



THE UNIVERSITY  
of NORTH CAROLINA  
at CHAPEL HILL

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Department of Pathology & Laboratory Medicine  
Nephropathology Laboratory  
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# UNC DIVISION OF NEPHROPATHOLOGY

## MEMORANDUM

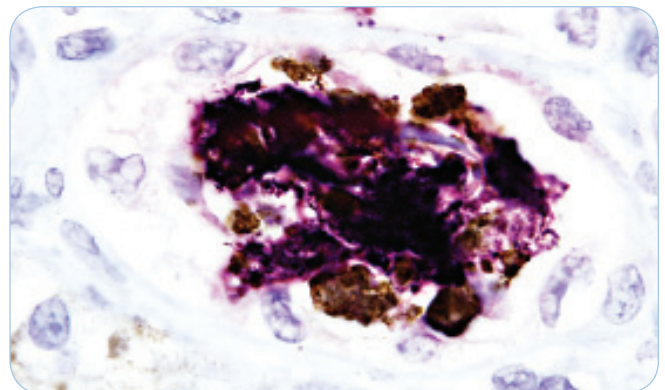
**TO:** Physicians submitting renal biopsies to the UNC Division of Nephropathology in Chapel Hill

**FROM:** Volker Nickenleit, M.D. (Director), Sharan Singh, M.D. (Associate Director), J. Charles Jennette, M.D. (Executive Director)

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The UNC Division of Nephropathology evaluates approximately two thousand specimens per year. Most are referred from nephrologists in community practice via their community hospital and local pathologist. Preliminary diagnoses are faxed to the managing nephrologists within 24 hours of the receipt of specimens. In addition, pertinent diagnoses are communicated immediately by telephone. A detailed final report is faxed and mailed to nephrologists and pathologists after completion of all studies together with histologic preparations and relevant images. The Division of Nephropathology is CAP and CLIA approved. **The Division of Nephropathology has flexible billing options and provides both direct patient billing and institutional billing** (see section #6 on page 5 for detailed billing information). **All reports can also be accessed via a secure online HIPAA compliant server anytime, anywhere.**



# 1 UNC RENAL BIOPSY KITS

The UNC Division of Nephropathology will supply mailing kits that contain preservatives and fixatives. Kits must be stored in a refrigerator or cold room prior to use. Stored correctly, they have a long shelf life (noted on the outside of the box). Kits are mailed free of charge in groups of 3 or 6, bundled with a copy of this memo and material safety data sheets. Each kit also contains a referral form for both native and transplant biopsies (2 separate forms). Pre-paid FedEx shipment labels are included for easy return of biopsies free of charge to UNC. The outer covers and plastic bags of the mailed kits are intended to be reused for mailing the biopsy specimens back to UNC.

Kits contain separate preservatives for light, immunofluorescence and electron microscopy. **Be sure to replace the same cap on the vial it was taken from. Even a small amount of transport medium mixed into the glutaraldehyde will result in less than optimal fixation.**

## ELECTRON MICROSCOPY

2.5% buffered glutaraldehyde in an ampoule is supplied. Break the ampoule and pour the contents into the container labeled 2.5% Glutaraldehyde. Place biopsy tissue in vial and cap tightly. Invert the vial several times to assure that tissue is floating freely in the fixative.

## LIGHT MICROSCOPY

10% fresh (non-recycled), neutral buffered formalin is supplied.

Place the biopsy tissue in the vial. Replace the cap tightly and invert the vial several times to guarantee that the tissue floats freely in the liquid and is not stuck to the lid.

## IMMUNOFLUORESCENCE MICROSCOPY

A transport medium (Michel's solution, IF transport medium) is supplied ready for use. Place tissue in vial, cap tightly and invert the vial several times to assure that the tissue is floating freely. Tissue can be kept in this medium for at least 5 days (at ambient temperature or refrigerated).

Michel's transport medium is designed for preserving biopsies for immunofluorescence studies only. Biopsies that have been placed (even briefly) in Michel's will not fix properly in formalin or glutaraldehyde and will show severe fixation artifacts. When preparing specimens for shipment be sure to replace the same cap on the vial it was taken from. Even a small amount of Michel's transport medium mixed into the glutaraldehyde will result in suboptimal fixation.

Send biopsy specimens at ambient temperature to the UNC Division of Nephropathology including all patient information and clinical forms. Please notify us by phone (919-966-2421) prior to shipment in order to guarantee proper tracking of the biopsy material, or call us to receive UNC biopsy kits free of charge. **Note:** Free pre-paid FedEx labels are provided with each kit.

