Developing and Fostering a Dynamic Program for Training in Veterinary Pathology and Clinical Pathology

VETERINARY STUDENTS TO POST-GRADUATE EDUCATION

Michael Lairmore, Thomas Rosol, Steve Weisbrode, Michael Oglesbee, Paul Stromberg, and Maxey Wellman

Department of Veterinary Biosciences
The Ohio State University
Columbus, Ohio

2005 OSU Training Program
Training in Veterinary Pathology and Clinical Pathology

College and Department Overview
Michael Lairmore – Department Chair and Associate Director for Basic Sciences, Comprehensive Cancer Center

Graduate Program and Pathology Training
Michael Oglesbee – Graduate Studies Chair
Paul Stromberg – President Elect ACVP and ACVP Exam Coordinator
Training in Veterinary Pathology and Clinical Pathology

- **Elements of the Program**
  - People – Faculty, Staff, and Students
  - Culture – Attitude, Teamwork, Rewards
  - Environment – Support, Structure, Administration
  - Organization – Goals, Plans, Funding
Faculty

- Critical Mass of Pathologists
  - 9 ACVP Boarded Anatomic
  - 3 ACVP Boarded Clinical Pathology

- Emphasis on Excellence
  - Systems Focus
  - Networking to resolve diagnosis & problems
  - Communications
Recognition of Contributions in Department, College, University, and Nationally

Dr. Cole Receives University Distinguished Service Award

Dr. Clarence Cole was honored by his colleagues at a College reception and presented with the University Distinguished Service Award at Summer Quarter Commencement. Dr. Cole has served the University as Department Chair (Veterinary Pathology), Associate Dean for Research and Dean (College of Veterinary Medicine), and Regents Professor from 1947 through 1985. But titles alone do not begin to reflect the accomplishments of Dr. Cole or provide insight into the outstanding service he has rendered.

Dr. Oglesbee to Receive Graduate Teaching Excellence Award
Staff

• Support for Residency Applications, Graduate Student Coordinator, Coursework, Recruitment, Grant Applications, Educational Resources, Pathology Image Collection, Records, Sample logistics, Occupational Health requirements, etc.
Students

- Active recruitment of DVMs with background consistent with goals of program
- Graduate student involvement in recruitment
- Respect for their time, listen to their needs
- Expectation of independent problem solving with structure
Environment – Support, Structure, Administration

- Competitive Stipends, Incentives for Fellowships
- Clear Program Guidelines e.g., Graduate Handbooks, Course plans, seminars, etc.
- Strong Administrative Support e.g., Career days, equipment, travel, etc.
Culture – Attitude, Teamwork, Rewards

- Faculty, staff, and students with strong sense of purpose
- Positive feedback with constructive criticism
- Key faculty leaders with strong sense of team
- Respect for colleagues

Research achievements of students celebrated - Distinguished Graduate Awards
Education Program Structure

- Program from veterinary student electives to courses for residents/graduate students is *faculty intensive*

- Faculty STRONGLY encourage and require independent study and self-directed learning, at every stage of program

- Experienced faculty are prepared to guide the student and help evaluate their progress

- One-on-one mentoring and interactive small group seminars from first elective for veterinary students to post-DVMs
Financial Support-Stipends

- **Stipend support** provided by the faculty mentor’s research funds. Additional sources of funding on a competitive basis including:

  **Training Grants**
  - Mouse Pathobiology
  - Oncology

  **University Fellowships** (Graduate School)

  **Department**
  - Pathology Residency Programs
  - Veterinary Anatomy Graduate Teaching Associate

  **Corporate-sponsored Fellowships**

  **College of Veterinary Medicine - Barber Charitable Trust**

  Strong record of obtaining graduate fellowships from federal agencies (e.g., National Institutes of Health): Mentored Clinical Scientist Development Award (K08), Special Emphasis Research Career Award (SERCA) National Research Service Award (NRSA)
Graduate Program Objectives

1. Provide a learning environment in which the resident/graduate student will become competent in diagnostic veterinary pathology, principles of pathobiology, and complete training for certification by ACVP

