



Director's Note

Fall is upon us, so for us in California that means a break from the heat of summer and some much-needed rain as we move into our holiday season.

The holiday time is among the busiest times for testing at the VGL. So, in this Newsletter, we provide information on important reminders about the University [holiday closures](#) and highlight an [upcoming promotion](#) so that you can plan your testing needs accordingly.

This past quarter we have been busy launching **7 new tests** to meet the needs of our clients. To learn more about these tests please see our [New Tests](#) section below.

Our [Case of the Quarter](#) is about [Myosin Heavy Chain Myopathy](#), a genetic disorder in Quarter horses and related breeds that causes susceptibility to Immune Mediated Myositis (IMM) or non-exertional rhabdomyolysis. Here we highlight a story from one of our clients on how utilization of our genetic test helped her and her horse. We are honored to have played a role in this case.

Because we are a university laboratory, education, research, and outreach are huge components of what we do. Thus, we have also highlighted accolades and activities from this quarter. Among our favorite was participating in the UC Davis Department of Animal Science Horse Day, where we were able to extend knowledge on genetic testing in the horse to over 180 attendees. If you are a horse enthusiast, and if you are ever out our way on the third Saturday in October, I strongly encourage you to attend this exciting event.

We are grateful for your support and trust in our laboratory's services.

Rebecca Bellone

Rebecca Bellone, PhD

Director, Veterinary Genetics Laboratory



Save the date!
January 3-12, 2023

UCDAVIS
VETERINARY MEDICINE
Veterinary Genetics Laboratory

To celebrate the new year, the VGL will be offering

10% off for 10 days!

Apply coupon code **newyear2023** at checkout and prepay online

Offer valid for **ANY** genetic tests ordered and paid for between 12:01am PST on January 3, 2023 and 11:59pm PST on January 12, 2023. No cash value. Cannot be combined with other discounts. Valid for non-contract clients only.

Explore the hundreds of genetic tests available from the VGL for 20+ species

DOG DNA SAMPLE SUBMISSION - UPCOMING CHANGES

To better assist our clients, beginning **January 3, 2023**, the information previously displayed in our dog DNA order form will be contained in a label that

will be attached to the VGL cytology brushes that are sent to clients. Below is a sample label.

Only peel open
TO HERE

Dog Name: **Uptown Girl** DO NOT WRITE ON LABEL

Sex: F Breed: Standard Poodle

Tests: Canine Genetic Diversity


Acct: jc123_uptown@gmail.com

NCD\$00273895

Paid
DV

In addition, every client will also receive a DNA sample collection brochure that provides instructions and tips for obtaining **high-quality DNA samples** from their dogs. Here is an excerpt of the brochure.

DNA Sample Collection




The key to successful DNA testing is a high-quality sample!

UCDAVIS
VETERINARY MEDICINE

DNA Sample Collection


The VGL requires **3** brushes per dog.
Follow the instructions below to collect your sample.

1 Before you start, wash your hands and make sure the brushes are labeled with the **CORRECT DOG NAME**.




TIP: If collecting samples from multiple dogs, wash your hands before sampling another dog.

2 Partially open the sleeve and pull out a brush by the handle. **DO NOT** touch the bristles.




3 Place bristle head between the dog's gums and cheek. Press lightly on the outside of the cheek while rotating the brush back and forth for **15 SECONDS** (and no longer than 30 seconds).




TIP: You want to collect cheek and gum cells, **NOT SALIVA**.

4 Wave the brush in the air for **20 SECONDS** to air dry.



20 sec

5 Insert brush back into the appropriately labeled sleeve. Repeat steps 2-5 for **ALL 3** brushes.



NOTE: Sample contamination or low-quality DNA samples can cause delayed test results.

Mail To:
Veterinary Genetics Laboratory – Dog Testing
P.O. Box 1102
Davis, CA 95617-1102

If using FedEx, UPS or DHL:
Veterinary Genetics Laboratory – Dog Testing
University of California, Davis
Old Davis Road (there is no number)
Davis, CA 95616

vgl.ucdavis.edu/sample-collection/dog

The VGL **highly recommends** using the cytology brushes that we provide; these typically result in the better quality DNA samples for us to do the testing. However, clients who prefer to send in their own brushes will be able to print the label at home from their account and attach it to an envelope containing their samples. Please contact our customer service team at **530-752-2211** or vglcustserv@ucdavis.edu for questions or additional information.