# 2 PREPARATION OF TISSUE

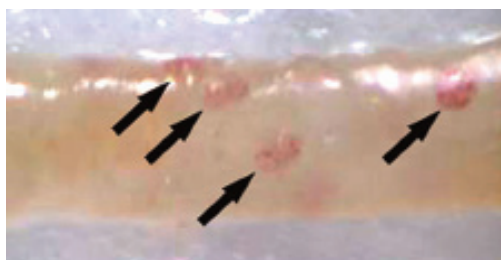
For obtaining most adequate biopsy material we strongly recommend using 15-16 rather than 18-gauge needles. Small 18-gauge needles do not reduce the risk of complications but rather substantially limit the diagnostic yield of a kidney biopsy, i.e. they often generate small, inadequate specimens. In addition 18-gauge needles can cause so-called "squeezing artifacts" due to sheer stress when obtaining the biopsy cores. Such artifacts can substantially impair subsequent morphologic studies.

In general 2 to 3 biopsy cores each measuring approximately 12-15mm should be obtained for histologic evaluation. Adequate sampling including a good insight into the arterial tree (large interlobular arteries,

branches of arcuate vessels) is of particular importance when evaluating renal transplant biopsies.

Tissue adequacy at time of biopsy can be assessed with a 10X to 15X hand lens or dissecting microscope. Adipose tissue presents as clusters of fat droplets and skeletal muscle as dark colored tissue that is easily disrupted in fascicles when prodded. "Simple"

magnification often also allows for the identification of renal cortex (glomeruli present as punctuated blushes or raised hemispheres; see arrows in figure) and medulla (collecting ducts present grossly as "striations").



"Preparation of Tissue"  
continued on Page 3

## PREPARATION OF TISSUE (continued)

Needle or wedge biopsies should be processed immediately after tissue collection. Never allow the tissue sample to dry out. If there is any delay, keep tissue moist on a cool saline-moistened gauze. Do not submerge the biopsy tissue in water or saline; this will introduce artifacts. Do not use Michel's transport medium or any other fixative as a holding solution prior to partitioning the sample.

Appropriation of tissue for light, immunofluorescence (IF) and electron microscopy (EM) is an important step to optimize the diagnostic yield of a renal biopsy. Of note: in general only a small segment of cortex (approximately 3mm) is required for EM analysis. Tissue sampled for EM studies is processed separately, and it is not thoroughly analyzed by standard light microscopy.

Tissue for the three methods of examination can best be obtained as follows: (see diagram)

In general, two or, even better, three long (approximately 12-15mm) biopsy cores are divided. One or two cores are fixed entirely in formalin for light microscopy; small segments (approximately 2mm) from both ends of the remaining core are fixed in glutaraldehyde for electron microscopy (this approach makes EM sampling of glomeruli likely since one end of the biopsy core should contain cortex), and the rest of the core is preserved in Michel's medium for immunofluorescence microscopy. In case only 2 cores are obtained, the "best" one should be fixed in formalin.

For renal transplant biopsies, 2 long tissue cores are needed for light microscopy, and one additional core for IF studies. Allograft biopsy tissue in glutaraldehyde for EM studies is only required if a glomerular disease process is suspected or in biopsies taken > 1 year post transplantation to search for allograft glomerulopathy or the presence of multi-layering of peritubular capillary basement membranes.

If very limited tissue is available, more than one diagnostic procedure can be performed on tissue preserved with one of the above mentioned methods. e.g.:

- Tissue submitted in Michel's transport medium for immunofluorescence microscopy can be processed for light microscopy (this will result in some artifacts), or
- Tissue fixed in formalin for light microscopy can also be processed for EM.

In all cases with a suspected glomerular disease process and suboptimal tissue sampling, it is usually best to submit the entire small biopsy core in Michel's transport medium. Limited small transplant biopsies should be entirely fixed in formalin.

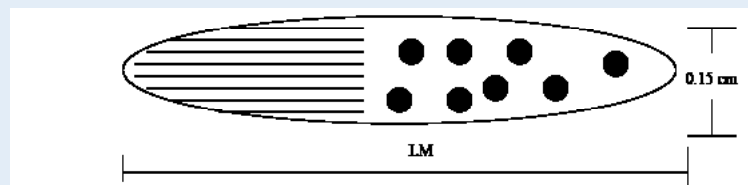
Follow directions for using the kits supplied by the UNC Division of Nephropathology (see section 1). If you do not use our kits, be sure to label your containers with the name of the preservative as well as the patient's name and the date of birth.

