



Slice Slice Baby: *A Case-Based Look at Cancer*

Presenters:

- + Jeremy Tobias, DVM, DACVP (Anatomic)
- + Pamela Jones, DVM, DACVIM (Oncology), DACVR (Radiation Oncology)
- + Rebecca George, DVM, MS, DACVIM (Oncology)



Stop,
collaborate
and listen



Learning Objectives

1. *Review tips for submitting samples that set your pathologist up for success*
2. *Learn to manage when results are unexpected or “non-diagnostic”*
3. *Address why some samples don’t yield definitive answers—and how to prepare clients for that*
4. *Know when and how to pursue add-on testing or correlate with clinical findings*
5. *Learn how to make your pathologist an extended member of your care team*



Tips for Biopsy Submission:

**Slice like a ninja, cut
like a razor blade**

Slido Poll / QR Code: When were you taught
how to prepare a biopsy submission and
interpret the pathology report?



Tips for Pathology Sample Submission



Formalin Fundamentals



How to Obtain Sample?



Submission Form! Submission Form! Submission Form!

Formalin



Health Hazards

- + Direct contact & fumes
- + Wear PPE
- + Safety sheet, clean-up, disposal procedures



How Much?

- + 10 parts formalin to 1 part tissue
- + Surface availability



Problems

- + Freezing outside?
- + Add 1 part alcohol (70-100% EtOH)
- + Only submit what you want examined
- + Color, Texture?
- + Fixed tissue is firm and brown



Don't Mix!

- + Cytology slides
- + Microbiology samples

How to Obtain Sample?



Pathologist

- + Highly dependent on ddx & lesion
- + More > less
- + Resource:



Oncologist

- + Coming up in our cases



Patient

- + Safety First!



YOU!

- + Access
- + Cost
- + Comfort
- + Pet parent/owner wishes

Veterinarian's Guide to Maximizing Biopsy Results by Yvonne Schulman. Wiley-Blackwell 2016

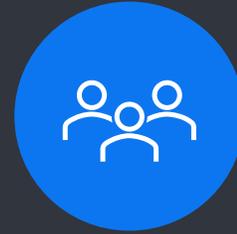
Sample Submission Forms!



**You are not
alone!**



**Treat as a
referral to a
colleague**



**Designate
a team member**



Job aides



- + Who has a checklist developed in their practice for pathology submission?
- + Who submits the pathology form to IDEXX for your practice?
 - + Multiple choice (SLIDO) versus hand raise?*

Sample Submission Forms!



Background

+ Signalment

+ History

Image from IDEXX
Learning Center

Speaking the Same Language—Cancer Biopsy Basics

67%

- Introduction
- Biopsy submission**
- Biopsy results
- Additional testing
- Summary and Resources
- Congratulations!

History of the pet

The next piece of information to describe the case is the **history** of the animal. This can include such information as clinical signs and duration, previous medical history, travel history, and previous diagnostics and treatments attempted with response, if applicable. Take a closer look at these factors:

- 1 Presenting complaint and duration:** This is the major clinical sign that brought the pet into the clinic. In a healthy patient, this could say something like "presented for annual wellness examination," while in a sick patient, this may be "presented for diarrhea persistent for 2 weeks." Duration of the clinical sign allows a denotation of whether the disease is chronic or acute.³ Additionally, a primary differential diagnosis or clinical suspicion included here can prompt a pathologist to make specific comments pertaining to the case for clinician and patient benefit.
- 2 Other clinical signs:** These may be clinical signs that have been happening coincidentally with the presenting complaint, such as diminished appetite or lethargy.
- 3 Current medications:** All pertinent medications and supplements should be noted in the patient record. Informing the pathologist of therapies or types of medications recently used, along with last treatment date, can be very helpful especially in cases of antibiotics or immunomodulatory drugs such as steroids or cyclosporine.
- 4 Exposure to other pets or travel:** Both pieces of information will help to prioritize infectious diseases over others if other animals in the household have similar symptoms or if the patient has traveled in an area where a specific disease is endemic.
- 5 Previous diagnostics performed related to this problem:** Many times, previously performed diagnostics such as blood work and cytology can be used to rule out specific conditions. Provision of these results (along with accession numbers, if applicable) is recommended.
- 6 Previous medical conditions:** A concise synopsis of pertinent medical history should be provided.
- 7 Vaccination status:** When pursuing a diagnosis of an infectious disease or some cancers influenced by viruses (FeLV and lymphoma), vaccination status helps to increase or decrease suspicion of these conditions.

Sample Submission Forms!



Description

- + Specific source
- + Appearance before/after surgery
- + Sampling method

Image from IDEXX
Learning Center

1

Biopsy source



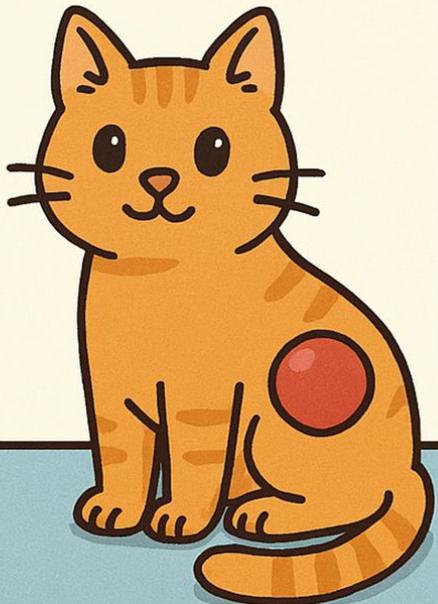
The biopsy source is where the biopsy was taken from and should be as specific as possible:

- Right front paw = good
- Bottom of right front digit 3, not involving paw pad = great
- Bottom of right front digit 3, not involving paw pad, adjacent to/suspicious for claw involvement = outstanding

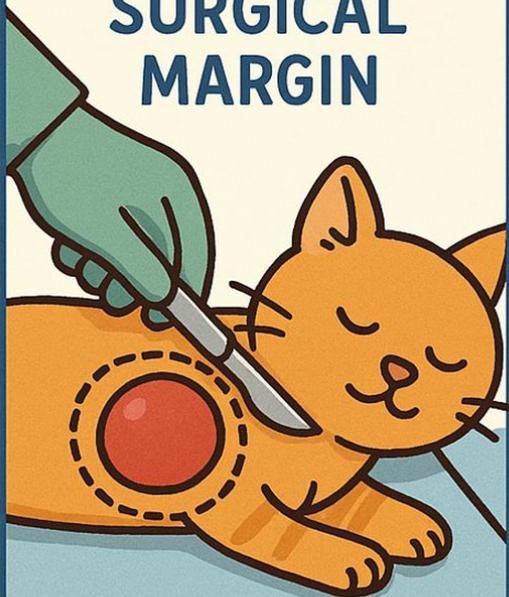
Depending upon the source, multiple methods of biopsy sampling may be considered.

