Welcome to the latest edition of the Purdue Comparative Oncology Program Newsletter. We had planned to distribute this edition sooner, but were delayed while we made adjustments to living and working in the COVID-19 pandemic. Our society, our country, and the world are facing multiple challenges that are certainly impacting our time, our energy, and our souls. But we decided it is time to move ahead with the newsletter and to base it around a theme of “hope and determination”!

Please allow us to share with you positive thoughts from pet owners on the impact of our pets, especially during the pandemic; an example of our research success merging physics and biology; the adaptations we are making to keep our work going; and a report of amazing generosity from a special family.

Thank you!

Dr. Debbie Knapp  
Director of the Purdue Comparative Oncology Program

*Photos of clinicians and staff without masks were taken prior to social distancing guidelines.*
Q&A with Dr. Knapp

What was it like for your group when the pandemic hit?

Like everyone, we were uncertain and worried about how to best proceed. None of us have ever experienced anything like this! The consideration to close our clinic to protect students, staff, and pet owners from potential virus exposure from each other was quickly deemed unacceptable. We knew that some of our pets and their owners did not have other places to go to receive the type of care we had been offering. But, we were also anxious because we cannot social distance in the hospital. A lot of what we do requires two or more people working very close together. So we very quickly turned our attention to how we COULD carry on the clinics as safely as possible.

Thank you. This is a good lead in to my next question. What has changed to promote safety in the Purdue Veterinary Hospital in this pandemic?

One of the first things I will mention is how we interact with pet owners. Pet owners stay in their cars in the hospital parking lot. We collect information over the phone, and go out to the car to bring the pet into the hospital while the owner waits outside. After evaluation and treatment, we talk to the pet owner on the phone again before taking the pet back out to their car when they are ready to go.

How well does this work?

It's OK. It's acceptable and the best approach for now, but I am really looking forward to the time we can have more direct contact with pet owners again. I like to draw diagrams on a board for them, and talk through things face-to-face. I feel badly that we cannot offer that right now.

Do you worry about being exposed to COVID from the animals?

No, not especially. I will preface this by saying that nothing in medicine or life is 100% safe. But, the risk of pets acquiring and spreading the virus appears quite low. Also, the pet owners answer a list of questions for us about potential prior COVID exposure to them and their pet. If we think the pet has possibly been exposed and could potentially have virus particles on their fur, we wear gloves and are more cautious when handling them, as well as taking our "usual" precautions.

What are those “usual” precautions?

Masks, frequent hand washing, frequent cleaning, and social distancing when possible are required in the hospital, but many of us do more than that. I change into scrubs, lab coat, and work shoes when I arrive in the morning. I wear a head covering (a cute blue and silver cycling hat that gets a few laughs) as well as a mask and my glasses. Then I change back to street clothes at the end of the day. One of the members of our team has become quite the expert in making masks.

Has the treatment the animals receive changed?

I would say most cases are evaluated and treated about the same, with a few exceptions. For a while we were worried we would not be able to get the kinds of masks and gowns we wear for surgery or when giving injectable chemotherapy. So if oral chemotherapy was a good option for a particular case, we would go with that rather than injectable chemotherapy that would require more PPE usage. Like everyone, we also re-use our PPE multiple times to make the supply we have last longer. The other main change is we have had to temporarily stop enrolling cases in our clinical trials because our hospital operations were in flux, and the supply of PPE, some drugs, and important materials was uncertain.
So, has your research been stalled?

No, not at all! We are continuing to get follow-up on the cases already in trials. And, we actually had a back log of data ready to analyze from studies. So this has fit in very well with the work-from-home when possible time. We are especially excited about the progress with some or our immunotherapy-related work.

Why is that?

