Description Goals and Philosophy for the Program (Official)

I. Education Goals and Philosophy for the Program

The Residency Training Program in Pathology at the University of California, Davis has as its broad mission the education of residents in training who seek specialization in anatomic and clinical pathology. The combined AP/CP Program is fully integrated and will, wherever possible, provide complete and comprehensive training in all subspecialty areas of Pathology, either at UCDMC laboratories (central or satellite) or at affiliates of the program. The primary emphasis of the program will be education. The educational mission will be carried out in the context of an academic medical center and will be designed to equip trainees with the necessary base of knowledge and practical experience to enable them to successfully pass the American Board of Pathology examinations in Clinical and Anatomic Pathology and to function as academic pathologists or practicing pathologists in the community. The service work in which residents will participate and be expected to complete, will form a part of the program designed to provide the requisite educational experience deemed necessary to meet the above goals. Additionally, residents will be encouraged, as they learn, to teach junior colleagues in the program, medical students, medical techology students and residents from other services. They will also be encouraged and expected to become involved in various institutional committees and councils pertaining mainly to the review of patient care, cost containment and laboratory management. Training and mentoring in these activities will be provided by the faculty and staff. Residents will become involved in scholarly activities and will be given assistance, instruction and guidance as to the design and interpretation of research with the expectation that each resident will complete at least one research project during their residency training program that will lead to presentation of this work at a national meeting and also to scientific publication, if possible. All faculty will be expected to participate in the fulfillment of the mission of the Residency Training Program.

II. Required Rotations: Description and Duration

A. Surgical Pathology – 15 months

The residents are on a 4-day rotation as follows:

- Day 1: frozen sections and grossing fresh/frozen specimens
- Day 2: gross routine/cancer specimens
- Day 3: sign out biopsy slides
- Day 4: sign out routine/cancer slides

On day 1, the resident is responsible for grossing all cases sent for frozen section and determining the appropriate tissue to submit for frozen section. This, of course, is done under the guidance of the attending. The frozen section is then reported to the surgeon and the resident may complete the grossing of the entire specimen or, if required, delay the grossing until day 2 to allow for overnight fixation. On day 2 the resident is responsible for grossing all specimens received by the grossing room between 8:00 am and 5:00 pm, as well as completing any cases pending from day 1. On day 3 the biopsies (grossed by pathology assistants), slides and paperwork, are usually available in the morning. The residents spend the morning previewing cases and reading appropriate texts. One on one biopsy sign out with attending is scheduled for the afternoon. Slides from the routines/cancer cases grossed on day 2 arrive in the afternoon of day 3 and the resident will preview the cases and order appropriate stains if required. Day 4, the resident meets with the attending for one on one sign out of routine/cancer cases.

The resident's responsibility increases with each month of time spent on surgicals. Initially, the resident will master the mechanics of surgical pathology by learning how to use the tools of the trade: gross examination, participating in sign-out and dictating cases. With time, the resident

will be able to handle all routine specimens by her/himself, increasing the responsibility for making the correct diagnosis. With time, the residents will demonstrate improved clinical understanding and capacity for consultation, conference presentation, and teaching junior residents. Eventually, the resident begins to function independently, producing finished reports, and handles complex cases with appropriate consultations from staff.

The director and faculty direct the training.

B. Autopsy Pathology – 4 months

During the residency program, the residents spend 4 months on the autopsy service. All autopsies are performed by residents with faculty supervision; microscopic evaluations are done with the same faculty member. Autopsy conferences are held on a monthly basis. Brain and spinal cord are removed on each autopsy cases that is not restricted. Autopsy brain cutting conference is held weekly, and the resident responsible for the autopsy case performs a gross evaluation before Neuropathology staff and reviews microscopic slides with the same attending. A final pathology report is expected within 60 days and includes the neuropathology evaluation.

In the course of learning autopsy procedures, the residents are introduced to various techniques and approaches to the autopsy including organ by organ dissection, en bloc removal, and the rapid or metabolic autopsy. Special examinations such as post-mortem injections or technical procedures at the autopsy table are taught.

As the resident becomes more capable of performing the autopsy and microscopic diagnosis, the faculty assumes a more supervisory rule. However, provisional diagnoses are always approved and signed by the attending faculty, all microscopic examinations are done with a faculty member, and the final report is reviewed and signed out by the attending faculty member.

C. Cytology – 3 months

While on cytology rotations, residents are involved in daily sign-outs of cytological material, are introduced to screening techniques for cervical smears, evaluate all nongynecologic cytology materials, perform and interpret all fine-needle aspirations, and review study sets and slides.