2. Develop and promote an academic environment in which the resident/graduate student can be introduced to skills in experimental design, research methods, and scientific writing to fulfill requirements for MS or PhD degree

3. Provide opportunity for teaching experience by assisting Departmental faculty in instruction
Overview of Pathology Training

- Heavy emphasis on diagnostic training for first year
- First year students are required to present monthly selected cases from AFIP
- Variety of system-based seminars with clinicians e.g., “Brain Trim”
- Weekly histopathology and research seminar required
- Informal rotations with potential faculty mentors for Ph.D. training
Overview of Pathology Training

- Year 2 and beyond-Diminished time on necropsy floor but more focus on proficiency in diagnostic pathology by:
  - 1. Surgical biopsy service
  - 2. Rotating on weekend necropsy
  - 3. Weekly Histopathology Slide Seminar
  - 4. Formal 3 quarter course in diagnostic pathology offered every other year
  - 5. Systems based pathology conferences with clinical specialists—e.g., dermatopathology, neuropathology, cardiac
  - 6. Independent study of literature
  - 7. Independent study of histopathology study sets maintained by an Educational Resource Staff Member
  - 8. Independent and faculty supervised study of gross pathology study slides
Overview of ACVP Board Preparation

- Board Preparation
  - Individual 12 month preparation plans with goals for didactic reading, review of clinical materials, mock histopathology and clinical pathology exams, and intensive one-on-one instruction.
  - Training is supplemented with seminars and intensive student-faculty interactions in necropsy, surgical pathology, clinical chemistry, cytology, and hematology.
Overview of Graduate Program
M.Oglesbee

Training environment

- Health Sciences Center- College of Veterinary Medicine is part of one of the largest Health Sciences Centers in the United States

- Graduate programs synergistic with our training program

Current Enrollment in VBS Graduate Program
- 79 total students
  - 62 Veterinary Biosciences
  - 10 Molecular, Cellular, & Developmental Biology
  - 5 Biochemistry Graduate Program
  - 1 Integrated Biomedical Scientist Program - Medicine
  - 1 Biophysics
DVMs in Training Program

- DVM graduate students
- (Total = 31)*
  - Pathology trainees: 16
    - 3 Clinical pathology
    - 13 Anatomic pathology

*Additional 9 combined degree students (i.e., DVM/MS)
Graduate Faculty Statistics

Graduate faculty = 48

- Departmental = 32

- Board certification, by discipline
  - 3  ACVP (clinical path)
  - 9  ACVP (anatomic path)
  - 1  ECLAM (European Lab Animal Med)
  - 1  ABCC Veterinary Clinical Pathology
  - 1  ACVM
  - 3  ACVIM

* ACVIM Translational Oncologists Oct. 1, 2005 and 2 active faculty searches in Immunology of Infectious Disease and Physiology/Toxicology
Faculty Appointments and Areas of Study

Joint appointments = 16
- 2 Veterinary Clinical Sciences
- 10 College of Medicine
- 1 College of Pharmacy
- 3 Childrens Hospital

Areas of Study
- 17 (Patho)Physiology/Pharmacology
- 16 Infectious disease/Immunology
- 13 Oncology/Cancer Genetics
- 1 Biomaterials
- 1 Protein Chemistry
Recruitment

Recruitment of DVM trainees

- Program Reputation and Referral
- National Advertisement e.g., website
- Annual ACVP Reception and Alumni
- Research Programs – Direct Recruitment
- Graduate Students in Program
- Pathology Club
- Summer Research Experience
- Dual DVM/MS graduate program
- Veterinary Research Day

Average duration of program is ~ 5 yrs

Most trainees are directly from vet school or 1-2 yrs of private practice
Current Support Pathology Trainees

Current pathology trainees (Total = 16)

- 1 NIH K08
- 5 NIH T32 (Mouse Models of Human Disease)
- 1 NIH T32 (Comprehensive Cancer Center)
- 1 National Multiple Sclerosis Foundation
- 1 Barber Endowment
- 5* Investigator research funds (NIH)
- 2 Departmental Funds

* One position is supplemented by a University Fellowship
History of Extramural Awards