### PARTITIONING OF RENAL BIOPSY NEEDLE CORES

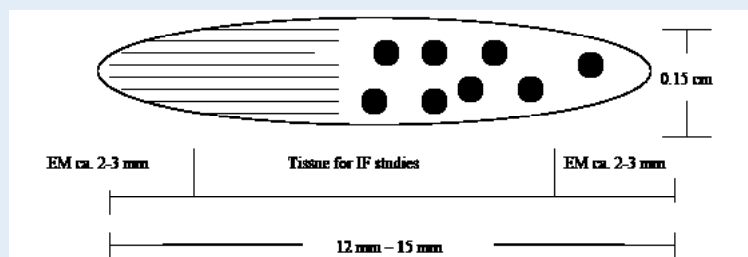
General rule: try to obtain two, or even better, three biopsy cores (12-15mm long) with a 15-16 gauge needle.

Take tissue for LM, less for IF, and least for EM (of note: EM is least helpful in transplant biopsies without clinical suspicion of a glomerular disease process).

First core [and second core if a total of three cores is taken] for formalin fixation (LM) :



Second core [or third core if a total of three cores is taken] to be divided for IF and EM :



# 3

## SPECIMEN AND PATIENT IDENTIFICATION/ CLINICAL INFORMATION AND REFERRAL FORMS

Referral forms to be submitted with each biopsy specimen are included in the UNC renal biopsy kit (see section 1), they can be requested from our office and faxed or they can be downloaded from the Nephropathology website (<http://www.uncnephropathology.org>). Please use the appropriate form for either native kidney biopsies or renal allograft biopsies. Please be sure the information is legible and complete in order to facilitate the diagnostic interpretation.

Specimens should be labeled with the patient's name and a second identifier (date of birth). Adequate clinical information is crucial for optimal and fast diagnostic workup.

Please, also provide current contact information for rapid communication of biopsy results, i.e. names of referring nephrologists and pathologists, telephone and fax numbers.

### AT A MINIMUM WE MUST HAVE:

1. Patient's full and correct name, date of birth, sex, and race for identification purposes
2. The date of the biopsy
3. List of underlying clinical problems
4. For institutional billing, name, address, phone and fax # of the institution that will receive the report and the bill
5. Name, address, phone and fax # of the nephrologist who requested/performed the biopsy and who will receive all diagnostic information including preliminary diagnoses by fax.

# 4

## SUBMISSION OF TISSUE: WHERE AND HOW

Specimens can be sent back to the UNC Division of Nephropathology along with a completed referral form by using our free pre-paid FedEx labels provided with each kit.

**UNC Division of Nephropathology**  
**Brinkhous-Bullitt Building, Room 409, CB# 7525**  
**Department of Pathology and Laboratory Medicine**  
**UNC School of Medicine**

We accept specimens during regular working hours Monday through Friday 8am-5pm. Please notify the UNC Division of Nephropathology at 919-966-2421 prior to sending a biopsy specimen in order to guarantee optimal specimen tracking. The Division of Nephropathology is closed Saturdays, Sundays and on major holidays. **In case of medical emergencies, weekend or holiday deliveries, tissue processing and interpretations can be arranged upon request (call 919-966-2421).**

Overnight Priority service by FedEx (approximate UNC delivery time 10:00am) has been the most effective means of transporting specimens. **The Division of Nephropathology**

**provides free pre-paid FedEx labels for easy shipment of biopsies back to UNC.** Please always retain a copy of the FedEx air-bill for proper specimen tracking.

If you are using a local courier, specifically instruct them to obtain a signature from a UNC nephropathology staff member upon delivery of the specimen.

# 5 REPORTING OF RESULTS

**All preliminary and final reports are available via our secure online web access. Managing physicians can set up email alerts about all new available reports for their patient management.**

A preliminary diagnosis is faxed to all managing clinicians indicated on the referral form within 24 hours of specimen receipt. In addition, pertinent findings crucial for patient management are also immediately communicated by phone.

All three modes of examination (LM, IF, EM) will be completed within 3 working days of receipt of a specimen unless special processing (e.g., reprocessing of LM tissue for EM) is required. Final reports include detailed descriptions of light, immunofluorescence and ultrastructural findings and a diagnostic interpretation often amended by a detailed comment. Glass slides, electron micrographs, IF images, and in selected

cases, also digital LM images will be sent to the referring pathologist and nephrologist. Additional digital images of interesting cases will be supplied upon request. A number of days are required to prepare the final typed reports and photographs for mailing (at least 90% of final reports are mailed within 5 days of receipt).