SURGICAL BIOPSIES FOR VETERINARIANS

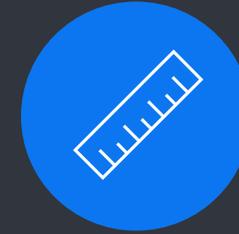
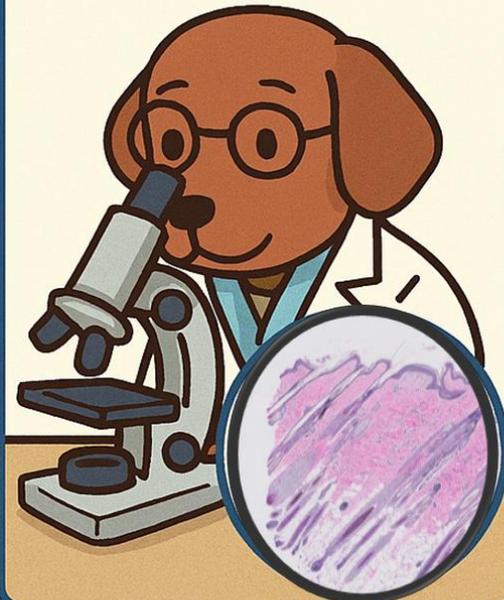
TUMOR



SURGICAL MARGIN



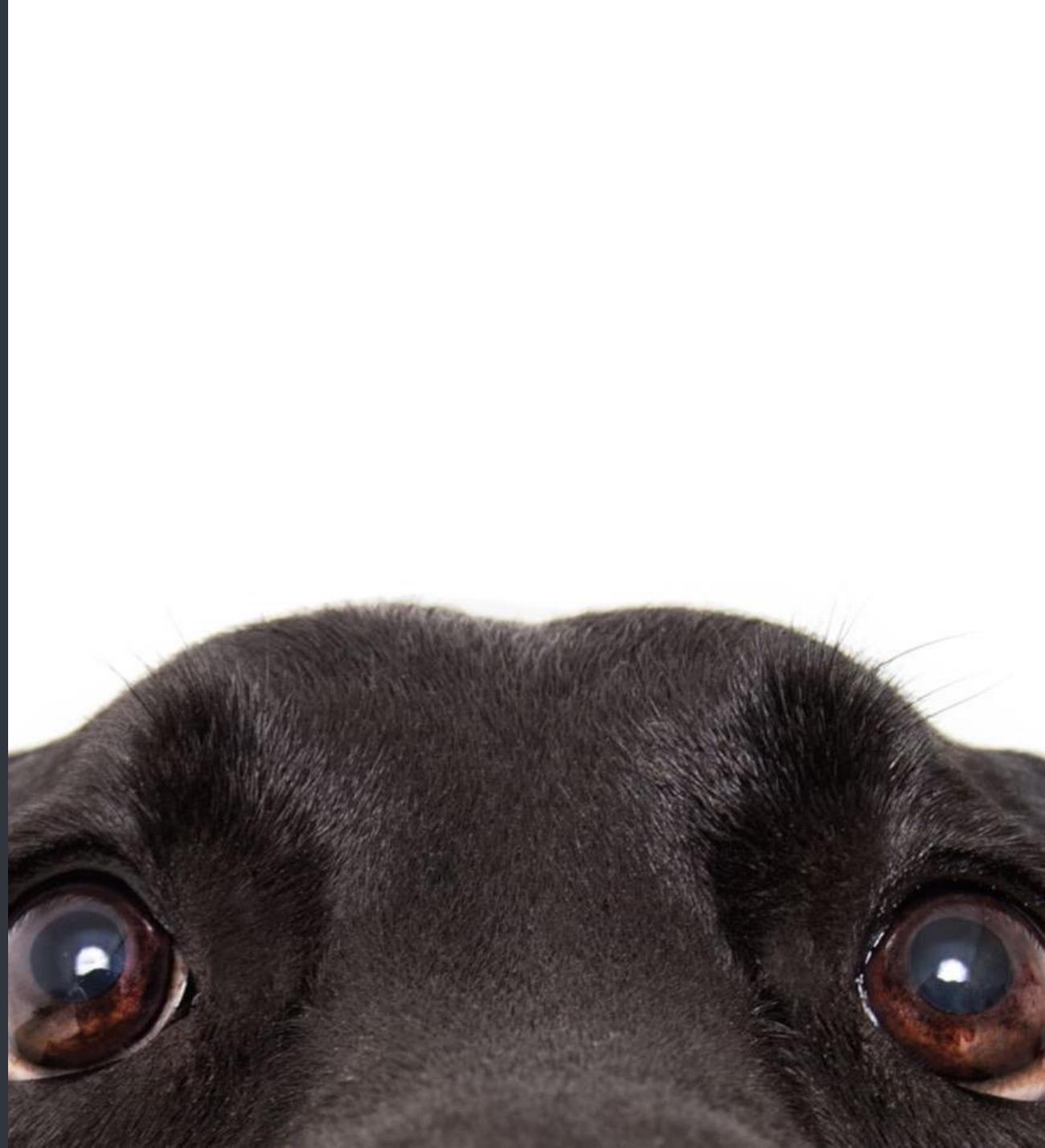
MICROSCOPIC MARGIN



Margins

- + Incisional
 - + Only a piece
- + Marginal excision
 - + I got it all?
- + Excision with curative intent
 - + All of it & more

Case Interpretation:
If there was a
problem, yo,
I'll solve it





PATHOLOGY REPORT

Mast Cell Tumors in Dogs

Franklin, 5.5 yr MN Lab mix

Biopsy Type:

Skin punch

Clinical History:

Chronic left sided nasal swelling with chronic rhinitis.

Pathologist's Report

MICROSCOPIC DESCRIPTION:

There is a poorly delineated, unencapsulated, dermal and subcuticular neoplastic infiltrate comprised of loose sheets and cords of atypical mast cells supported by excess, robust collagenous stroma. Neoplastic mast cells are round with distinct cell borders and moderate to markedly granulated basophilic cytoplasm surrounding central, round nuclei with finely stippled chromatin and 0-1 prominent nucleoli. There is mild anisocytosis and moderate anisokaryosis with rare binucleation and admixed eosinophils.

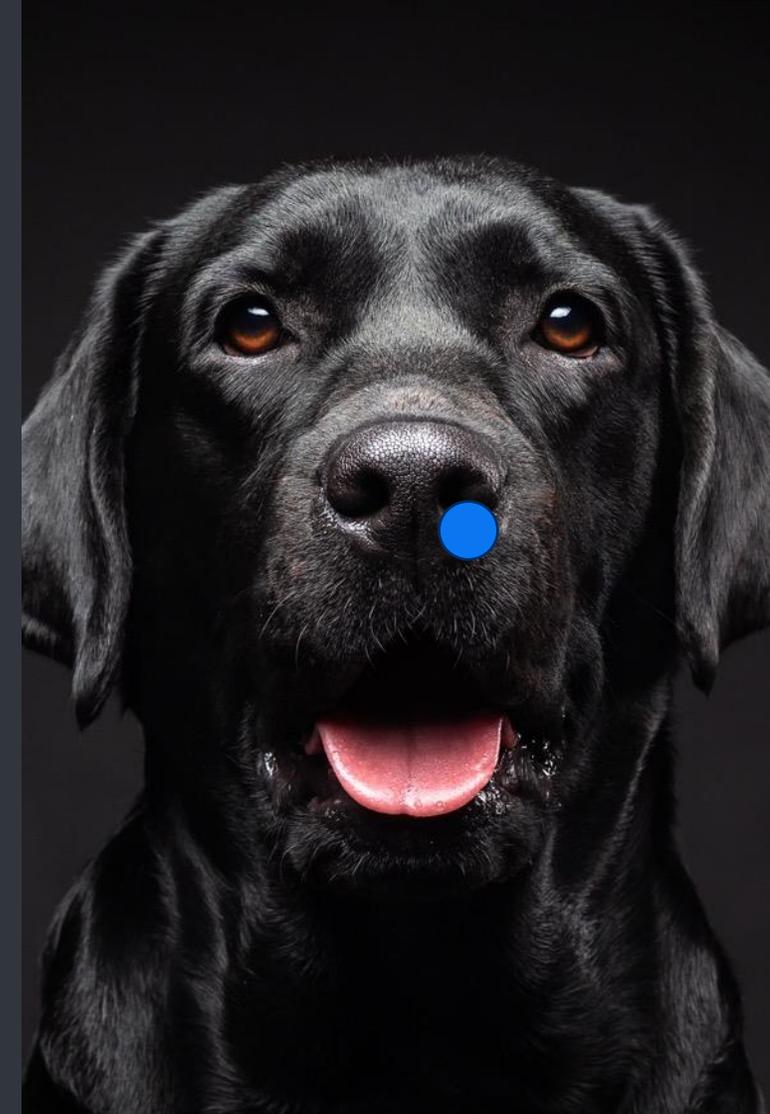
MICROSCOPIC INTERPRETATION:

