Tumor Biopsy

Biopsy is usually essential for evaluation of animals with neoplasia or suspected neoplasia. Biopsy will differentiate neoplastic from non-neoplastic disease, often permits grading of tumors, and allows clinicians to give more accurate prognoses. Biopsy will often influence therapy: whether narrow or wide resection is required; whether chemotherapy may be beneficial; and, if so, which chemotherapeutic agent is appropriate. These brief notes are designed to assist the clinician in getting the best from their biopsy samples.

Inclusion of clinical details will assist the pathologist in interpreting histological findings and comments on behavior and likely problems. Species, breed, age and sex information are essential. A brief description of the tumor should include site, size, whether there is attachment to or infiltration of surrounding structures, whether the entire lesion is thought to have been submitted, and whether there is enlargement of the drainage lymph node.

Types of Biopsy

Needle-core biopsy

A 14G biopsy needle (Tru-cut) is used to remove a core of tissue from suspect masses or tissues. Tissue should be flushed with saline from the central notch into fixative. Depending on the site biopsied, sedation and local anesthesia may be adequate, but deep sites require general anesthesia.

- Will often give a diagnosis on solid tissue masses but may not give information on local behavior since the lesion edge cannot be properly evaluated.
- May be inconclusive if evaluation of architecture is required for diagnosis (e.g., lymphosarcoma), or there is extensive necrosis or inflammation in the tumor mass.
- Where localized internal lesions are suspected (e.g., liver or renal masses), needle-core biopsy is best performed using ultrasound guidance.

Pinch or punch biopsy
Pinch (or grab) biopsies can often be obtained during endoscopic examinations of tubular viscera. Punch biopsies, preferably 6mm or more, may be used to obtain material from suspect skin tumors, especially on extremities or other sites where more extensive incisional or excisional biopsy could cause poor healing.

- Will often give a diagnosis, but may give little information on local behavior.
- Problems of orientation with these small samples may result in inconclusive results. Tissue distortion, due to crush artifact, may also result in inconclusive results, especially with pinch or grab techniques.
- Avoid areas with obvious surface necrosis. The superficial samples may reveal only debris and underlying inflammation. It is often useful to take multiple samples.

**Incisional biopsy**

A portion of the tissue is removed, usually (and preferably) including the junction with normal tissue. The biopsy site should be selected so as not to compromise future complete resection. Usually requires general anesthesia.

- Will almost always give a specific diagnosis and should also allow grading.
- If the advancing edge of the tumor is included, will allow evaluation of local behavior and give information on likely prognosis.
- Avoid areas where there is obvious tissue necrosis. Excess pressure with forceps or use of cautery techniques, especially on small samples, will cause tissue artifact and may make samples non-diagnostic.

**Excisional biopsy**

The entire suspect lesion is removed and submitted intact. Most commonly used where knowledge of the type of lesion would not affect the requirement for total excision (e.g., localized skin nodules, splenic or testicular masses). Usually requires general anaesthesia.

- Will give a definitive diagnosis and allow grading.
- Will allow evaluation of local behavior, the adequacy of resection, and give information on likely prognosis.
- If a particular point of the excision margin is considered as possibly incomplete, this should be marked for the attention of the pathologist.
Fixation of Samples

Containers of 10% neutral buffered formalin, the fixative of choice, are available from the laboratory on request, free of charge. Up to 50 ml of formalin may be sent by post.

- Samples should be no more than 1 cm thick to allow for adequate formalin penetration. Thicker samples should be sliced to allow adequate fixation, but slices should not be thinner than 0.5 cm. Thinner slices often curl up in fixative and cause problems in processing and orientation.

- Completely excised skin nodules of 1-2 cm diameter should be incised by a single incision through the skin surface, leaving the deep excision edge intact. The incised edges retract in formalin, and incision through the deep excision margin may make it impossible to decide if complete excision has been achieved.

- Samples should be placed in at least 10 times the volume of fixative as the volume of tissue. Where large samples must be submitted, they can usually be prefixed in the practice overnight, then sent in a smaller volume of fixative.

- For many large lesions, a representative slice 0.5-1 cm thick that includes the edge with the smallest excision margin will be adequate. Always include suspect-normal tissue junctions. A simple diagram illustrating the mass and the portion sent can be very helpful.

- Samples that include bone will require decalcification before they can be processed. This may take from 1-2 days for small bone fragments, and up to several weeks for entire large toes or portions of mandible or maxilla.

Specific Samples

Lymph node biopsies

In suspected, especially early, cases of lymphosarcoma (malignant lymphoma), evaluation of node architecture can be essential in differentiating neoplasia from reactive hyperplasia. Complete node excision is therefore the preferred sample. The submandibular node is best avoided, since there is often reactive hyperplasia or active lymphadenitis associated with oral disease. Similar changes are often found in popliteal nodes, and the prescapular node, provided it is enlarged, is often the best sample. Obviously, if only one node is enlarged, it should be submitted. If the node is more than 1 cm thick, it should be incised by a single incision along its length.
Splenic masses

Large, especially haemorrhagic, splenic masses are notoriously difficult to sample. The centers of the lesions are often composed of necrotic tissue debris or simple blood clot. Samples should be taken from the outer margin of the mass and should include adjacent normal splenic tissue and, on at least one sample, the outer capsule over normal and suspect splenic tissue. Samples that include only the outer splenic capsule over blood clot are often non-diagnostic. Several samples should be taken from very large masses.

Testicular tumours

Many testicular tumors can be submitted intact, or with a single incision through the testis along its long axis. Where large testes or masses are present, a 1 cm slice through the mass and surrounding testicular substance is usually adequate. It is always beneficial to include a portion of epididymis and spermatic cord as metastatic testicular disease is often associated with permeation of vessels and lymphatics in these sites.

Bone tumours

With suspect bone tumors, it is essential to include the deep or central portion of the lesion. Many neoplastic and inflammatory bone lesions are associated with marked periosteal reaction with formation of new bone; and shallow punch, core or wedge biopsies may reveal only the outer reaction and miss the central specific pathology.

Additional Information

At IDEXX Laboratories, we try to report tumor samples on the working day following arrival at the laboratory. If samples require special stains or refixation, reports may be delayed by 24-48 hours. Where decalcification is required, complete examination may be considerably delayed, but a preliminary report will be issued where possible.

If you anticipate difficulties in sampling a particular case, please telephone to discuss with one of our histopathologists.