All final reports are additionally faxed to the managing nephrologist and pathologist indicated on the referral form. **Please note:** in order to facilitate rapid communication, contact information including names, telephone and fax numbers of the referring nephrologists and pathologists must be clearly written on the referral forms accompanying the biopsy material.

# 6 BILLING

**FLEXIBLE BILLING OPTIONS ARE AVAILABLE WITH EITHER INSTITUTIONAL OR DIRECT PATIENT BILLING.**

**Direct Patient Billing:** We will provide a detailed patient information sheet containing necessary information for filing with the patient's insurance company. A copy of the patient's insurance card should also be attached to this sheet to insure accuracy of information.

**Institutional Billing:** The bill will request payment to **Nephropathology Service, UNC**. Checks should indicate that the payment is made for renal biopsy interpretation; they should be mailed to Nephropathology Services, Department of Pathology, CB#7525, UNC School of Medicine, Chapel Hill, NC 27599-7525.

Our charge for light microscopic interpretation is \$225. It is the same whether histologic sections or tissue is submitted. Suggested CPT codes for the light microscopy: **88305** (for routine stain- H&E) **plus 88313** for each special stain- PAS, Masson. If the biopsy is inadequate, i.e., does not contain renal tissue or glomeruli, we will not charge.

Our charge for immunofluorescence microscopy is \$275. Suggested CPT codes for the immunofluorescence microscopy: **88346** for each of the antisera used to detect immune deposits. For non-renal tissue there is no charge.

Our charge for electron microscopy is \$450. Suggested CPT code for electron microscopy: **88348**. For non-renal tissue or medullary parenchyma without glomeruli there is no charge.

If all three procedures are performed the **total consultation charge is \$950**. We do not bill separately for additional procedures, such as step sections through the paraffin block, tissue reprocessing, or special diagnostic studies including C4d staining. All charges have been determined to be justifiable based on the complexity of the procedures. They are reasonable compared to charges from other institutions, and are low enough for recovery of costs through primary site patient billing.

**Laboratory Certification Numbers:** CAP 13992-01, CLIA # 34D0655124. Federal Tax ID# 56-6001393.

**Important: the name of the entity for reporting tax information is The University of North Carolina not the Division of Nephropathology.**

UPIN: E29975 for Dr. Jennette, F43998 for Dr. Nickeleit, and F80182 for Dr. Singh.

NPI: 1881788511 for Dr. Jennette, 1598851990 for Dr. Nickeleit, and 1154417806 for Dr. Singh.

# 7 GLOMERULAR DISEASE COLLABORATIVE NETWORK

The GDCN was established in 1985 to enhance communication and research efforts between nephrologists and the UNC School of Medicine (division of nephrology and nephropathology unit). The GDCN is organized by the UNC Kidney Center and co-directed by Dr. Ronald J. Falk, Professor and Chief, Division of Nephrology and Hypertension and Dr. J. Charles Jennette, Professor and Chair of Pathology and Laboratory Medicine. The GDCN participants are approximately 300 nephrologists, most in private practice, from throughout North Carolina, Virginia, South Carolina, Georgia, and Florida. The foundation of the GDCN is the ongoing enrollment of patients at the onset of their renal disease and subsequent long term follow-up.

All nephrologists who submit renal biopsies to the UNC Division of Nephropathology are invited to participate in the GDCN and to enroll eligible patients into ongoing collaborative clinical trials. Annual GDCN CME events allow nephrologists who submit specimens to the UNC Division of Nephropathology to meet UNC faculty and to discuss patient care issues and upcoming clinical trials. This group has a great resource from which to derive useful information. Drs. R. Falk and P. Nachman from the UNC Kidney Center are available for clinical consultation and discussion of specific patient management issues if uncommon and challenging interpretations are rendered by the UNC Division of Nephropathology.

# 8 INQUIRIES

Please feel free to contact the Division of Nephropathology. We look forward to assisting you.

**HOURS:** Weekdays (except major holidays)  
8am-5pm Eastern Time

**PHONE:** (919) 966-2421

**FAX:** (919) 966-4542

**EMAIL:** [volker\\_nickeleit@med.unc.edu](mailto:volker_nickeleit@med.unc.edu)  
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[jcj@med.unc.edu](mailto:jcj@med.unc.edu)

For further detailed information, including downloadable referral forms, please visit our website at <http://www.uncnephropathology.org>