Haired skin: Cutaneous mast cell tumor (see comments)

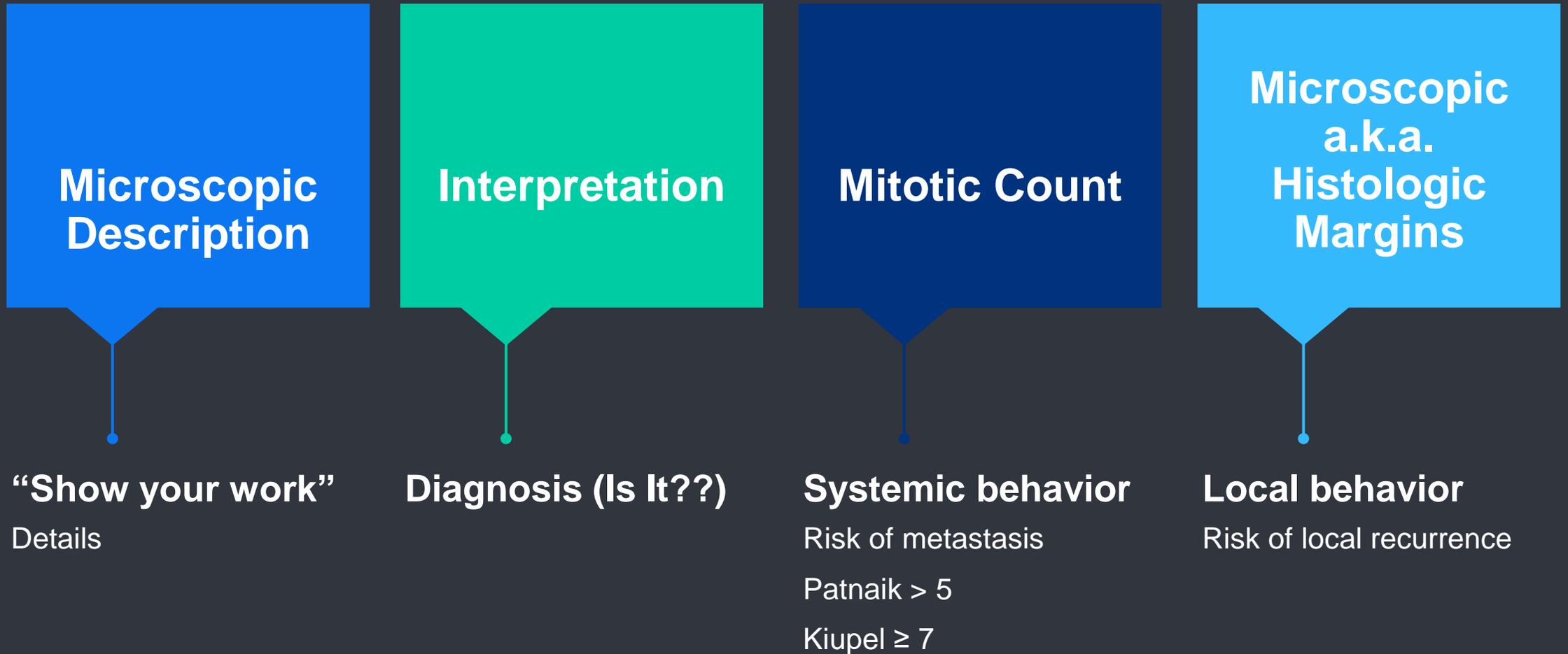
Mitotic count: 1 in 10 hpf

Margins: Incisional sample

Lymphovascular invasion: None identified



Mast Cell Tumors in Dogs: Interpreting the Pathology Report





PATHOLOGY REPORT

Mast Cell Tumors in Dogs

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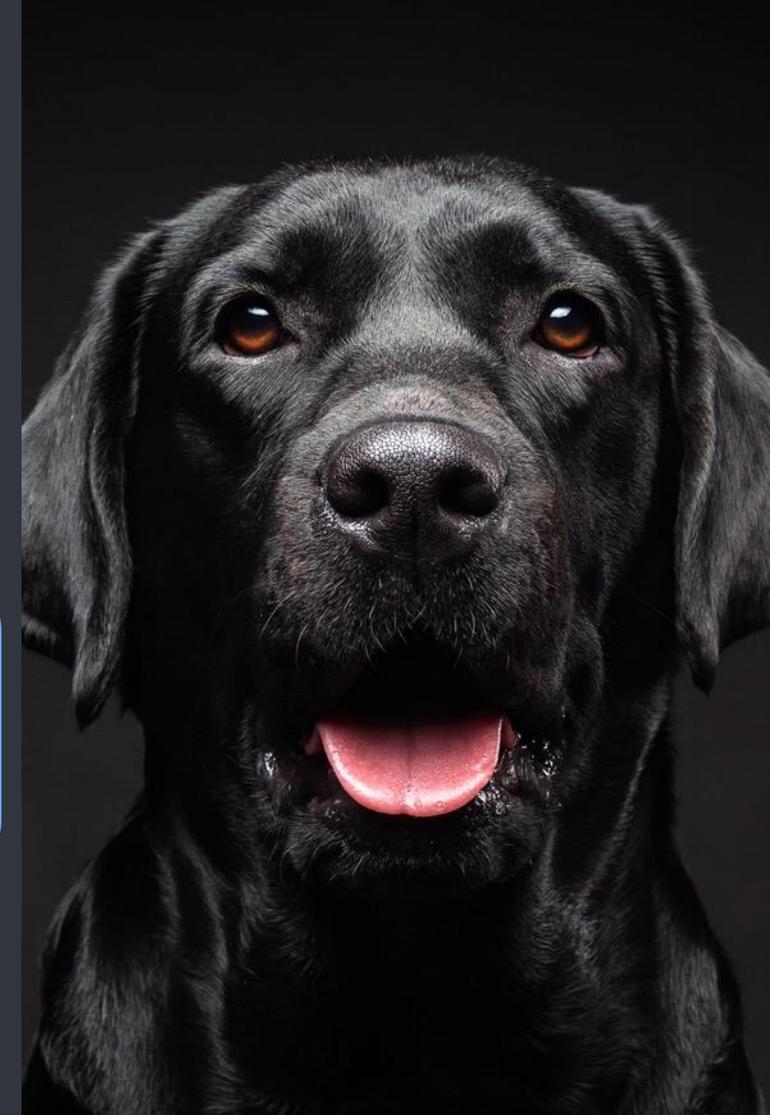
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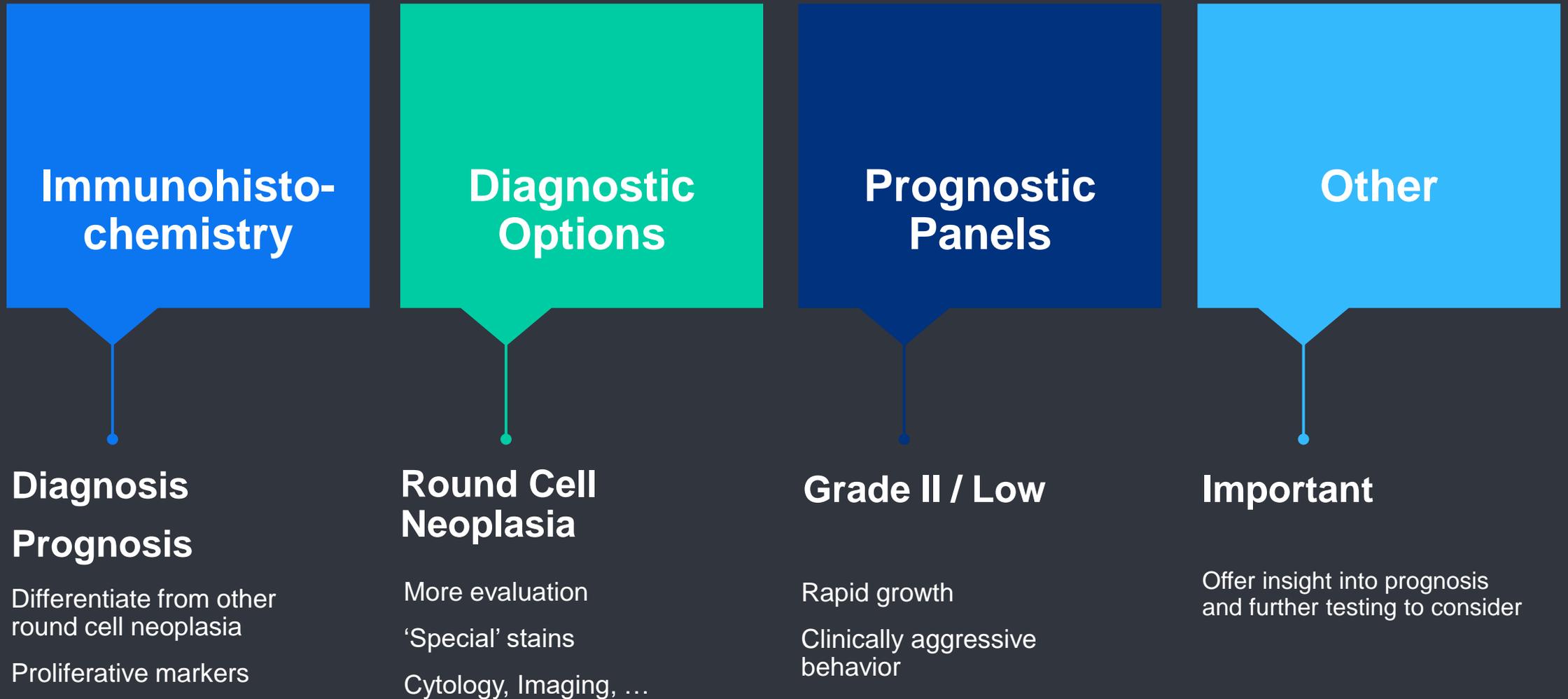
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Margins: Incisional sample

