Microscope Upgrades for Veterinary Student Pathology Laboratories

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Matthew Brewer, DVM, PhD
Joseph Haynes, DVM, PhD, DACVP

PROPOSING UNIT:
Department of Veterinary Pathology, College of Veterinary Medicine, Iowa State University

PROJECT LEADER:

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**PROJECT METHOD AND PLAN**

*Purpose*

Microscopy is an integral component of student education in the Doctorate of Veterinary Medicine Program at the College of Veterinary Medicine. From an instructional perspective, many courses employ microscope-based materials for teaching. Professionally, microscopy is a required clinical competency for newly graduated veterinarians. As such, use of microscope technology throughout our curriculum simultaneously facilitates student education whilst providing an opportunity for veterinary students to develop this important clinical skill.

The Department of Veterinary Pathology teaches six courses in animal pathology and parasitology to approximately 600 veterinary students annually. Our central focus is helping students develop a solid working knowledge base of animal diseases. In particular, we emphasize the pathophysiology behind these disorders, as well as the appropriate techniques to diagnose them. As many animal illnesses are caused by microbes, we frequently use microscopic specimens of disease in our classroom instruction. Additionally, microscopic study allows students to appreciate the histopathologic and cytologic changes that occur in disease states. Currently we have 40 microscopes for veterinary student use in our two teaching laboratories. Twenty-six of these scopes were purchased in 1996, with the others being acquired before this time. Despite routine service of our microscopes, the optical components of many scopes have degraded such that visualization of microscopic samples is greatly compromised.

To replace our aging collection of scopes, we hope to purchase a new set of teaching microscopes for our veterinary students. In particular we would like to acquire 40 new Olympus CX23 microscopes, a scope designed for student education in biological specimens. Each CX23 comes equipped with 4X, 10X, 40X, and 100X objective lenses. The microscopic field-of-view is approximately 20% larger than our current scopes. The CX23 uses an energy efficient LED light source with an estimated lifespan of 20,000 hours. With routine maintenance, these microscopes have an estimated lifespan of 15-20 years of instructional use. Cumulatively, we believe the CX23 will be an excellent successor microscope and enable us to continue teaching with microscopic specimens in our pathology courses.

*Impact on Student Experience*

We believe the addition of these new microscopes to our teaching laboratories will positively impact the professional development of many veterinary students for numerous years to come.

From an instructional perspective, these microscopes will be used in six required courses for our veterinary students. These classes are taught by over a dozen faculty members annually throughout all four years of the veterinary student curriculum:
<table>
<thead>
<tr>
<th>Year in Veterinary Curriculum</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>VPTH 342 Anatomic Pathology I</td>
</tr>
<tr>
<td>Year 2</td>
<td>VPTH 372 Anatomic Pathology II</td>
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<tr>
<td></td>
<td>VPTH 376 Veterinary Parasitology</td>
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<tr>
<td>Year 3</td>
<td>VPTH 409 Introduction to Veterinary Cytology</td>
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<tr>
<td></td>
<td>and Laboratory Techniques</td>
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<tr>
<td>Year 4</td>
<td>VPTH 456 Necropsy</td>
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<td></td>
<td>VPTH 457 Clinical Pathology</td>
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In our courses we use a variety of microscopic samples to help our students truly learn the nature of animal diseases. These samples include tissue biopsies, blood smears, cytology specimens, and fecal preparations. Nearly 600 veterinary students each year will use these new microscopes to visualize our teaching materials. Assuming an operational lifespan of 15 years, these microscopes may help educate nearly 2,250 future veterinarians.

Microscopy is also considered a necessary clinical competency for newly graduated veterinarians. Microscopes are frequently used in clinical practice for disease diagnosis and treatment monitoring in animal patients. In a single day a practicing veterinarian may evaluate numerous biologic samples, ranging from blood to urine to fecal material. With any professional skill, the best way to become proficient with a technique is practice. As we routinely use microscopes in our courses, we instruct students how to properly use this diagnostic technology. More importantly, our microscopic teaching materials effectively become opportunities for students to practice and hone their microscopy skills. These CX23 microscopes will ensure our students can continue developing their microscopy abilities, whilst using newer generation microscopes that will be similar to the microscopes they will use as practicing veterinarians.

With regards to access, all veterinary students in the College of Veterinary Medicine will have controlled access to these microscopes. The microscopes will be housed in our pathology teaching laboratories, 1778 and 2780 Vet Med. With permission from faculty, veterinary students may access these microscopes during non-instructional periods to evaluate teaching samples or practice their microscopy skills.

