

Transformation in Education and Practice

Since 2001, the American Society of Cytopathology (ASC) has been investigating the challenges within the cytology profession. Led by the Multidisciplinary Steering Group and the ASC Executive Board, this process involved surveys and consultations with peer organizations and non-pathology stakeholders. These efforts culminated with a Summit in November 2009, with the subsequent findings and recommendations published in the [Future of Cytopathology White Paper](#). A newly formed Task Force on the Future of Cytology whose members were appointed by Dr. Hormoz Ehya, ASC President, will review the findings and recommendations outlined in this White Paper.

One of the goals of the Task Force is to bring to the ASC membership the transformation currently evolving in the profession. Contributors have been invited to share their experiences, successes and challenges for this new column in *The ASC Bulletin*, Transformation in Education and Practice. This column will feature articles from training programs and laboratories that are undergoing transformation by incorporating approaches that innovate and create significant changes in what we do and how we do it. We hope you find their stories inspirational

Sue Zaleski, M.A., SCT(ASCP), Co-Chair, Task Force on the Future of Cytology

Transformation in Cytotechnology Education at The University of North Carolina-Chapel Hill Campus

Allen C. Rinas, M.S., SCT(ASCP), CMIAC

Division Director, Cytotechnology Program, Clinical Assistant Professor; Departments of Allied Health Sciences, and Pathology and Laboratory Medicine
University of North Carolina at Chapel Hill

Program Description

The Cytotechnology Program at the University of North Carolina is transitioning from a three semester Post Bachelorette Certificate Program to a Masters Degree Program in Diagnostic Cytology (MDC).

Program Changes

The courses added to the new Masters Degree program are courses that currently exist on campus and are shared courses with the Masters Degree Program in Molecular Diagnostics (CLSC courses) and the Ph.D. program in Molecular and Cellular Pathology (PATH courses). The Molecular and Cellular Pathology (MCP) program focuses on experimental pathology with a translational research mission while the Molecular Diagnostics program focuses on molecular procedures utilized in the medical microbiology laboratories. All cytology courses from the Certificate Program are retained to insure a strong base in cytomorphology education. This was a concern expressed by the Communities of Interest. The pathology courses include laboratory sessions that build on histopathology and molecular



**Allen C. Rinas, M.S.,
SCT(ASCP), CMIAC**

continued from page 123

pathology, which strengthens cytology skills related to cell block interpretation, immunohistochemistry, and cytology-pathology correlation. The cytotechnology students also attend Surgical Pathology, Autopsy and Neuropathology conferences, Pathology Grand Rounds and Tumor Board sessions.

The transition includes adding 13 credit hours of biotechnology courses (from the CLS and MCP programs) with application of this information to cytologic testing in cell block, and histopathology specimens. In situ Testing (FISH, CISH) and other markers that improve sensitivity and specificity will increasingly become routine practice in full service cytology laboratories. The goal is to better serve patients by preparing graduates for the expanding role of molecular testing and to offer more diverse employment opportunities. The future direction of medical practice will demand laboratory tests that are more sensitive and specific, and performed on smaller (less invasive) samples. Due the intense and highly specialized training involved, the Program admits 12 students (6 students per year).

Curriculum

YEAR 1

Fall Semester (16 Hours)

CYTO 710 Gynecologic Cytopathology,	4 credits
CYTO 710L Gynecologic Cytopathology Laboratory (Molecular incorporated)	5 credits
CYTO 720L Clinical Practice in Cytopathology 1	2 credits
<i>PATH 713 Mechanisms of Disease (added course)</i>	3 credits
<i>PATH 714 Mechanisms of Disease Laboratory (added course)</i>	<u>2 credits</u>
	16 credits

Spring Semester 2011 (17 Hours)

CYTO 730 Diagnostic Cytopathology 1, (Non-GYN Cytology)	5 credits
PATH 464 Light Microscopy (includes Fluorescent microscopy, laser capture)	3 credits
<i>PATH 715 Systemic Pathology (added)</i>	3 credits
<i>PATH 716 Systemic Pathology Laboratory (added)</i>	2 credits
<i>CLSC 730 Research Methods (online course) (added)</i>	3 credits
CYTO 750L Clinical Practice in Cytopathology 2	<u>1 credit</u>
	17 credits

Summer Session (**Both summer courses are online**)

<i>CLSC 710 Principles of Molecular Diagnostics</i> (Summer Sessions 1 & 2)	3 credits
CLSC 650 Clinical Laboratory Administration (Summer Session 1 only)	<u>3 credits</u>
	6 credits

YEAR 2

Fall Semester (15 or 16 Hours)

CYTO 750 Diagnostic Cytopathology 2 (Non-GYN Courses)	4 credits
CYTO 760 Diagnostic Cytopathology 3 (Non-GYN Topics)	3 credits
CYTO 801 Independent Study	3 credits
CLSC 770 Elective	2 or 3 credits
CYTO 755L Clinical Practice in Cytopathology 3	<u>3 credits</u>
	15/16 credits

Spring Semester (15 Hours)

CYTO 799 Clinical Practice in Cytopathology 4	10 credits
CYTO 740L Laboratory Techniques (Cyto, Molecular lab rotation)	4 credits
CYTO 800 Comprehensive examination and review	<u>1 credit</u>
	15 credits

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continued from page 124

Communities of Interest

Incorporating biotechnology education in cytopathology is needed to keep pace with the growing demand for molecular testing in Anatomic Pathology, which is influencing all areas of clinical laboratory medicine. A survey of North Carolina cytology laboratories (which included administrators, pathologists, managers, supervisors and cytology staff) was conducted. There was overall strong support for the MS transition. Ninety-eight percent (98%) of respondents recommended that traditional cytology courses be strengthened or maintain the same level of training. Only 2% of respondents felt that GYN training could be reduced. Data from this survey also indicated that a steady number of cytology positions are expected to open within the next 10 years, making employment outlook very favorable. The Cytotechnology Program Advisory Board favored the Masters Degree option. Both Advisory Board members and cytotechnology survey responders expressed the desire that the added courses in the MS Program be offered to former Certificate Program graduates on a part-time basis leading to a Masters Degree.