Extramural awards for graduate students
1990-present (total = 31; 26/31 were DVM pathology trainees)

- 9 NIH K08 (Mentored Clinical Scientist Development Award)
- 3 NIH K01 (Special Emphasis Research Career Award)
- 9 NIH F32 (Individual National Research Service Award)
- 8 NIH T32 (Institutional National Research Service Award)
- 1 National Multiple Sclerosis Society
- 1 US Army Postdoctoral Research Fellowship
Veterinary Students – Beginning the Journey

- Basic pathology courses must be taught in an engaging and interactive manner
- Electives in pathogenesis of disease are critical in attracting veterinary students into the discipline of pathology
- Support and nurture Path Club and provide faculty mentors
Veterinary Student Electives

- **Basic Pathology** - Basic histologic changes tissue in context to disease. Each student - a slide study set and a microscope. Course attracts those seriously interested in pathology as well as those fascinated with mechanisms.

- **Introduction to Applied Pathology** - Correlation of macroscopic and histologic findings in diseases. This generates excitement and interactions.

- **Basic Macroscopic Pathology** - Interpretation of macroscopic tissue changes in diseases of domestic and exotic animal species, with correlation to pathogenesis - attracts students NOT considering pathology - knowing that interpreting gross lesions is important in clinical practice.

- **Individual studies** offered to single students or groups of students usually using histopathology slide-based case material.
Gross Pathology Training

- Required Coursework for Anatomic Pathology Residents
  - VBS 718 Advanced Gross Pathology (necropsy)
    - ~ 3 hours per day, 2.5 days per week and a Saturday morning approximately every 2-3 months
  - Conducted with faculty pathologist
  - Average case load is 6 per day - first year of the program, majority of time in Applied Pathology at Department or at the Ohio Department of Agriculture Animal Disease Diagnostic Lab (ADDL).
Surgical Pathology Training

- VBS 815 Veterinary Surgical Pathology (2nd year and beyond on volunteer basis) ~ 2 hours per day, 1 day per week.
  - Daily phone report to the Veterinary Hospital
  - Completing final reports in consultation with faculty pathologists
  - Average case load is 5 per day
Research and Histopathology Seminars

- VBS 850 Research Seminar and VBS 800.02 Veterinary Histopathology Seminar - both required
  - Requires intense preparation
  - 2 to 3 times per year, residents rotate with faculty as the seminar moderator
  - Research progress seminar presented by each graduate student yearly
Systemic Pathology Course

- VBS 810, VBS 811, VBS 812
  Advanced Systemic Pathology I-III. An advanced study of animal diseases, all organ systems

- Other graduate courses selected by the faculty advisor and student (in consultation with advisory committee) as being necessary

- Key is flexibility to student needs
Course Plan Clinical Pathology

- Required Coursework for *Clinical Pathology Residents* over the 12 Quarter/3 Year Program

- VBS 739 Laboratory Medicine
  - Advanced training in hematology, cytology, and clinical chemistry; independent study in methods

- VBS 800.01 Seminar in Veterinary Clinical Pathology
  - Case presentation and preparation of visual aids

- In addition, VBS 850 (Research Seminar), VBS 800.01 (Histopathology Seminar), VBS693, and VBS 999 (thesis research)
Clinical Pathology Service

- Cytology service duty
  - First-year residents - review all cytology cases and hemograms selected
  - First-year residents complete a preliminary write-up on cases, reviewed by the faculty
  - Second and third year residents assigned cytology duty based on discussions with faculty and research advisor
Evaluations

- **Evaluation of the resident/graduate student:**
  - Course work
  - Quality of work-ups on cases and presentations
  - Annual research progress updates and final research report
  - Defense of thesis

- **Selection of an advisor:**
  - Students rotate through research laboratories
  - Students provided a list of eligible faculty
  - 3 rotations of ~ 4 weeks in duration
Quality of Pathology Program

Selected Indicators

- Publications in High Quality Scientific Journals
- Highest ACVP Board Pass Rate
- Prestigious Fellowships & Awards e.g., NIH
- ACVP awards e.g., Casey Scholarship
- Job Placement in Leadership Positions
Overview of ACVP Board Preparation and Integration of Training
P. Stromberg

