UCDAVIS VETERINARY MEDICINE
Veterinary Genetics Laboratory

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Director's Note

As we move into summer here at the UC Davis Veterinary Genetics Laboratory, we are excited to share some of our latest happenings.

After our first newsletter was distributed in April, we heard a great deal of positive feedback. Many of you let us know you wanted to learn more about interesting cases. Thus, we are excited to share another interesting case in which we identified the genetic cause of a horse' s white spotting pattern.

This quarter we are also thrilled to be able to share about a generous donation that will allow us to focus efforts to monitor genetic diversity across species and develop tools to mitigate rapid loss of diversity through genetic testing.

Below we highlight other accomplishments, activities, and new educational resources that are advancing our mission.

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

Rebecca Bellone, PhD
Director, Veterinary Genetics Laboratory

Case of the Quarter

VGL researchers discover a novel genetic variant causing white spotting in a Standardbred filly

This uniquely patterned Standardbred filly was born at Wai Eyre Farm in Canterbury, New Zealand, to solid-colored parents: a black mare and a bay stallion. White patterning is rare in Standardbreds, eliciting curiosity and prompting the owners to get the foal genetically tested for known white spotting variants. Parentage testing was done by InfogeneNZ at Massey University and they recommended coat color testing be performed by the VGL.

We tested the filly for all routine white spotting mutations, as well as other mutations known to cause white spotting in horses, and none were present in the filly. Research by Dr. Rebecca Bellone and team identified a *de novo* variant in the KIT proto-oncogene receptor tyrosine kinase (*KIT*) gene as responsible for causing this unique sabino-like pattern in the Standardbred filly.

The finding has generated quite a buzz on social media, international news, and popular press stories. Read more about this study here.

Overflowing with Gratitude

The VGL received a generous donation of $360K from an anonymous benefactor!

The money will be put towards two major areas: improved infrastructure and expansion of diversity testing.

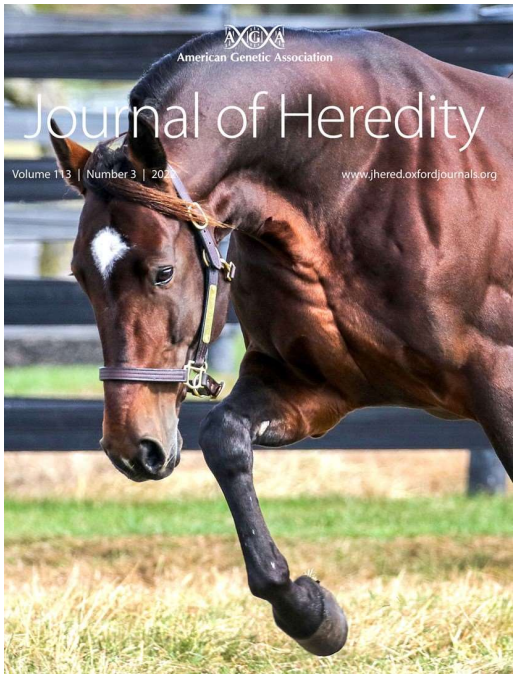
Genetic diversity is a growing area of interest for breed management and herd health, creating a significant demand for diversity testing across domestic species. The VGL currently offers routine diversity testing for certain dog breeds and bison, and is in the process of developing diversity panels for additional dog breeds.

Expanding our diversity tests for dogs and developing tests for other species, including the horse, is a major priority of our research and development section. If you are also interested in supporting these research endeavors please click on the button below.

To find out other ways to support the needs of the laboratory please contact the director.

Support the mission of the VGL!

Research Highlights



A VGL research publication made the cover of Journal of Heredity. Published in May, 2022, the study provides a baseline for assessing and managing genetic diversity in the American Standardbred horse. Thank you to the United States Trotting Association for funding this study.

VGL Clients Help Advance Our Understanding of MYHM in Quarter Horses

Client participation and consent were essential for advancing our understanding of genetic findings and

Communications and Outreach

Dr. Felipe Avila gave an interview to the Japanese Akita Breeders Association of Germany that was recently made available online. Dr. Avila discussed the state of genetic diversity in the breed and explained how diversity tracking through genetic testing provides a valuable tool to redistribute diversity and reduce the prevalence of recessive disorders in closed populations.

Dr. Rebecca Bellone's interview with "The Horse" was published online on June 13. In light of her 2020 publication, Dr. Bellone discussed the genetic findings associated with Distichiasis in the Friesian horse. Coincidently, Dr. clinical manifestations of myosin heavy chain myopathy (MYHM) in the Quarter Horse. The VGL is grateful for all of our clients who participated in this study. Read about the recent findings here.