In the first month, the resident interacts directly with the cytotechnologists in learning techniques of PAP screening and evaluation of nongynecologic cytology preparations. All nongynecologic cases are previewed, then examined subsequently with one of three cytopathologists. Residents watch performances of fine-needle aspirates, eventually perform them with faculty guidance, and ultimately perform FNAs independently.

The second and third months of cytology entail progressively increasing responsibility on the resident's part in performing and interpreting FNAs. Cytologic materials are evaluated, reviewed with the cytopathologist, and dictated by the resident.

D. Forensic Pathology – 1 month

This rotation is at the Sacramento County Coroner's Office. Teaching is under the direction of four board-certified forensic pathologists who assume the responsibility for directing the resident's training in all areas of the forensic autopsy. Specifically, this includes demonstrating performance of forensic autopsies, the legal implications of post-mortem findings, and handling of evidentiary materials including toxologic materials.

Residents observe a variety of cases including homicides, drownings, motor vehicle accidents, suicides, and natural deaths. Residents are supervised by faculty in performance of forensic autopsies, most of which are done on natural death cases. Residents perform the examination and dictate all reports.
Residents perform up to 10-15 autopsies during the month in the Coroner's Office. Residents also attend trials where forensic evidence is presented in order to see how pathologic findings are dealt with in the legal system. You will also present a 45-60 minute Powerpoint presentation at the end of the rotation.

E. EM – 1 month

In the EM elective, the resident spends one month working with the Senior EM Technologist (Grete) and signing out EM cases with the attending who ordered the EM. The resident will review thick sections and determine the optimal areas for TEM. There are commonly two scope sessions per week during which the transmission electron microscope (TEM) photos are taken. Timely turnaround time is a paramount goal. Native kidneys are on the TEM in 3 days or less. 95% of the cases submitted for TEM are completed by the TEM lab in 4 days. After photos are taken, the resident will review the cases with the ordering attending, and dictate the reports (Dr. Ellis however likes to signout the EM later as an addendum, he has a system that he likes so review the neuro case and EM with him, then give him the case). There are also old cases (back to 1973), textbooks and study sets to review. If interested, you can ask the EM lab about other EM equipment and techniques, which are available and routinely used in the research mode.

F. Blood Bank – 4 months

Training in blood banking begins with the Medical Technologists and Directors presenting didactic lectures on the basics of blood grouping, cross matching, and transfusion reactions in addition to laboratory training with the blood bank technologists. The next three months of rotation in blood banking are spent at UCDMC except for two weeks at Sacramento Blood Source (donor acquisition, blood processing, HLA testing). The bulk of the training consists of didactic sessions with the director, bench work, and evaluating transfusion recommending blood products, assessing incompatibilities and reactions as the rotations progress. The residents are closely supervised by both the director and the technologist supervisors.

The blood bank rotation may include apheresis responsibilities, including being on-call.

G. Hematology/Immunology – 6 months

The objectives of the program in hematology/immunology are designed to train pathologists who will be future practitioners or academicians giving them the opportunity to develop new skills and exposure to new developments in the field of hematology especially in the areas of flow cytometry, optical biology, cytogenetics and molecular biology.

The program is designed to give a broad experience in diagnostic and clinical laboratory hematology to the pathology residents rotating on the service. The residents in hematology are trained in the processing and interpretation of peripheral blood smears, bone marrow aspirates, biopsies and lymph nodes. Since hematopathology is primarily a lab-based sub-specialty, the resident rotating on service must be well-trained in the utilization of modern diagnostic techniques and in the operation of a laboratory. This includes familiarity with a full range of standard coagulation procedures, immunopathology, hemoglobin, analysis including HPLC and

hemoglobin electrophoretic procedures, molecular biology, special histochemistry, cytogenetics, hematology instrumentation, quality control, and laboratory management.

In addition, the resident will interface with the clinical services (especially the hematology /oncology service) aiding in the diagnosis and care of patients.

The pathology resident on service will be actively involved in the work-up and interpretation of hematologic tissue (primarily lymph nodes and bone marrow) at UCDMC. The resident will participate in the surgical pathologic examination of relevant hematologic tissue including gross examination. There is frequent interface in case work with dermatopathology, gastrointestinal pathology and neuropathology. Frequently, the hematopathology service with the resident or fellow is often asked to "take over" the work up of complicated cases with hematopathologic facets from other pathology services. All findings and conclusions are presented to the hematopathologists and relevant pathologists for finalizing the pathology reports and diagnoses.