The Board of Trustees of the University of North Carolina made a unilateral decision to phase out certificate programs, providing them with the options for transitioning into graduate or undergraduate degree programs, operate as independent programs or close. Decisions made for each certificate program are based on justification of need and availability of funding, a major challenge for smaller programs. This was the most significant driving force for the program transition.

Program Goals

The MS degree program furthers the mission of the Division of Cytotechnology, which is *“to prepare competent diagnostic cytologists with the knowledge, skills, and attitudes that are required to fulfill current and future professional roles and leadership positions as members of the health care team.”* The MS curriculum includes courses in education, management, and research to help full-fill this mission. Graduates of the MS program wishing to pursue greater research interests may apply to the Molecular and Cellular Pathology program and receive full credits for courses completed in the MS degree program. They may also opt to complete the on-line MS degree program in Molecular Diagnostics while employed as a cytotechnologist.

Student Recruitment

The Program will enroll candidates with a Bachelor’s Degree (from any accredited college or University), with 20 semester hours of Biological Sciences, 8 semester hours of Chemistry, and 3 hours of mathematics (statistics highly recommended). Prerequisite courses include microbiology, genetics, cell biology (or equivalent) and biochemistry. Recommended courses include biotechnology courses, cell physiology, molecular genetics, pathology, anatomy and histology. A GRE exam is also required. No changes in student recruitment efforts are planned. The Department of Allied Health Sciences currently offers recruitment support for all Allied Health Programs. Most of the applicants learn about the program from the program web pages or other on-line resources. It is too soon to determine if there will be an increase in the applicant pool for the MS program, as the web pages have not been developed at the time of this writing. This Program is on schedule to start in August 2011.

Program Support

The Program is well supported by the Associate Dean of the School of Medicine who is also Chairman of the Department of Allied Health Sciences. New office and laboratory space has been provided. The Department of Pathology continues to offer exceptional support for the program by providing laboratory and office space for the 2nd year class, full funding of the Medical Director, as well as lecture support from as many as five pathologists and two geneticists from within this Department. The Molecular and Cellular Pathology Program offered by the Department of Pathology has made exceptional accommodations to include cytotechnology students. The Division of Clinical Laboratory Sciences is also supportive

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continued from page 125

by allowing students to take courses that are part of the MS degree in Molecular Diagnostics. Clinical affiliates offer strong support by writing support letters, and agreeing to accept students for clinical training in the cytology, and molecular diagnostics, and cytogenetics laboratories. Efforts will be made to affiliate with translational research programs that develop tumor markers. The Cytotechnology Programs Review Committee (CPRC) has reviewed the summary proposal of the MS curriculum and issued a letter of support for the transition which was included as supporting documentation to the University.

A biotechnology grant has been submitted to assist with start-up funding for the purchase of seven microscopes, a teaching microscope, supplies and equipment for the molecular techniques courses.

Greatest Hurdles

The greatest hurdles encountered are funding, funding, funding, and faculty. There will be a need to hire an educational coordinator to assist with the program. The biotechnology grant (if funded) donations from alumni and vendors and development funds will be used to launch this new program. A growing need for cytotechnologists and the ability for greater multi-skilled employment opportunities help with justification of need. Graduates of the Program will have the advantage of seeking employment in translational research facilities that strive to develop in situ molecular markers for cancer diagnosis and or tumor progression, cytogenetics and molecular diagnostics laboratories.

These challenges are met by supportive departments, strong clinical affiliation relationships, grant submission, and development funding. Planning a degree program requires extensive documentation and justification, graduate school committee reviews, surveys of the communities of interest, and other details required by the University. Fortunately the Department has granted the Program Director time with no classes to complete this effort. At the time of this writing this Program awaits the final review and approval of the Academic Council scheduled in August 2010. Once approved, student recruitment and final preparations can begin. ■

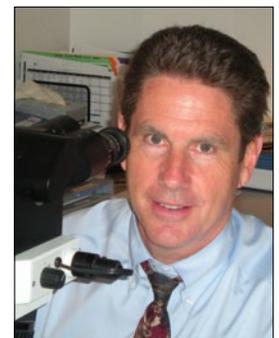
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Transformation in the Cytopathology Laboratory at the University of Rochester Medical Center

Michael S. Facik, M.P.A., CT(ASCP)
Chief Supervisor, Cytopathology Laboratory
University of Rochester Medical Center
Rochester, New York

Current Trend

The University of Rochester Medical Center in Rochester, New York is a 700 bed tertiary care teaching hospital. The cytopathology department is composed of 10.6 staff cytotechnologists (CT), five cytopathologists, three cytopreparatory technicians, and four additional support staff. Our laboratory is experiencing what seems to be the current trend in many cytology laboratories across the country - decreasing Pap test volumes and greater emphasis on concurrent human papillomavirus (HPV) testing. However, as a major university teaching hospital, our non-gynecologic volume has grown



**Michael S. Facik, M.P.A.,
CT(ASCP)**