Lymphovascular invasion: None identified



Mast Cell Tumors in Dogs: Interpreting the Pathology Report



Mast Cell Tumors in Dogs: What are the Next Steps?

Immunohistochemistry

Interpretation: Round cell tumor



Diagnostic

KIT
+ Others

Interpretation: Mast cell tumor

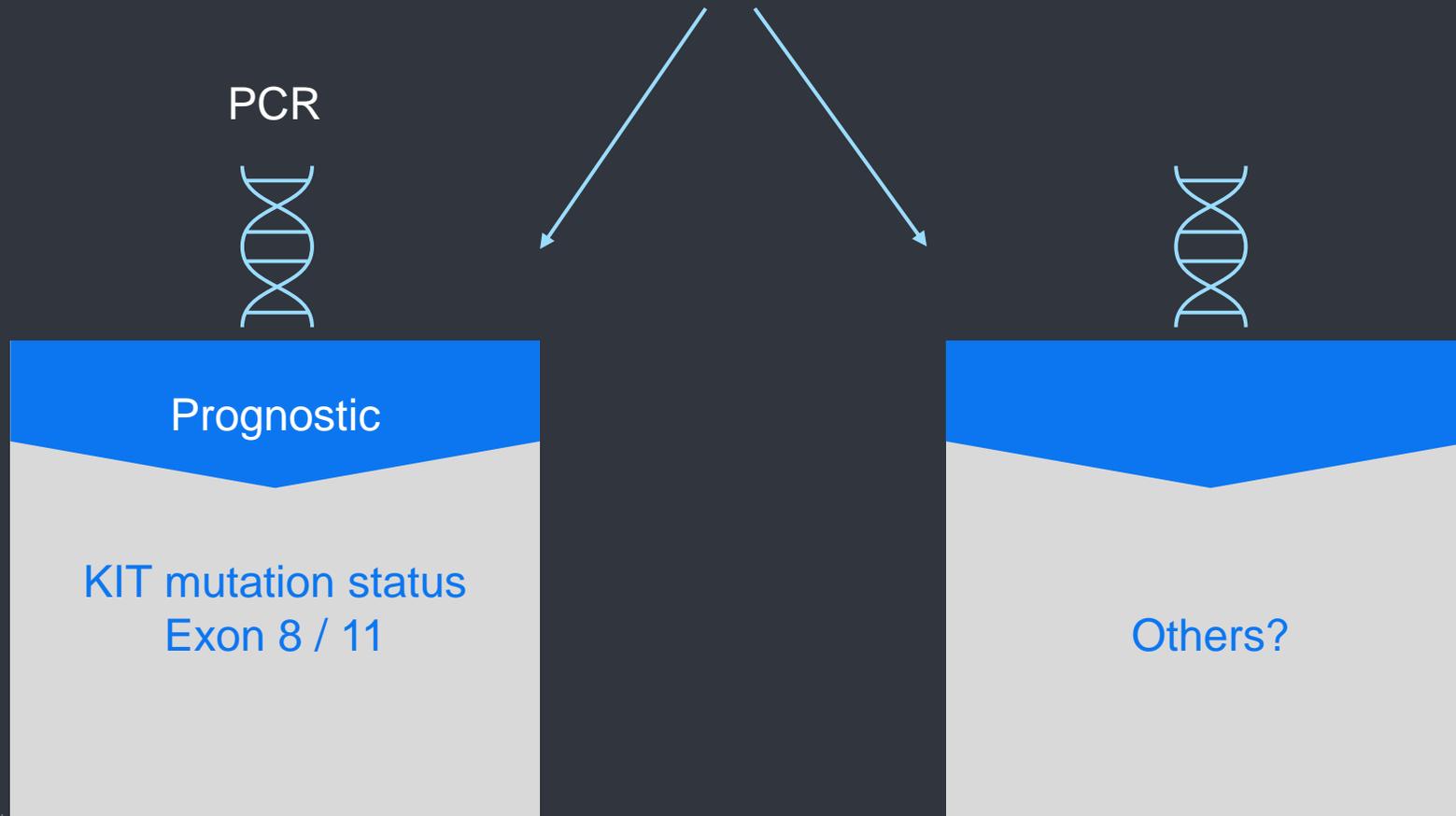


Prognostic

Ki67
AgNOR
KIT localization
patterns

Mast Cell Tumors in Dogs: What are the Next Steps?

Additional Diagnostics





PATHOLOGY REPORT

Mast Cell Tumors in Dogs

Franklin, 5.5 yr MN Lab mix

Biopsy Type:

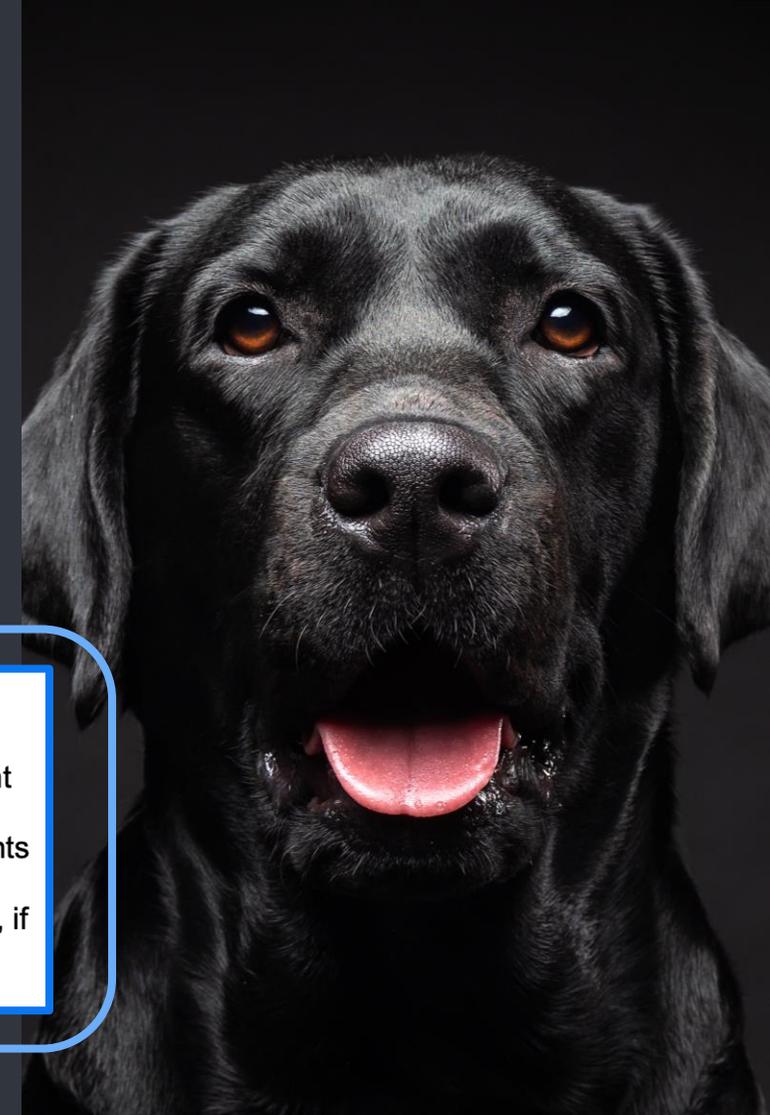
Skin punch

Clinical History:

Chronic left sided nasal swelling with chronic rhinitis.

COMMENTS:

Flynn's mass is a cutaneous mast cell tumor (CMCT). Using standard grading criteria, these incisional samples are compatible with a grade 2/low-grade neoplasm, although in some areas the cytologic features suggest increased malignant potential; excisional biopsy is recommended for more accurate grading. Despite the vast amount of knowledge on canine MCTs, there is no single test or measurable feature that could unequivocally establish the prognosis of CMCTs, and patients should be evaluated on a case-by-case basis, taking into account all factors, including patient information, clinical history, anatomic location, microscopic features, and results of staging (Kiupel, 2017). Performing the MCTPP may also be helpful, if indicated, after assessment of these other items (Sledge et al., 2016; Kiupel, 2017).





MAST CELL TUMORS IN DOGS

Basic Review of MCT Grade

Features	Patnaik Grading System (1984)	Kiupel Grading System (2011)
	3-tier system	2-tier system
Grades	I: Low grade / well differentiated II: Intermediate III: High grade / poorly differentiated	Low grade High grade
Mitotic Count	> 5 / 10 hpf: Worse prognosis	≥ 7 / 10 hpf: High grade / Worse prognosis

+Overview from an Oncologist



Diagnosis

- + FNA + Cytology
- + Biopsy + Histopathology
 - + **GRADE!**
- + Immunohistochemistry



Staging

- + Depends on patient criteria
- + May include:
 - + Regional lymph node evaluation
 - + Abdominal ultrasound
 - + Thoracic radiographs



Treatment

- + Surgery
- + Radiation therapy
- + Chemotherapy
- + Tyrosine kinase inhibitors
- + Immune checkpoint inhibitors
- + Intra-tumoral therapy



Prognosis

- + Variable
 - + Grade?
 - + Stage?



PATHOLOGY REPORT

Oral Melanoma in Dogs

Samson, 10 yr MN Hound mix

Biopsy Source: ORAL_CAVITY

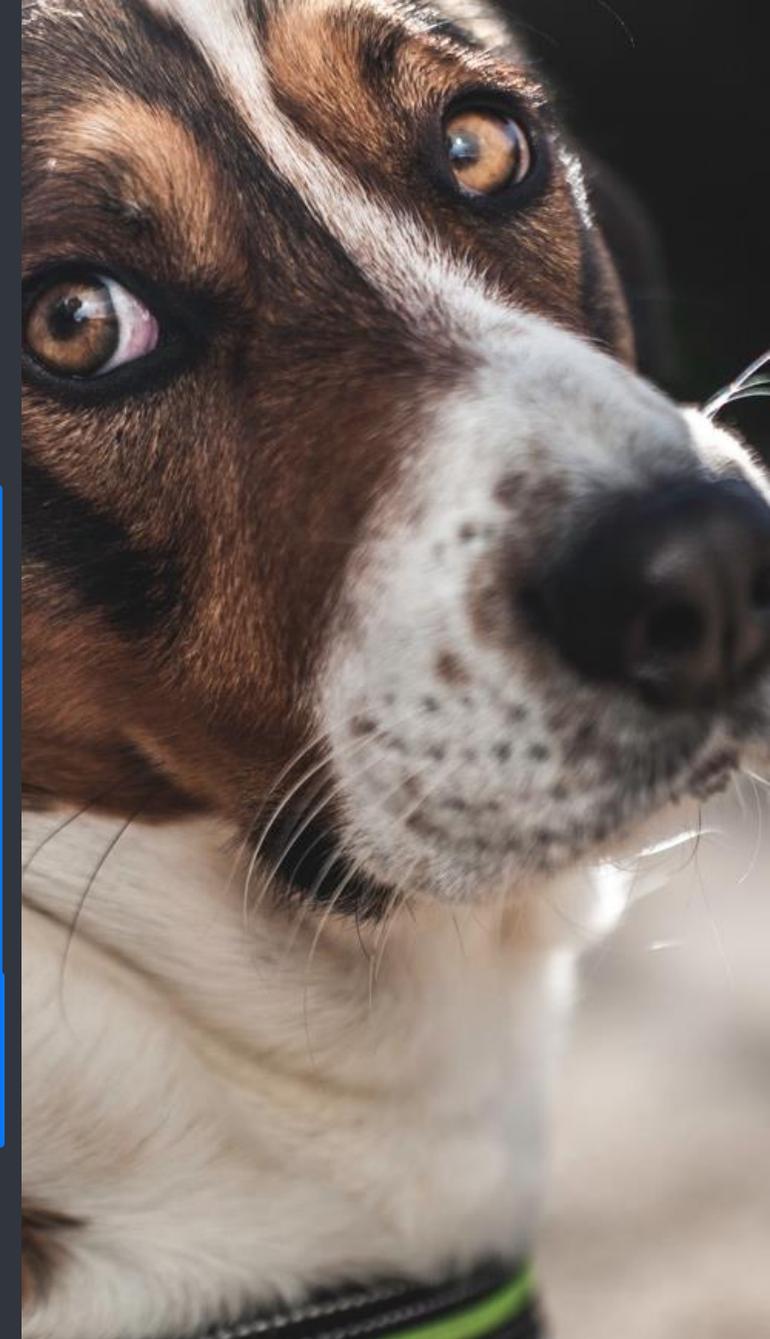
Biopsy Type: EXCISIONAL

Clinical History: Recently noticed a pedunculated lobulated mass on gums above the upper left premolars.