Formal immunopathology sessions encompassing both flow cytometry and surgical pathologic read-out sessions are held at least four times weekly. In addition, formal review of peripheral smears, body fluids, and hemoglobin analysis are also held four times weekly.

H. Clinical Chemistry/Toxicology – 4 months

CLINICAL CHEMISTRY
Modular Resident Training Program (MRTP)

Concept
The MRTP is based on resident background, proficiency, and modular topics. Each topic is 1 week in duration. Residents complete 7 core areas and at least 3 electives, for a total of 10 or more topics. Core areas have problem solving clinical correlates that the residents complete during the rotations. The instruction in continuous quality improvement and management is tailored to the program at the site of training. Overall, Clinical Chemistry training is 16 weeks in duration with individual rotations of 8 or 4 weeks.

Objectives

Type	Objective	Required	No. Available
Core Areas	Basic Competency	7 weeks	7 topics
Electives	Consultative Skills	3 weeks	9 topics
CQI & Management	Profession Experience	Continuous	Continuous

Core Areas (in recommended order)
1. Chemometrics (Quantitative Laboratory Medicine)
2. Electrolytes
3. Enzymes, Heart, and Liver
4. Immunoassays and Their Use in Clinical Diagnosis
5. Advanced Markers of Myocardial Injury
6. Assessment of Renal Function
7. Acid-Base Balance and Acid-Base Disorders

- *Learning Objectives:* Achieve basic competency in all seven-topic areas
  Complete problem solving clinical correlates

Electives

1. Adrenal
2. Automation and Robotics
3. Molecular Markers of Malignant Neoplasms
4. Nucleic Acid Biochemistry and Diagnostic Applications
5. Nutrition and Trace Elements
6. Point-of-Care Testing
7. Pregnancy and Fetal Maturity
8. PTH and Calcium Metabolism
9. Thyroid

- *Learning Objective:* Develop consultative skills in at least three elective areas

Continuous Quality Improvement (CQI) and Management Projects

1. Quality Control, Proficiency Testing, and Accreditation
2. Disorders of Lipid Metabolism
3. Electrophoresis Interpretation
4. Monitoring Hepatitis Testing

- *Learning Objective:* Provide professional enrichment in individual laboratories

Performance Criteria

In the core areas, the resident should demonstrate: (1) mastery of basic information during tutorials with faculty, and (2) progressive improvement in the quality of responses on the problem solving clinical correlates until a 70% proficiency is achieved. In the elective areas, the resident should demonstrate understanding of clinical examples obtained from texts, literature, sites of training, or on-call experience. In the CQI and Management areas the resident should work with faculty to define and successfully complete projects relevant at the site of the rotation.

I. Microbiology – 4 months

The primary role of the resident in microbiology at the completion of his/her rotation is to act as the liaison between the Microbiology Laboratory, the ID service, and the medical/surgical staff. In this capacity, the resident must be familiar with all relevant aspects of bacteriology, mycology, mycobacteriology, parasitology and virology in order to provide timely consultative services. The resident also monitors test requests for optimal laboratory utilization, and provides feedback to the housestaff regarding inappropriate ordering and specimen collection problems.

Specifically, the training consists of two months in bacteriology that include didactic sessions of each topic (e.g., enterics, anaerobes) followed by bench setup, reading plates and reactions and finally, unknowns. Emphasis is on antibiotic sensitivity determination. The next two months include dictation and bench training in virology, parasitology and mycology, and latter of which includes known specimen identification.

The responsibilities of the resident are progressive throughout the rotation. They progress to the point where the resident is able to serve as a consultant to the housestaff. Training is the responsibility of the area director and senior technologists.

J. Informatics – 1 month

The resident learns about the practical issues of management including laboratory organization and operation, budgeting, data processing and quality control/quality improvement.

K. Molecular Diagnostics/Cytogenetics – 1 month

This rotation is at UCDMC, your contact persons are Sandra Hatcher and Dr. Jeffery Gregg. It is a good idea to talk to them a few days ahead of the rotation, to plan out your time during the molecular/cytogenetics month. The resident will learn specimen collection, laboratory techniques, clinical applications and interpretation of test results for both disciplines. For molecular pathology, laboratory techniques include DNA and RNA extraction, enzymatic amplification, gel electrophoresis, hybridizations techniques, and array technology. For cytogenetics, laboratory techniques include harvesting and appropriate staining of blood, bone marrow, solid tumor and amniotic fluid specimens. It also includes fluorescent in situ hybridization (FISH). The resident will review interpretative reports and signout with Dr. Gregg. A small project can be initiated during this month if you are interested.