VGL researchers have also led or contributed to seven other publications since April 2022. Our equine genetics research team published a review of the investigated risk factors for equine recurrent uveitis, new results from an international study revealing a genetic association with recurrent uveitis in Icelandic horses, and the identification of a novel variant associated with dominant white spotting in a Standardbred horse (see our Case of the Quarter). The team also contributed to a review article exploring the overlap between opioid metabolism and coat color in horses, and an original research study that sheds light into what was previously considered erroneous and low quality gene expression data. Finally, our mammalian evolution and ecology research team published their findings on the effect of landscape features on the genetic diversity of an endangered salt marsh harvest mouse and the effectiveness of spatially explicit capture-recapture approaches using noninvasive fecal DNA to estimate the population abundance of wild elk species. These findings can inform conservation prioritization for the management of endangered species.

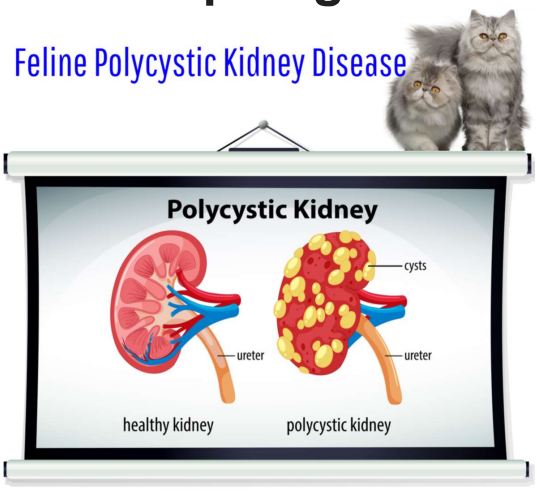
Bellone also presented a webinar on Distichiasis that was held by the Friesian Horse Association of North America and sponsored by the Fenway Foundation on June 23. This full webinar can be viewed here.

The **VGL** participated in two University-hosted events this past Spring quarter:

Picnic Day was held on April 23 and visitors coming to our booth got to do a puppy breeding experiment and translate genetic code for a chance to win one of our great raffle prizes.

Take Our Children to Work Day was UC Davis' equivalent of a career day and was held on April 28. After a short introduction to our laboratory and what we do, UC Davis employees and their children were able to visualize and touch DNA they extracted from strawberries.

Genetic Testing Spotlight



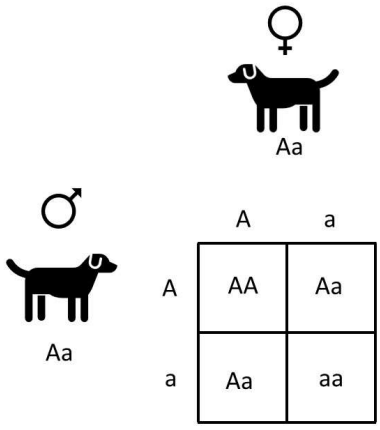
Polycystic Kidney Disease (PKD1) is an inherited disorder of cats. It is characterized by fluid-filled sacs (called cysts) in the kidneys, liver and pancreas that are usually present at birth and continue to grow throughout a cat's life, eventually causing the kidneys to stop working (kidney failure). Read more about this disorder on our Facebook page and website.

The VGL offers a genetic test that can be used for early diagnosis of affected cats and to inform breeding decisions.

2022-2023 Ann T. Bowling Fellowship Recipient

Educational Resources

Have you heard of Punnett Squares? Did you know that they can help predict possible outcomes of a particular breeding? Check out our educational resources page to learn more.



Other VGL Contributions to the Community

The VGL is proud to announce that our Quality and Efficiency Manager, **Christina Lindquist**, will be taking over as Chair of the Wildlife Forensic Biology Subcommittee within the Biology/DNA Scientific Area Committee of the Organization of Scientific Area Committees (OSAC) for Forensic Science starting October 2022.

In line with our mission, in 2016 the VGL created the Ann T. Bowling Fellowship to honor the memory of Dr. Ann Bowling, who significantly contributed to advancing the services of the VGL and made important scientific discoveries related to horse genetics here at the VGL. This fellowship is designed to carry on her legacy and promote research and education in animal genetics.

The fellowship is funded by the VGL but recipients are selected by an outside committee established by the UC Davis School of Veterinary Medicine's Graduate Student Support Program (GSSP). **Myles Hammond** is the first VGL-affiliated student to receive the fellowship. Myles joined the Bellone research group in 2021 and is a Ph.D. student in the UC Davis Integrative Genetics and Genomics Graduate Group. His dissertation research is focused on investigating the genetics of multiple coat color phenotypes in horses and their

The OSAC was created by the National Institute of Standards and Technology (NIST) to provide leadership in assessing standards developed for different forensic disciplines, and facilitate and promote the use of high-quality and technically sound standards that ensure results from forensic analyses are reliable and reproducible across the nation.

connection with health traits.

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