TOP OF THE FIELD
Veterinary technician specialists in clinical pathology have demonstrated a mastery of related skills by completing extensive continuing education, case logs, case reports, and more.

SPECIALTY SPOTLIGHT

VTS in Clinical Pathology

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For years, I felt like an outsider at work. My career path was different from my colleagues' because I fell in love with the science behind testing as a college student and began my career as a bench technician in a diagnostic laboratory soon after. When I heard there was a movement to form a clinical pathology specialty, I jumped at the chance to take the exam. Instead, I was invited to sit on the organizing committee. After meeting with fellow clinical pathology geeks who nerd out about the same things, I found that I was not the odd person out in veterinary medicine! There seems to be a similar profile for those who are passionate about collecting samples and performing laboratory testing. It is important to remember that clinical pathology is not just about performing diagnostic tests on animals; it begins with the sampling process and includes much more than merely running tests. I love "sticking things." I love to obtain the samples and process them to ensure optimum handling of samples from start to finish. All of these factors are what ensure that a veterinary technician specialist (VTS) in clinical pathology is improving the lives of patients.

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A detail-oriented personality is vital for successful completion of a VTS in clinical pathology. Throughout the process of diagnostic testing, a clinical pathology veterinary nurse/technician will ensure that the tests are reliable and the results truly reflect processes occurring physiologically within the animal.

THE BENEFITS OF A VTS (CLINICAL PATHOLOGY)

Monetary rewards may be possible depending on the practice. However, many benefits are intangible. A sense of belonging to a group, having a network of specialists to seek out validation of procedures, and gaining confidence in advanced skills become tools to improve the quality of care for patients. Specialized veterinary nurses/technicians are also sought to publish materials, present at conferences, manage quality assurance programs within clinics, and serve as a mentor to others in the field.[1,2] This further establishes bonds with others outside of one's place of work.[1,2]

HOW TO QUALIFY

The very first step to becoming a specialist in clinical pathology is to become a credentialed veterinary nurse or technician and then gain experience and completion of clinical pathology–specific continuing education (CE).[1,3,4] In the United States, applicants must be a graduate of an American Veterinary Medical Association (AVMA)-accredited veterinary technology program and credentialed as a veterinary nurse/technician in the state in which they live or work. Canadian candidates must be a graduate of a Canadian Veterinary Medical Association (CVMA)-accredited program and credentialed according to the requirements of their province. Applicants who reside and work in a state, province, or country that does not require credentialing as a veterinary nurse/technician may demonstrate a passing score on the Veterinary Technician National Exam (VTNE) or otherwise show proof of credentialing from their country.[1,3,4]

REQUIRED EXPERIENCE

Experience hours may begin once a candidate has become credentialed as a veterinary nurse/technician. Because a specialty goes beyond the initial credentialing process by requiring advanced skills and knowledge, this is mandatory.[3] Potential candidates will begin

TABLE 1 VTS in Clinical Pathology Requirements[1,5-11]

REQUIREMENT	
Credentialing as a veterinary nurse/technician	• According to state/province/country requirements, documentation by credentialing board • Demonstration of passing score on Veterinary Technician National Examination
Experience	3 years or 4000 hours, documented on Academy of Veterinary Clinical Pathology Technicians (AVCPT) forms
Clinical pathology–related continuing education	40 hours (10 hours in person, online interactive) documented by certificates and AVCPT forms
Skills mastery	100 core and 25 supplemental
Case logs	50 - Complete blood count
	25 - Chemistry
	25 - Urinalysis
	25 – Group A (coagulation, cytology, immunohematology)
	25 – Group B (microbiology, parasitology, coprology)
	20 – Group C (acid-base, serology, immunology, toxicology, other)
Case reports and forms	Hematology – Including blood films, test results, and relevant forms
	Chemistry – Including all relevant forms
	Urinalysis – Including all relevant forms
	Including quality assurance and quality control procedures for each case report
Standard operating procedures	For all skills
Statement of purpose	Narrative indicating source of interest in clinical pathology, aspirations, goals, and future contributions to the specialty
Letters of recommendation	2 sent separately to AVCPT, each from a different category
Application fee	Currently $50

logging experience hours collecting, processing, and reporting diagnostic results. For clarification, other tasks not related to clinical pathology during the regular workweek would not count toward these hours. An applicant will determine the approximate percentage of a typical workweek in which they spend performing clinical pathology–specific tasks and then multiply the total hours worked by this percentage to calculate experience hours.[5] The Academy of Veterinary Clinical Pathology Technicians (AVCPT) requires 4000 hours or 3 years of experience (**TABLE 1**).[1,3-5]

