible. Not commonly used anymore but seen occasionally. There are many different ways to formulate these and no one way is correct. There is lots of latitude. This type of response to diagnosis frees you from making a formal anatomic morphologic diagnosis. There may be overlap with other forms of diagnosis. Etiologic diagnoses can be of widely varying specificity.

*Because many answers are acceptable these tend to be low discrimination answers and I think that is why they are not commonly used anymore.

Cutaneous acarasis
Verminous arteritis
Intestinal histoplasmosis (protozoal enteritis)
Toxic hepatopathy (hepatic mycotoxicosis)
Proliferative and exudative interstitial pneumonia (pulmonary toxoplasmosis)
Protozoal myelitis (Spinal sarcocystosis)

2. MAJOR HISTOPATHOLOGIC ALTERATION = what is the histopathologic appearance of the gross lesion you are looking at grossly? Used occasionally when the characteristic microscopic lesions for which the Mx may not be obvious.

Hemomelasma ilei in horses – hemorrhage, hemosiderosis and granulation tissue

Ostertagiosis (Morocco leather abomasums) – mucus neck cell metaplasia and glandular hypertrophy

E. WHAT DETERMINES THE TYPE OF QUESTION ASKED?

Examiners ask the appropriate questions that are the most discriminating for that image.
Mx, Causes, Name the Disease tend to be the most common.

Practice to be able to answer every type of question for every image you look at. Remember if examiners cannot agree on an answer, how can they expect you to answer correctly?

F. TESTMANSHIP

If you can not see a lesion, **look in the center of the image.** Pathologists and photographers tend to center the item or interest in the middle of the image. Remember that **in situ images may have multiple lesions** in different areas NOT in the center.

If you can not get oriented as to organ to tissue, think about **reproductive, endocrine or lymphoid** tissues. This portion of the examination is about **interpreting what you see**, not formal description writing.

*Read the question again and take your cue from what is asked* about the image. If the question asks for 3 Mx’s, that is a tip off that there is more than one important Mx present in the image. Look for them! If you do not see other, how can you break up the Mx you do see into several.

Intervertebral disc disease  

*Mx = Chondroid metaplasia and disc degeneration*

1) With dorsal protrusion  2) Rupture into spinal canal  3) Focal myelomalacia of the spinal cord.

Experience and practice pay huge dividends here. Experienced pathologists should have no problem with this but learn how to play the game to ensure success. Gross pathology images are readily available; personal collections, websites, CE courses Try all questions for every image. Not all questions will be “appropriate” for each image. It will be obvious which are and which are not.

*Be able to “Shoot from the hip” BEFORE you take the examination. The idea is to have pre-formed Rx to images. Then is it only a matter of pattern recognition; you have already decided how you will respond.*