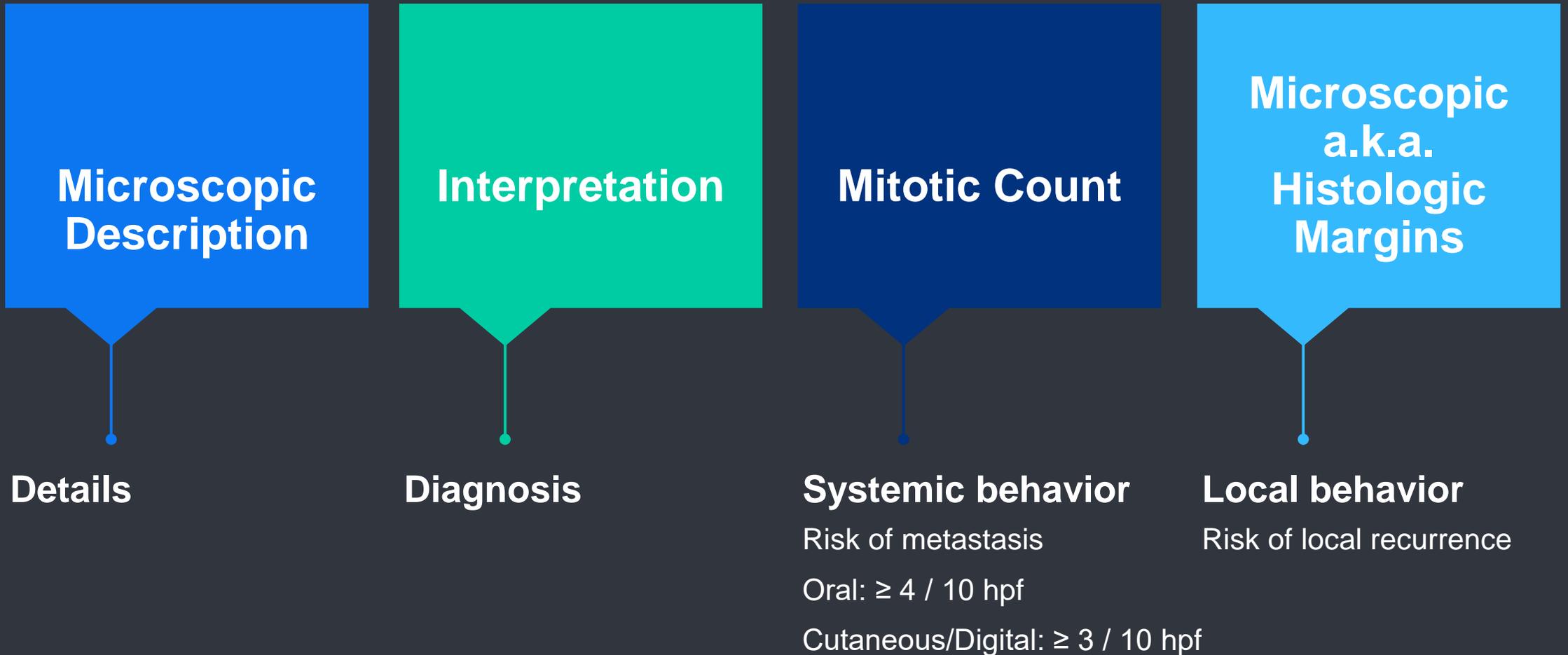
Pathologist's Report

INTERPRETATION:
Melanocytic neoplasm, oral, malignant
Mitotic count (per 2.37 sq mm): high (more than 19/10 HPFs)
Nuclear atypia: 30% or more
Degree of pigmentation: less than 50%

Level of infiltration: Shallow or raised with no bone lysis
Histologic tumor-free margins: Not clear; the nearest peripheral margin contains neoplastic cells, with 2.0 mm deep margin.
Vascular invasion: Not present



Oral Melanoma in Dogs: Interpreting the Pathology Report





PATHOLOGY REPORT

Oral Melanoma in Dogs

Samson, 10 yr MN Hound mix

Biopsy Source: ORAL_CAVITY

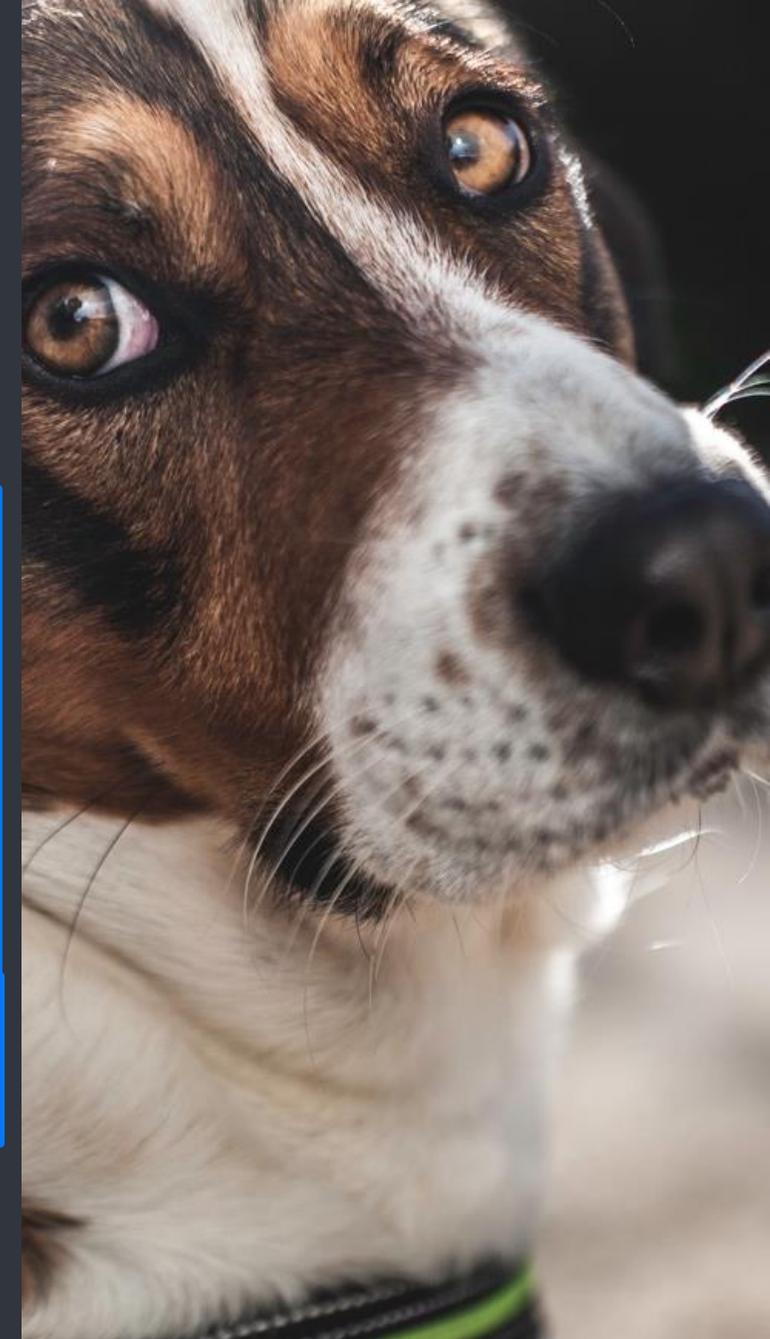
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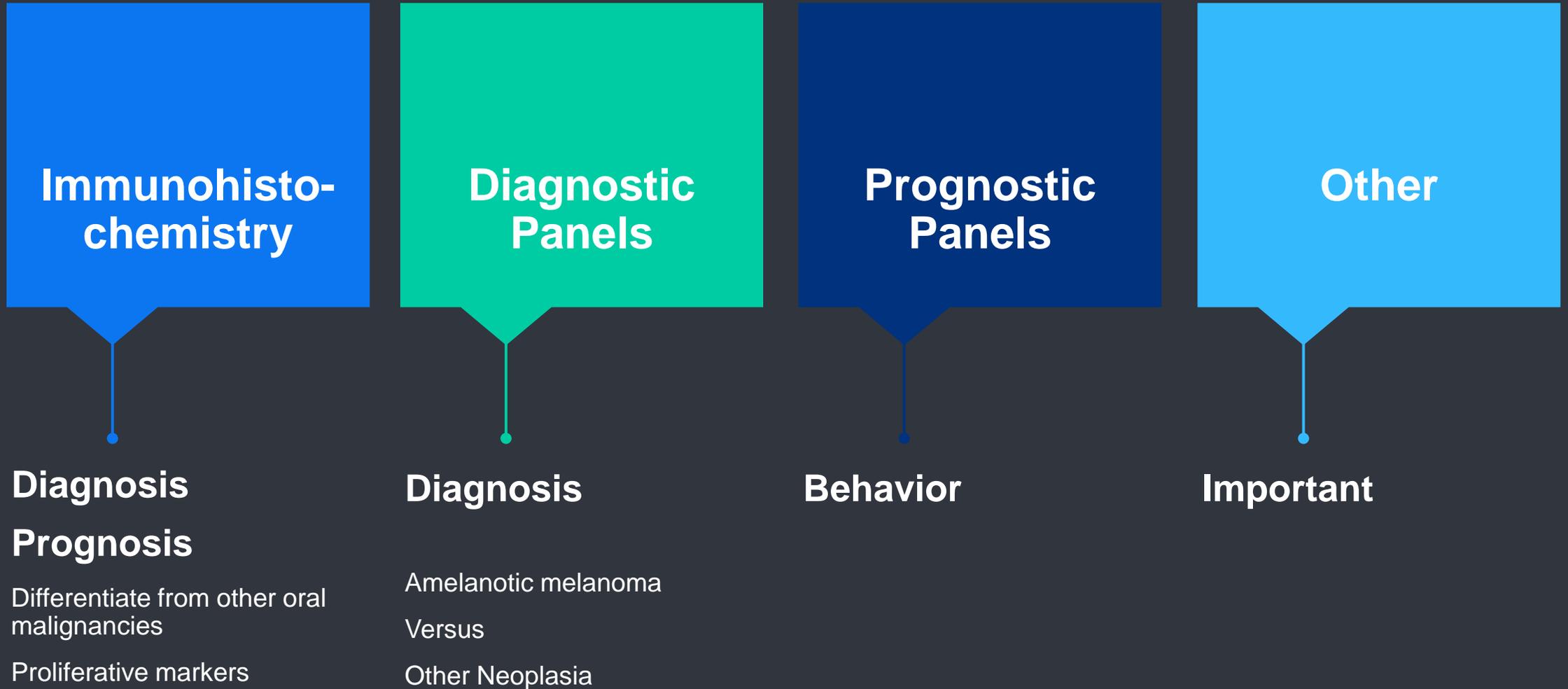
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Oral Melanoma in Dogs: What are the Next Steps?



