Artificial insemination (AI) gives breeders an opportunity to breed dogs that otherwise might not be possible due to geographical location, behavior incompatibilities or other factors. A recent study examined whether antibiotics added to commercial semen extenders to increase shelf life inhibit the growth of bacteria in semen samples.

“Breeders are not shipping females for natural breeding as much today and thus are turning more to AI,” says Ginny Altman, vice president of the American German Shepherd Dog Charitable Foundation. “Since semen collection introduces bacteria into the semen sample from normal bacterial flora, we wanted to learn whether the antibiotics used in extenders control the growth of bacteria.”

The study, funded by the AKC Canine Health Foundation with support from the American German Shepherd Dog Charitable Foundation, was led by Carla Barstow, DVM, and Margaret Root Kustritz, DVM, PhD, DACT, professor of small animal reproduction at the University of Minnesota College of Veterinary Medicine. They recruited 14 male dogs from members of all-breed clubs in the Minneapolis area. Included were six Samoyeds, six Malamutes, one English Springer Spaniel, and one Labrador Retriever, ranging from 2 to 9 years of age.

“We hypothesized that the growth of aerobic, anaerobic and Mycoplasma bacteria would be controlled in semen extended with commercial canine extender containing several antibiotics,” says Altman. The study showed that proper storage and shipment of semen is important for AI breeding.

Study Shows Proper Storage and Shipment of Semen Is Important for AI Breeding

**PROCESS FOR STUDYING BACTERIAL GROWTH IN SEMEN SAMPLES**

**DOG COLLECTED**

**NEAT SAMPLE: ANAEROBIC, AEROBIC AND MYCOPLASMA TESTING**

**COMMERCIAL EXTENDER CONTAINING SEVERAL ANTIBIOTICS**
At Collection: Anaerobic, Aerobic and Mycoplasma Testing

- 24 Hours: Aerobic and Mycoplasma Testing @ 5°C
- 48 Hours: Aerobic and Mycoplasma Testing @ 5°C

**COMMERCIAL EXTENDER CONTAINING ONE ANTIBIOTIC**
At Collection: Anaerobic, Aerobic and Mycoplasma Testing

- 24 Hours: Aerobic and Mycoplasma Testing @ 20°C
- 48 Hours: Aerobic and Mycoplasma Testing @ 20°C

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Storage and Shipment of Semen

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ders when stored at refrigeration or room temperatures for up to 48 hours,” Barstow says.

“Our study was intended to mimic what can happen in the real world. It is important for the receiving veterinarian who will do the AI procedure and the brood bitch owner to know that the semen product they are using is safe. In reality, manufacturers include antibiotics in extenders to prolong shelf life, not inhibit bacterial growth.”

Commercial semen extenders are used with chilled and frozen semen. Extenders are liquid media that support spermatozoa by providing nutrients and a buffering capacity to offset changes in temperature that occur during storing and shipping.

Chilled semen must be shipped and inseminated in a bitch within 24 hours of collection to retain viability and reduce the risk of disease. In addition to normal bacterial flora from a male dog’s urethra, semen can be infected from urine in the urethra and organisms that are shed from prostatic or testicular fluid caused by systemic infection.

Preventing disease transmission by AI will protect bitches only if an antibiotic is added to the semen. Two commercial canine extenders commonly used by theriogenologists, or reproduction specialists, were tested in the study. One extender contains several antibiotics, and the other has a single antibiotic.

“We noted an expected motility loss in the first 24 hours,” says Barstow. “We also found that the motility of spermatozoa was not affected by the presence of bacteria, thus motility is not a measure to determine whether a sample contains bacteria.”

Related to bacterial growth, 35 percent of dogs had significant growth of bacteria in their semen, which is in accord with information from the literature, Barstow says. Bacterial growth was controlled in samples that were held at refrigeration temperature, but not in all the samples that were held at room temperature.

“It was interesting to see how each dog’s semen responded differently to different extenders. It also was surprising to see how resilient canine semen is. For example, at 24 hours, three of the six samples of semen kept at room temperature had greater motility than its refrigerated counterpart.”

Each semen sample was separated into 11 samples. Three cultures, considered neat samples, had no extender added and were tested for anaerobic, aerobic and Mycoplasma bacteria. The remaining semen was separated into two groups for adding the respective extender products. The individual extender groups were tested for anaerobic, aerobic and Mycoplasma bacteria at collection, 24 hours and 48 hours.

What They Learned

“In our study, we compared bacterial growth between extenders, between storage temperatures and over time,” Barstow says. “It was interesting to see how each dog’s semen responded differently to different extenders. It also was surprising to see how resilient canine semen is. For example, at 24 hours, three of the six samples of semen kept at room temperature had greater motility than its refrigerated counterpart.”


Storage and Shipment of Semen

Types of Bacteria Commonly Found in Semen Samples

Aerobic Bacteria: Organisms commonly cultured in semen collected from normal dogs as well as from dogs with a history of reproductive tract disease. Aerobic bacteria must have oxygen to ferment. Examples are E. coli, Staphylococcus sp. and Streptococcus sp.

Anaerobic Bacteria: Any organism that does not need oxygen for growth and that could react negatively or die if oxygen is present. An example is Bacteroides fragilis. Mycoplasma sp. and Ureaplasma sp.: Part of the normal flora of the distal urethra in dogs, these are among the smallest free-living bacteria. They lack a cell wall and live inside cells. They also can live in cultures outside cells similar to viruses, but unlike viruses, they can be killed by certain antibiotics.
Cognition Study Uses Games to Evaluate Best Candidates for Service Dogs

Only about half of dogs trained to be service dogs make it. Considering the investment of time and money to train a dog selected for service work, coupled with the high demand for service dogs to help people with physical and developmental disabilities, the ability to predict which dogs are more likely to succeed would potentially enable more dogs to be trained and placed with people who need them.