**Integration with Current University Infrastructure**

The CX23 microscopes can be seamlessly integrated into our teaching laboratories. No physical modifications to our laboratory spaces or classroom technologies will be needed. Eight microscopes will be used in 1778 Vet Med with the remaining scopes utilized in 2780 Vet Med. Concerning security, both teaching laboratories are routinely locked following classroom instruction. Access during non-instructional periods requires faculty permission. Additionally, locked storage cabinets for the microscopes are present in 2780 Vet Med. To ensure there is space for the CX23 scopes, many of our current teaching microscopes will be placed in departmental storage, offered to other departments in the college, or sent to university surplus.
**BUDGET AND JUSTIFICATION**

*Funding Sources*

The Department of Veterinary Pathology is willing to cover 20% of hardware costs and all shipping charges associated with purchase of the microscopes. $9,505 of departmental funds has been allocated for the purchase. We have requested, but were denied, funds from the College of Veterinary Medicine Computer, Library, and Information Management committee for acquisition of these microscopes.

*Hardware Maintenance*

The Department of Veterinary Pathology is willing to cover all annual upkeep and repair fees for these microscopes, and thus is not requesting any ongoing funding for hardware maintenance.

**Budget**

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<th>Item</th>
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<tr>
<td>Hardware</td>
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<tr>
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*Hazardous materials surcharge of 1.75% included per CAC Tech Starter Proposal guidelines.
Budget Justification

Hardware
Olympus CX23: The per unit cost for the Olympus CX23 microscope, following a 15% academic discount from Olympus, is $1,139. Each CX23 is equipped with an LED light source and 4X, 10X, 40X, and 100X objective lenses. We are requesting $37,086 for the purchase of these scopes, accounting for 80% of hardware costs. The Department of Veterinary Pathology has allocated $9,112 of departmental funds for the purchase of these scopes, representing the remaining 20% of the cost.

For more information on the CX23, please follow this link:
http://cache.olympus-lifescience.com/downloads/storage/847249684/CX23_en.pdf?__gda__=1452278549_c4d7a61ca96065bb1327d965407586d

Hazardous Materials Surcharge: The hazardous materials surcharge of 1.75% was added, per the CAC TechStarter Proposal guidelines. The total hazardous materials surcharge is $797; we are requesting $638 from CAC to cover this fee and the Department of Veterinary Pathology will cover the remaining $159.

Other
Shipping: No funds are requested to cover shipping fees for the microscopes. The Department of Veterinary Pathology has allocated $234 of departmental funds to cover the shipping cost.
Quotation # QT-US-M-101491
Quote title Olympus CX23 LED Student Microscopes
Date Dec 31, 2015

Bill to: Ship to: Iowa State University
Mary Hull
Veterinary Pathology
2764 Vet Med
Ames, IA 50011, United States

Expires Mar 29, 2016
Customer Ref # Joseph Haynes
Contact Name jhaynes@iastate.edu
Contact Phone (319) 333-8121
Contact Email Scott.Carpenter@olympus.com
Customer Fax TBD
Ship Via TBD
Payment Terms TBD
Payment Terms Conditions TBD
Currency TBD

Other Shipping Charge Y $234.00

P/N Description Unit Price Discount Net Unit Price Extended Price
CX23LFS1K CX23LEDRFS1; CX23SET, BI, 4/10/40/100XOB, EYEP, RTSTG, PWR, CVR 1,340.00 15% 1,139.00 45,560.00

Grand Total (USD) $45,560.00
Tax (6%) 2,733.60
Grand Total (USD) $48,293.60

Estimated tax of $2,733.60 will be
removed at time of purchase due
to ISU tax exempt status.
January 5, 2016

To: ISU CAC Committee

From: Lisa K. Nolan, DVM, PhD

Dr. Stephen G. Juelsgaard Dean of Veterinary Medicine

RE: Department of Veterinary Pathology Student Light Microscope Request

I highly support the request by the Department of Veterinary Pathology for a grant to purchase 40 new student light microscopes. Microscopy is an essential function in the College of Veterinary Medicine’s Doctor of Veterinary Medicine program with a large number of required and elective courses utilizing microscope-based materials for classroom instruction.

In order to continue to offer a high-quality education to our current and future DVM students, the department needs to replace their aging microscope inventory. The new teaching microscopes requested in the department’s proposal are specifically designed for student education in biological specimens and will be used on a daily basis by students for the next two decades.

Thank you for your consideration.