Oral Melanoma in Dogs: What are the Next Steps?

Immunohistochemistry

Interpretation: Malignant Neoplasia



Diagnostic

Melan-A
PNL-2
+ Others

Interpretation: Melanoma



Prognostic

Ki67

Overview from an Oncologist



Diagnosis

- + Biopsy + Histopathology
- + Immunohistochemistry



Staging

- + Regional lymph node cytology and/or biopsy
- + Thoracic radiographs



Treatment

- + Surgery
- + Radiation therapy
- + Immunotherapy
 - + Oncept melanoma vaccine
- + Immune checkpoint inhibitors
- + Chemotherapy



Prognosis

- + Variable
 - + Margins?
 - + Stage?

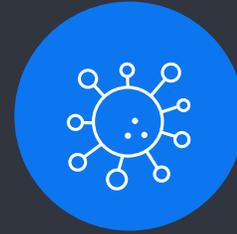
Non-Diagnostic / Non-Definitive Results



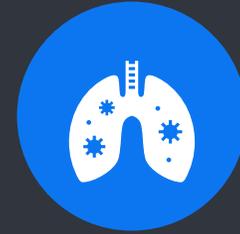
Sample Quality



**Poorly
Differentiated
Cancer**

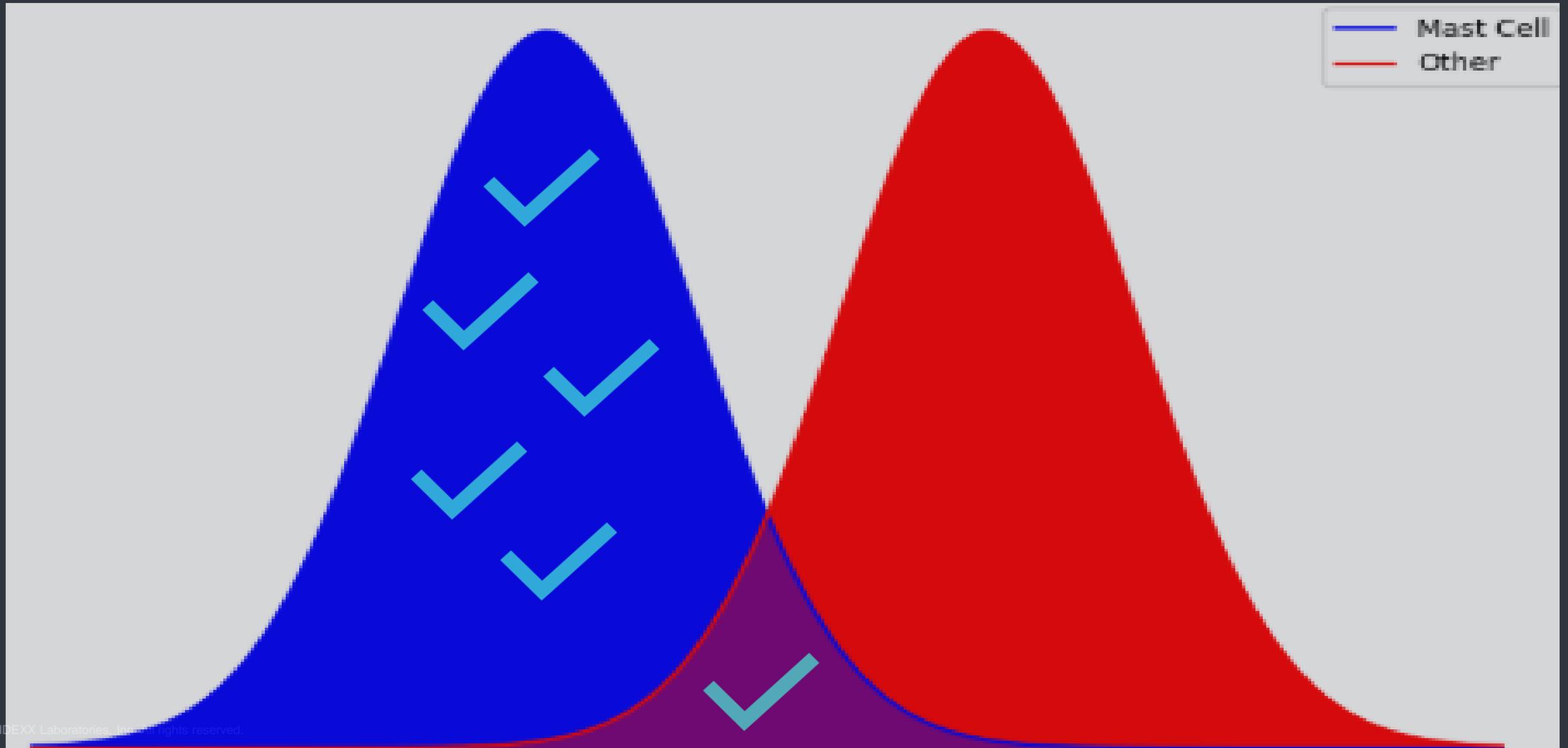


**Inflammation
Repair**

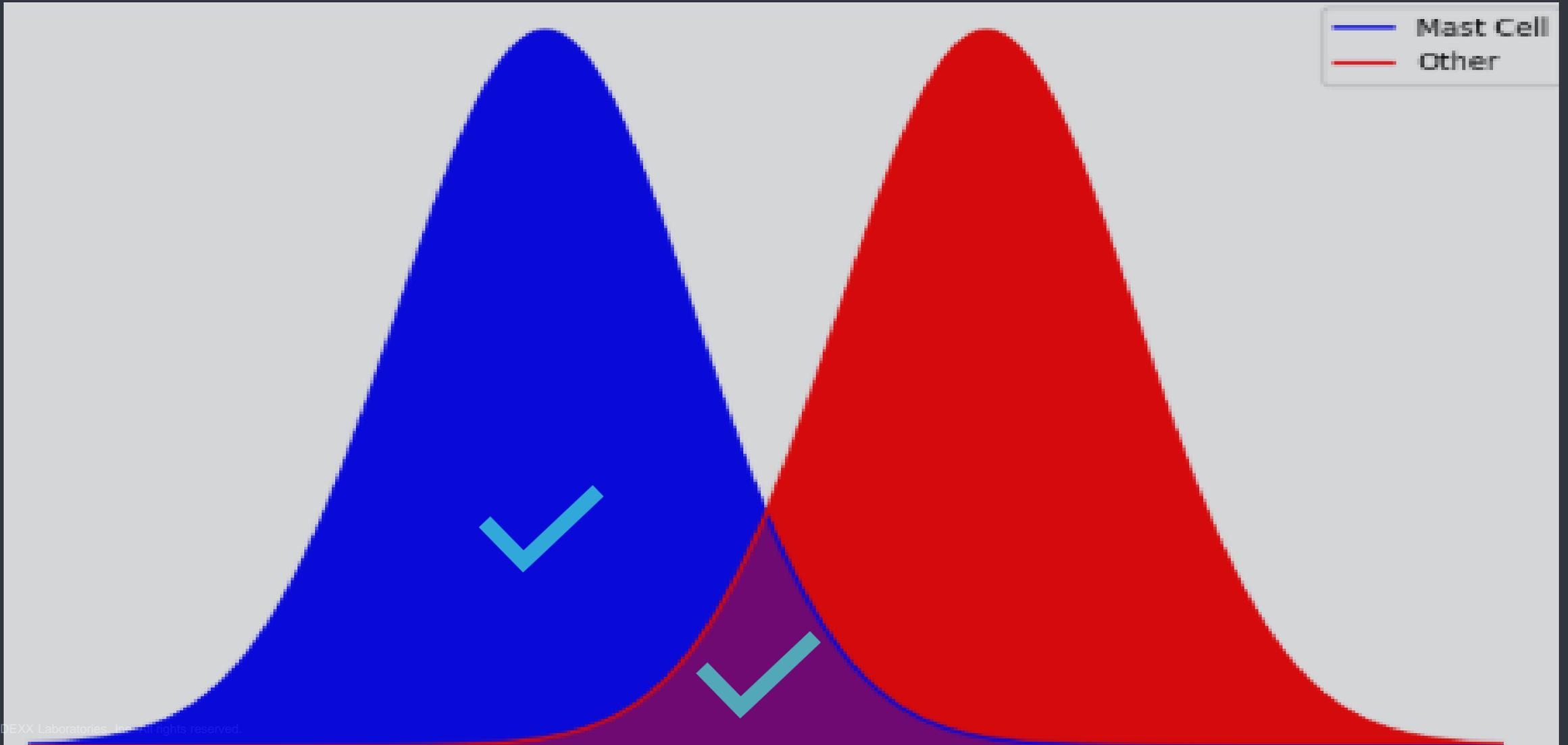


**Stage of
Disease**

Non-Diagnostic / Non-Definitive Results



Non-Diagnostic / Non-Definitive Results



Non-Diagnostic / Non-Definitive Results



Sample Quality



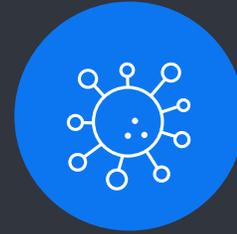
UNAVOIDABLE



**Poorly
Differentiated
Cancer**



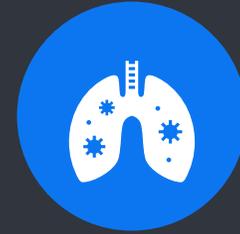
UNAVOIDABLE



**Inflammation
Repair**



UNAVOIDABLE



**Stage of
Disease**



UNAVOIDABLE

Summary

Quick to the point,
to the point,
no faking





+What message or tip have you taken away from this presentation today?

+Slido word cloud

Final Thoughts



Save Time

Taking time on the front end of submission can save you time on the back end. Create checklists and empower your team! Prepare yourself, team and client for biopsy outcomes.