That’s the aim of a collaborative two-year study involving researchers at the Duke Canine Cognition Center in Durham, North Carolina, and the largest nonprofit assistance-dog training organization in the country, Canine Companions for Independence in Santa Rosa, California. Funded by the AKC Canine Health Foundation, the study will produce a series of cognitive tests, or games, to help assess canine emotional health and well-being in the service dog selection process. The research also might help predict specific types of service for which a dog is best-suited.

“Until now, there hasn’t been any attempt to develop cognitive testing for service dog assessment,” says Evan MacLean, PhD, co-director of the Duke Canine Cognition Center. “Are there individual differences in cognition that relate to how well dogs fare in their working lives? There may be different cognitive styles in dogs that align with their potential to work in various capacities.”

The long-term goal of the research is to streamline the process of breeding, training and matching dogs with jobs and handlers. “Does a dog’s communication ability, memory, empathy for humans, and ability to independently solve problems matter?” asks MacLean. “We believe that temperament is important, but so is a dog’s cognitive aptitude in determining the best service dogs.”

A shortage of service dogs to assist people with disabilities is universal. Jeanine Konopelski, director of marketing for Canine Companions, says, “As people have learned about the life-transforming benefits an assistance dog can provide a person with a disability, applications have been on the rise. Canine Companions has over 400 people currently waiting to receive a highly trained assistance dog.”

Trained assistance dogs can alert people to sounds and help them balance, pick up dropped objects, open doors, and push buttons. Service dogs can pull wheelchairs and alert authorities and family members to medical conditions such as hypoglycemia and seizures. Dogs provide comfort, confidence and focus to people suffering from post-traumatic stress disorder and to autistic children.

“It costs up to $45,000 to train a service dog, which includes up to two years of training. It begins with initial obedience commands, socialization and training by a professional dog instructor and continues for the life of the dog with ongoing follow-up,” Konopelski says.

About 200 dogs will be included in each of the two phases of the Duke study. The large number of dogs allows the researchers to evaluate whether there are clusters of skills that reliably group dogs together and whether this brings new understanding about dog psychology.

The nearly completed first phase entailed using a large battery of tests, or games, to measure 28 problem-solving skills based on previously published animal cognition studies. Each of the 200 dogs in phase one were tested in four one-hour sessions. The goal is to shorten the test and use only the most effective games as quality measures of cognition.

The second phase, a shorter version of the phase-one games, will include a different set of 200 dogs. The shorter test will feature measures that have shown promise in discriminating between dogs that succeed or fail in training. This phase will begin later this year and is expected to take about one year to complete.

“The cognitive traits needed by dogs that guide the blind may be different than those needed by dogs that alert deaf people to sounds or those that help people in wheelchairs,” MacLean explains. “We may be able to gather information from dogs to help us steer them toward the ‘careers’ that best suit their dispositions.”

Hopefully, the results of this study will produce cognition testing that can be used to help meet the ongoing need for service dogs to help people who need them. “By working with Canine Companions, we have gained firsthand exposure to how assistance dogs can make a huge difference in peoples’ lives,” MacLean says. “That’s powerful motivation to do the best we can to help streamline the process of breeding, training and matching dogs with jobs and handlers.”

Using Cognitive Test Games to Predict Ability

For the first time, a series of cognitive games are being used to predict the abilities that best define important characteristics for assistance dogs. Here are examples of the cognitive tests being developed by experts at the Duke Canine Cognition Center. Which Cup? A treat is hidden underneath one of two inverted cups. The handler stands between the cups and points to one cup. Will the dog interpret the pointing correctly and go to the cup with the treat? What if the handler simply looks at the correct cup or places a marker on the cup. Many dogs, but not all, are able to use these cues to find the treat.

Loose Lid? A dog is given a simple task, such as removing a loose lid placed over a container with a toy. Most dogs find this task easy to solve, but what if the lid is secured tightly to the container so it cannot be opened? Some “do-it-yourself” dogs continue to work at the lid, while “help seekers” give up easily and solicit help form the handler.

This Labrador Retriever is intent on getting the toy inside the container.
Check out upcoming Purina-sponsored show and sporting events at venues across the country. These events are great opportunities to meet dog enthusiasts, canine experts and Purina representatives who can answer questions about *Purina Pro Plan* dog food and *Purina Pro Club*.

**Upcoming Events**

**Follow the Pro Plan Champion Cup Leaders**

View the Top 10 dogs leading the 2015 *Pro Plan* Champions Cup competition. The yearlong *Pro Plan* Champions Cup award is sponsored by *Purina Pro Plan* brand dog food and is based on points tabulated from Bests in Show and Group placements at more than 200 Purina-sponsored all-breed dog shows. The winner receives a $10,000 cash prize, an original oil painting by dog portrait artist Linda Draper and a keepsake *Pro Plan* Champions Cup trophy.

**Purina Pro Plan Introduces NATURAL Dog Food**

*Purina Pro Plan* dog food recently launched a new natural line. *Purina Pro Plan* NATURAL Formulas Plus Essential Vitamins and Minerals offer outstanding nutrition with high-quality natural ingredients. This natural dog food contains no corn, wheat or soy; no added artificial colors, flavors or preservatives; and no poultry by-product meal. *Purina Pro Plan* NATURAL includes three Adult Grain Free formulas: Chicken & Egg, Lamb & Egg, and Tuna & Egg. There also are two all life-stage formulas, Chicken & Brown Rice and Turkey & Barley, and one adult dog formula, Duck & Rice Formula.

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