CONTINUING EDUCATION

As candidates are gaining experience, consideration regarding CE must also be made to ensure that 40 hours of CE relating to clinical pathology is obtained within the 6 years prior to submission of the application.[3] Courses may relate to sample collection or disease processes, which involve a significant amount of diagnostic testing (e.g., diabetes mellitus, metabolic acidosis/alkalosis, infectious diseases). CE can be obtained through RACE-approved events, national/local conferences approved by designated veterinary boards, and accredited veterinary technology programs or veterinary schools.[3,6] At least 25% (10 hours) must be obtained through in-person or online interactive means.[3] Other sources can include non-interactive webinars and printed sources. Proof of participation is to be included with the application packet.[1,3,4,6]

REQUIRED SKILLS

Specific skills related to clinical pathology must be mastered.[7] A candidate "must be able to perform the task safely, consistently with a high degree of success, and without being coached or prompted."[1] Veterinarians or a VTS who is most qualified to sign off on the skills will verify successful mastery.[7] As skills are mastered, cases will be logged and linked to the skills verification list.[7] Skills and logs come from a variety of diagnostic tasks in hematology, clinical chemistry, parasitology, urinalysis, coprology, cytology, serology, coagulation, microbiology, immunology, toxicology, and others as approved by the AVCPT Executive Board.[7,8] Up to 10 additional skills that are not already included on the skills form may be submitted to the executive board for approval. Case logs are maintained as an inventory of tests performed by the applicant.[1] Case logs are color coded to match skills and logs to help keep applicants organized and log tests and skills in the proper location (**TABLE 1**).[1,3,4,7,8]

CASE REPORTS

During the process of collecting and recording logs, candidates will pick 3 cases to write up a detailed narrative and fill in case report forms provided by the AVCPT. One case will have a significant emphasis on hematology, 1 will have a chemistry emphasis, and 1 will have a urinalysis emphasis. Case reports are created from an unusual or clinically abnormal patient from those entered into the case logs. Cases will include copies of test results, both a stained and an unstained blood film for complete blood counts, and information on quality assurance and quality control procedures.[1,3,9]

A significant part of completing tests reliably involves both developing and implementing standard operating procedures (SOPs).[2] This is where veterinary clinical pathology nurses/technicians go above and beyond the basics. As part of the application process, candidates are asked to include SOPs for every test included on the skills list.[10] Quality control methods for each test and quality assurance techniques are to be included with the testing procedures as part of the SOPs and in case reports.[9,10,11] It is imperative that veterinary nurses/technicians who desire specialization understand their importance and implement these methods.[1-3,10]

ADDITIONAL REQUIREMENTS

Once the bulk of the documentation is finished, the candidate writes a statement of purpose detailing their interest in clinical pathology, career path, aspirations, and goals, including a plan to contribute to the specialty.[11] Two letters of recommendation are sent to the AVCPT by 2 separate types of letter writers: a veterinarian, credentialed veterinary nurse/technician, AVCPT member, member of the American Society of Veterinary Clinical Pathology, or VTS in any of the other NAVTA-approved academies.[3] Finally, a signed waiver, release, and indemnity agreement and the application fee is included in the complete application packet, due by January 15 of the year the applicant plans to sit for the credentialing exam.[11] Once the materials are reviewed and approved by the credentials approval committee, the applicant is notified of their successful application and an exam fee is requested by July of that same year.[3] Candidates are notified of the exam format once the exam fee is received and the examination occurs in September/October.[3] Exam fees vary from year to year depending on costs associated with administering the exam and generally run from $100 to $200.[1,3,11]

CONCLUSION

If you have found yourself getting lost in the tiny, fascinating world of microscopic examination of fecal material, marvelously stained cytology, and blood slides or you love playing with bodily fluids from animals in general, this may be the niche for you! TVN

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NexGard®
(afoxolaner) Chewables

Brief Summary: Before using NexGard® (afoxolaner) Chewables, please consult the product insert, a summary of which follows.

CAUTION: Federal (USA) law restricts this drug to use by or on the order of a licensed veterinarian.

Description: NexGard is a soft chewable for oral administration to dogs and puppies according to their weight. Each chewable is formulated to provide a minimum afoxolaner dosage of 1.14 mg/lb (2.5 mg/kg).