Case of the Quarter

Testing for myosin heavy chain myopathy (MYHM) helps solve equine clinical case



Legend is a 6-year-old American Quarter horse who presented to his veterinarian with lethargy, loss of appetite, fever, dark urine, edema and muscle loss in the hindquarters. Despite hospitalization, Legend's condition continued to deteriorate and he developed signs of kidney failure. After reading [articles](#) shared by the UC Davis VGL on [MYHM](#), Karissa Waber, Legend's owner, and his veterinarian decided to submit a hair sample from this horse for [genetic testing](#). The results of this testing determined that Legend had two copies of the My allele and was therefore susceptible to immune-mediated myositis (IMM) and non-exertional rhabdomyolysis. Genetic testing at the UC Davis VGL helped diagnose this challenging clinical case and helped Karissa understand what was happening with her horse and how to care for him in the future. To read more about this case, please see our [news story](#).

New Tests

The VGL has launched **7 new tests** this quarter in an effort to better support the needs of our clients:

[Congenital Ichthyosis 2 in the](#)

Holiday Closures

The VGL will be closed on the following dates that are University holidays: **December 23-26, 2022** and **December 30, 2022-January 2, 2023**.

[Golden Retriever](#) - A skin condition in which the outer layer of the skin does not form properly and results in scaling. The condition often progresses to large patches of thickened, black, scaly skin. Two genetic variants have been associated with congenital ichthyosis in the Golden Retriever.

[Multidrug sensitivity \(MDR1\)](#) - Dogs with multidrug sensitivity are predisposed to adverse reactions (neurotoxicity) following use of certain common drugs, like ivermectin, which is found in heartworm medication.

[Junctional Epidermolysis Bullosa in the Saddlebred \(JEB2\)](#) - An inherited disease that causes moderate to severe blistering of the skin and mouth epithelia, sloughing of hooves in newborn foals, and skin lesions that develop as the foal ages. This test detects a causal variant specific to Saddlebreds and related breeds.

[Progressive Retinal Atrophy \(rcd4-PRA\)](#) - A heritable condition characterized by late onset degeneration of photoreceptor cells in the retina, which leads to blindness. This genetic variant is found in several dog breeds.

[Cerebellar Degeneration-Myositis Complex \(CDMC\) in the Nova Scotia Duck Tolling Retriever](#) - A heritable disorder that causes neurological

Please plan time-sensitive shipments accordingly and note that the US mail system typically experiences delays during the holiday season.

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Research Highlights



VGL researchers have contributed with 12 new publications since July. The [largest study to date to investigate pigmentation variants in horses](#) was recently published by **Drs. Felipe Avila and Rebecca Bellone** and their team. [The study](#) looked at 29 genetic variants that determine base coat color, dilution and white patterning were investigated in 11,281 horses from 28 breeds. The results are enabling breed-specific counseling on genetic testing for equine coat color being done by Dr. Bellone and other members of the equine genetics research team.

Our equine genetics research group

signs that manifest as early as 10 weeks of age in affected Nova Scotia Duck Tolling Retrievers.

[Cardiac Laminopathy \(CLAM\) in the Nova Scotia Duck Tolling Retriever](#) -

Discovered by Dr. Danika Bannasch at UC Davis, CLAM is a fatal heritable condition that results in dilated cardiomyopathy and sudden death in young adult Nova Scotia Duck Tolling Retrievers.

[Shedding±](#) - The extent of shedding is impacted by several genes, but combinations of variants in the MC5R and RSPO2 genes in particular result in decreased overall shedding rates.

Stay tuned, more to come!

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Communications and Outreach

In line with our mission to provide education in animal genetics, the VGL has participated in several outreach events this October and November:

Sacramento Academic and Vocational Academy (SAVA) Career Fair

also advanced our understanding of insidious uveitis by determining the [heritability of this condition in Appaloosa horses](#) and revealing risk factors of this disorder in the [Knabstrupper breed](#), which is known to have been under selection for the leopard spotting pattern characteristic of the Appaloosa. Under the mentorship of Dr. Bellone, this was the focus of Dr. Nicole Kingsley's dissertation work.