I think we talked quite a bit about immunotherapy in our last newsletter, and how it really is transforming cancer treatment, and how studies in dogs can help dogs and should help make the immunotherapies more effective for humans. Now, there is one more reason why immunotherapy research is especially important. It appears that some of the worst effects of the coronavirus infection in people is due to lung damage caused by immune system processes that actually become detrimental rather than helpful. It appears that some of these detrimental immune system processes could be similar to those that cause serious side effects with certain cancer immunotherapies. So, the more quickly we can develop and study immunotherapies in dogs, and the quicker we can identify ways to monitor the many things that the immune system does (good and bad), the more opportunities we will have to understand and circumvent these adverse events in cancer therapy and in viral infections.

You said the theme of this newsletter was “hope and determination”. Why are you hopeful and determined?

I have a lot of hope. We are thankful for our team in our Comparative Oncology Program and the College of Veterinary Medicine, and for our “extended team” that goes way beyond this, and how people are coming together to help each other and keep things going. Each day we are better at “managing” life and our work in the pandemic, and each day we are closer to companies offering a coronavirus vaccine. Our hospital operations are picking up again. Clinical trials will re-open as soon as we can make that happen. Pets have never been as important as they are now, so our work continues to be very impactful. And, we continue to be incredibly grateful for the support received for our work so we can do more to help pets and people!! I think determination, perseverance, and resilience are three words that also characterize our team very well now. Whether it’s putting together an online curriculum in less than a week, adapting to new ways to operate the hospital, getting papers and grants written, and keeping our research going, our team keeps “getting after it” and getting it done. I can share that our determination also goes beyond veterinary medicine. We are determined to make our environment inclusive and welcoming for ALL people, and to make a positive difference in our world.
Scientists in the PCOP have teamed up with Purdue scientists, Drs. David Nolte (Physics Department) and John Turek (Basic Medical Sciences Department), to study a technique called Biodynamic Imaging or “BDI”. BDI is poised to fill an important role in cancer therapy. One of the long-time challenges in cancer therapy has been how to accurately pick the drug(s) that will help an INDIVIDUAL cancer patient. Even if a particular drug is highly effective in 60% of patients, how does the doctor know if that drug will work in their specific patient? And if that drug will not work, then which other drug(s) would work? The general approach in oncology practice is to try one treatment, and if it does not work, then try another one. And if that one does not work, then try yet another treatment. This process takes time, time which many cancer patients do not have. BDI is a technique being used to determine if a particular drug or drugs will be effective BEFORE the drugs are ever given to the patient. If a drug is destined to fail, BDI could prevent the patient from being exposed to a drug that will not help them and that could make them sick.

The BDI process is fascinating, yet simple. A biopsy (i.e. piece of cancer tissue) is collected from the patient. The tissue is split into several smaller pieces, and each piece is put in a separate part (a “well”) of a tissue culture plate along with some culture media. Then each piece of the tumor is treated with a cancer drug of interest or with a control solution with no drug in it. The fascinating part is that motion inside the cancer cells can be detected by Doppler light scattering, a technique similar to that used in weather radar, and using a

These images help visualize the type of information captured by BDI. Viewing each image from bottom to top, the changes in color indicate changes in motion in different parts of the cancer cells in a piece of tumor tissue removed from the dog. Note the cancer drug being tested is applied at “time 0”. Reading the image from bottom to top, note the dramatic change in colors in the sensitive tumor on the right compared to the more limited changes in color in the drug-resistant (insensitive) tumor on the left.
Purdue scientists, Drs. David Nolte and John Turek, teamed up in the development of a technique called Biodynamic Imaging or “BDI”. BDI is being used to image the motion in small tumor biopsies treated with cancer drugs, to determine if those same cancer drugs will be effective once given to the patient. Kody, a wonderful Golden Retriever, participated in a study led by Dr. Mike Childress in the PCOP. Kody experienced prolonged survival following chemotherapy, and this positive response was predicted by BDI. Carolyn McGuire, Kody’s owner, is shown here with Kody and Dr. Childress.