Program Goals – Research Prepare to become an independent modern biomedical research scientist capable of competing for NIH funds or work in discovery or safety assessment division of pharmaceutical or biotechnology companies

a. State of the art hypothesis driven research; problem solving, “Good Science”

b. Modern research methods – develop molecular skills

c. Obtain graduate degree - ~ 3-4 chapters published in high quality peer-reviewed journals for PhD.
Program Goals – Pathology & Communication

Develop veterinary pathology skills and literature sufficient to prepare for success on the ACVP certification examination; multitasking, organizational ability

Enhance oral and written communication skills

multiple opportunities to write, present and interact each year of training
Activities to Enhance Training

Weekly histopathology conference –
aka AFIP Wed slide conference – student written and oral presentations, discussion. Faculty and student driven

Biweekly gross photo conference — Systematic review of gross lesions in animals. Faculty driven

~ Monthly gross photo review –
Critique of all photos taken on service pathology by students & faculty. Faculty driven

Monthly shared gross path conference with state diagnostic lab staff — staff driven
Activities to Enhance Training

Monthly Special Pathology Conferences -

Clinical & pathology faculty as well as student driven.

Integrated clinicopathologic approach
a. Dermatopathology “Rounds”
b. Cardiovascular pathology
c. Renal pathology
d. Neuropathology – “Brain trim”
e. Ophthalmic pathology
f. Lab animal pathology
g. Zoo pathology
Activities to Enhance Training

Weekly Research Seminar
Student participation – proposal, progress, final, reports; faculty, invited & visiting scientists

Formal Course Work – *minimal*
1 yr systemic vet path course. Most students take statistics, molecular genetics and whatever they and their research advisor think they need.

*Philosophy = “Graduate school is a time to learn how to teach yourself”* Learn self sufficiency and develop confidence!
Keys to Success

“How do you keep path skills growing during the research years”

1. Shared surgical pathology participation
   ~1 day/wk for blocks for adv students
2. Shared weekend necropsy duty ~ 4-5/yr
3. Participation in special pathology conferences – most have minimal prep time
4. Individual consultation with faculty – ad hoc
5. Self driven literature study – texts, journals.

“Its never too early to think about the exam”
How Are the Goals Reached?

**Research skills** – research advisor driven lab experience. Observation of research in seminars. Interactions with other research scientists. Attendance at national meetings.

**Pathology skills** – service pathology experience, pathology conference participation, faculty guided self study of literature, AFIP sets. CE and board prep courses encouraged.

**Communication skills** – research proposals, publications, path reports, clinician-client interactions, seminar preparation and presentations.
Preparation for the Board

- Organization of final 12 month course of preparation.
  - References, organization, a study plan, short term goals
  - Meet periodically to assess and teach how to triage articles
  - Meet every 2 weeks to review gross pathology photos for 12 month period, last 2-3 months are done weekly
  - Meet privately to discuss individual issues
  - Starting July 1, each student takes a 10 slide histopath exam in 2 hours once/week for 10 weeks.
  - The exams are graded with comments and reviewed
  - Each student will describe 100 slides during 2-3 months
  - Help orientation about Ames and their travel plans
Determinants of Exam Success

“What does the student do with the resources offered in the training program”?  

**A key - Much of it is voluntary. Students may vary widely in their participation**  
(Other obligations, personal lives, external factors, research results, student motivation, abilities)  

But it **matters greatly because it impacts on the final year of preparation**
Philosophy and Commitment

“Why is this credential so highly valued?”
Job needs, supply & demand, value of the training

“Being a Diplomate implies”
Intelligent, broad biomedical view, mechanisms-oriented, high motivation, achievement/goal orientation, multitasking ability, organizational and communication skills; not afraid to accept challenges.

“It’s not just that they know a lot of pathology”
Conclusions

People – Faculty, Staff, and Students
Culture – Attitude, Teamwork, Rewards
Environment – Support, Structure, Administration
Organization – Goals, Plans, Funding

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