Contact Us

Don't be afraid to contact your pathologist! Leave best way to be contacted – avoid phone tag!



Case Dependent

Oncologists rely on more than one criteria to make recommendations and have a case-based approach.



Teamwork

Specialists are part of your team!



If you want to REALLY make a pathologist's day, email a case update!



Submission quick reference for Skin Mass(es) – “SHARP FLAG”

S: Signalment (Age, Sex, Breed)

H: History – use **TRACKED:**

T: Tumor(s) - signs & timeline

R: Recent meds, timing, and response

A: Accompanying signs/conditions besides the tumor(s)

C: Concise cold cases (past medical issues)

K: Known exposures (travel, pets, people)

E: Existing diagnostics (e.g. imaging, cytology, microbiology)

D: Disease prevention (vaccination status; FIV/FELV)

A: Area of tumor (precise body location)

R: Ruler – measure tumor (L × W × H cm)

P: Prep the Path lab – describe specimen(s) submitted; separate sites; only submit what you want examined

F: Formalin 10:1 ratio (fluid:tissue)

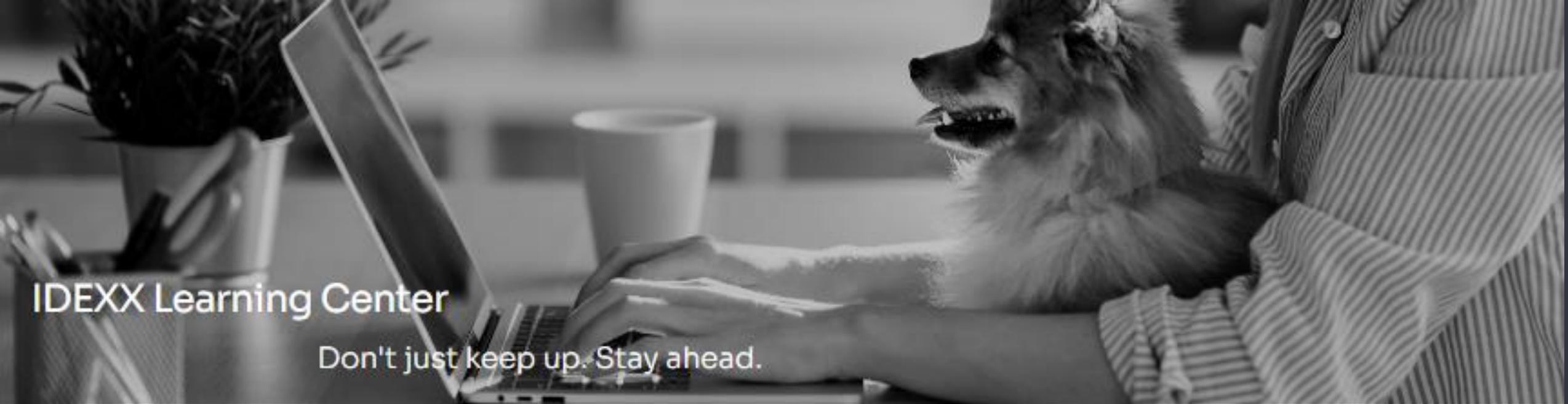
L: Label jar(s) clearly

A: Ask the vet(s) – suspected disease & open questions

G: Goal of surgery (wide margin to cure, only a piece removed, or thin margin)



Call IDEXX & ask for a pathologist if unsure.



IDEXX Learning Center

Don't just keep up. Stay ahead.



Speaking the Same Language: A Veterinary Oncology Terminology...

Enrolled

EN | 4 courses | 1h 00m

Learning plan



Pathology Technician Mastery Certificate Course

Enrolled

5 courses | 1h 30m

Learning plan

**Curated Mind
Educational Newsletter**