Indications: NexGard kills adult fleas and is indicated for the treatment and prevention of flea infestations *(Ctenocephalides felis)*, and the treatment and control of *Ixodes scapularis, Dermacentor variabilis, Amblyomma americanum,* and *Rhipicephalus sanguineus* infestations in dogs and puppies 8 weeks of age and older, weighing 4 pounds of body weight or greater, for one month. NexGard is indicated for the prevention of *Borrelia burgdorferi* infections as a direct result of killing *Ixodes scapularis* vector ticks.

Dosage and Administration: NexGard is given orally once a month, at the minimum dosage of 1.14 mg/lb (2.5 mg/kg). See full product insert for dosing table and details.

Warnings: Not for use in humans. Keep this and all drugs out of the reach of children. In case of accidental ingestion, contact a physician immediately. Keep NexGard in a secure location out of reach of dogs, cats, and other animals to prevent accidental ingestion or overdose.

Precautions: Afoxolaner is a member of the isoxazoline class. This class has been associated with neurologic adverse reactions including tremors, ataxia, and seizures. Seizures have been reported in dogs receiving isoxazoline class drugs, even in dogs without a history of seizures. Use with caution in dogs with a history of seizures or neurologic disorders.

The safe use of NexGard in breeding, pregnant or lactating dogs has not been evaluated.

Adverse Reactions: In a well-controlled US field study, which included a total of 333 households and 615 treated dogs (415 administered afoxolaner; 200 administered active control), no serious adverse reactions were observed with NexGard.

Over the 90-day study period, all observations of potential adverse reactions were recorded. The most frequent reactions reported at an incidence of > 1% within any of the three months of observations are presented in the following table.

Table 1: Dogs with Adverse Reactions.

	Treatment Group			
	Afoxolaner		Oral active control	
	N[1]	% (n=415)	N[2]	% (n=200)
Vomiting (with and without blood)	17	4.1	25	12.5
Dry/Flaky Skin	13	3.1	2	1.0
Diarrhea (with and without blood)	13	3.1	7	3.5
Lethargy	7	1.7	4	2.0
Anorexia	5	1.2	9	4.5

[1] Number of dogs in the afoxolaner treatment group with the identified abnormality.

[2] Number of dogs in the control group with the identified abnormality.

In the US field study, one dog with a history of seizures experienced a seizure on the same day after receiving the first dose and on the same day after receiving the second dose of NexGard. This dog experienced a third seizure one week after receiving the third dose. The dog remained enrolled and completed the study. Another dog with a history of seizures had a seizure 19 days after the third dose of NexGard. The dog remained enrolled and completed the study. A third dog with a history of seizures received NexGard and experienced no seizures throughout the study.

Post-Approval Experience (July 2018): The following adverse events are based on post-approval adverse drug experience reporting. Not all adverse events are reported to FDA/CVM. It is not always possible to reliably estimate the adverse event frequency or establish a causal relationship to product exposure using these data.

The following adverse events reported for dogs are listed in decreasing order of reporting frequency for NexGard: Vomiting, pruritus, lethargy, diarrhea (with and without blood), anorexia, seizure, hyperactivity/restlessness, panting, erythema, ataxia, dermatitis (including rash, papules), allergic reactions (including hives, swelling), and tremors.

Effectiveness: See full product insert for details regarding Effectiveness.

Animal Safety: In a margin of safety study, NexGard was administered orally to 8 to 9-week-old Beagle puppies at 1, 3, and 5 times the maximum exposure dose for a total of six treatments. There were no clinically-relevant effects related to treatment on physical examination, body weight, food consumption, clinical pathology (hematology, clinical chemistries, or coagulation tests), gross pathology, histopathology or organ weights. Vomiting occurred throughout the study, with a similar incidence in the treated and control groups, including one dog in the 5x group that vomited four hours after treatment.

In a well-controlled field study, no adverse reactions were observed from the concomitant use of NexGard with other medications.

Contact Information: For a copy of the Safety Data Sheet (SDS) or to report suspected adverse drug events, contact Boehringer Ingelheim Animal Health USA Inc. at 1-888-637-4251. For additional information about adverse drug experience reporting for animal drugs, contact FDA at 1-888-FDA-VETS or www.fda.gov/reportanimalae.

The information provided here is not comprehensive. The full FDA-approved product insert is available at www.nexgardfordogs.com. Consult your veterinarian for further information.

Product approved by FDA under NADA # 141-406

Marketed by: Frontline Vet Labs™, a Division of Boehringer Ingelheim Animal Health USA Inc. Duluth, GA 30096

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