In collaboration with Dr. Monica Aleman, Professor in the Department of Medicine and Epidemiology at UC Davis, and the VMTH, the equine genetics research group also published a study showing the [prevalence of genetic disease variants in horses with muscle disease](#), highlighting the importance of both histological and genetic analysis in the evaluation of horses with muscle disease. Another collaborative study between Dr. Carrie Finno, Gregory L. Ferraro Endowed Director of the Center for Equine Health, and Dr. Bellone, also determined that genetic variants causing [equine familial isolated hypoparathyroidism \(EFIH\)](#) and [fragile foal syndrome \(FFS\)](#) are found at low frequencies in the US Thoroughbred population but are not recent mutations. The study further highlighted the importance of genetic testing to avoid increases in carrier frequency and production of affected foals. Dr. Bellone also extended



Drs. Rob Grahn, Felipe Avila and Liza Gershony attended and spoke to high school students from a group of charter schools in the Sacramento area about the VGL and possible careers in Animal Science and Animal Genetics.

UC Davis Horse Day 2022



This year's [Horse Day](#) took place on October 22 and was a huge success! **Dr. Rebecca Bellone** was invited to give her popular talk about coat color genetics and how it relates to coffee, and she answered many questions throughout the day about this and other things related to equine genetics! **Rachel Ketchum** and **Dr. Liza Gershony** also attended and talked to many current and future VGL clients as well as many UC Davis students who came by the booth with questions about genetic testing.

knowledge on inherited ocular disorders by co-authoring a book chapter in the latest edition of *Equine Ophthalmology*, edited by Dr. Brian Gilger.



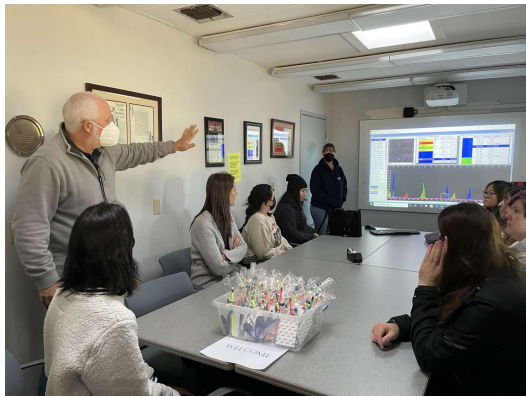
Studies by mammalian ecology and conservation researchers, **Drs. Ben Sacks** and **Mark Statham**, have shed light into the origins of the [Island fox](#), and allowed for [dietary characterization](#) of the salt marsh harvest mouse, which is an endangered species endemic to the coastal wetlands of the San Francisco Estuary. The researchers also developed a [new noninvasive technique](#) for studying the genetics of small endangered mammals using bait stations to passively collect fecal DNA.

UC Davis School of Veterinary Medicine Fall Symposium 2022



The VGL had a table at this year's [SVM Fall symposium](#). **Sam Hanawalt, Diana Djalili, Kirsten Myers** and **Dr. Liza Gershony** answered attendees' questions about available genetic tests and how to best use them.

First Year Aggie Connections



The VGL hosted two [First Year Aggie Connection](#) classes: one on horses and the other on cats. These courses are for UC Davis undergraduate or transfer students, and their goal is to bring together students that share a purpose, interest or theme to foster connections that can aid them in navigating their first year at UC Davis. Our participation in these courses provides an opportunity for the students to learn about genetics



Additional studies by Dr. Sacks demonstrated that spatially explicit capture-recapture approaches using noninvasive fecal DNA can be used to estimate the density and abundance of gregarious ungulates, such as the [Tule elk](#), and [black bears](#). Reviewing evidence collected by several colleagues, Dr. Sacks also discussed how coyote admixture with red wolves over the years may prove an [important resource for conservation efforts of the red wolf](#).

in the species they are passionate about. **Drs. Rebecca Bellone** and **Rob Grahn** took the students on a tour of our facilities, showing them all the steps needed for a high-quality and highly accurate DNA testing pipeline and talked to them about research in the field.



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