Using this Doppler light scattering approach, the researchers can determine how a patient’s cancer will respond to chemotherapy even before they begin treatment. Drs. Childress, Nolte, and Turek have tested this technique in dogs with lymphoma, and found that the BDI assay accurately predicted which individual dog would respond to a specific drug >80% of the time! They are now testing the BDI technique against other drugs for dogs. Drs. Turek and Nolte are collaborating with physicians to test the BDI assay in people with cancer. Success in these studies will pave the way for a powerful technique to individualize and improve cancer therapy.
You can’t put a price on unconditional love and affection from a pet. But an avid animal-loving Indiana couple’s gratitude for the opportunity to spend more time with their beloved, cancer-stricken canine companion inspired a $1 million gift to support the Purdue Comparative Oncology Program (PCOP) based in the Purdue University College of Veterinary Medicine, and an integral component of the Purdue University Center for Cancer Research (PCCR).

In January 2020, before the COVID-19 global pandemic began wreaking its havoc, the Indiana-based Werling Charitable Foundation made a $1 million gift to the PCCR, to be combined with another $1 million made available through the PCCR’s Walther Cancer Foundation’s matching-fund program, to support canine oncology research in the College of Veterinary Medicine. Together, these funds will create a $2 million endowment to be used exclusively for groundbreaking bladder cancer studies in dogs led by Dr. Deborah Knapp.

“For this is an incredibly generous gift, and one that will certainly have high impact for many years to come,” says Dr. Knapp, the Dolores L. McCall Distinguished Professor of Comparative Oncology, and director of PCOP. “It is especially an honor to receive this gift from a family with whom we have formed a close relationship over many years and multiple pets. This gift also provides further inspiration to our comparative oncology research team because it sends a clear message that people truly value our work and understand that it is transforming the outlook for pet animals and humans facing cancer.”

For the Werling Charitable Foundation co-chairs, the close relationship with Dr. Knapp and her research team began when their first rescue animal Brandi, an Australian shepherd, was granted a new lease on life after being diagnosed with bladder cancer and given three months to live. Following a recommendation from their veterinarian, a Purdue alumnus, they contacted the college’s Veterinary Hospital.

“Thanks to Dr. Knapp and her team, Brandi lived another year and eight months,” Sue Ann Werling said. "We cherished that special time to have Brandi longer."

The Werlings praised Dr. Knapp’s passion and expertise in providing a humane quality of treatment for Brandi. "The care Brandi received for bladder cancer was phenomenal, and allowed her to live a happy and wonderful life." Thus began the Werling Charitable Foundation’s long-term commitment of annual giving to Purdue and Dr. Knapp’s work to help cure bladder cancer both in dogs and, ultimately, in humans. An initial matching gift program, in Brandi’s name, generated $500,000 in support from others and raised $1 million in 2015.

To date, Dr. Knapp’s PCOP canine bladder cancer studies have taken a disease with an average survival of just a few days to one with an average survival of 450 days.
The Werlings’ experiences of working with Purdue leaders were deciding factors in their charitable foundation’s support for the university and the College of Veterinary Medicine.

The 2020 Werling Charitable Foundation gift was also made as a tribute to honor the dynamic leadership at Purdue University and the College of Veterinary Medicine — notably President Mitch Daniels, Dean Willie Reed, and, of course, Dr. Knapp. “The Werlings have a profound admiration of President Daniels’ leadership, his integrity, honesty, and work ethic. He truly has the students’ best interests at heart.”

Making a difference for animals and people

The Werlings share small-town values along with a passion for improving the lives of animals and people. Evan grew up as a small-town, Indiana farm boy, who then worked his way through college. He is the author of the 2019 book — The American Dream Is Real, a guide for “entrepreneurs, teachers, parents, and today’s youth.” It chronicles his rise from humble roots to his success as a CPA, and as a domestic and international entrepreneur — and now as a career mentor.

President Daniels wrote a book endorsement that praised the author as “a wonderful example” of what it means to achieve the American Dream. “Our students at Purdue have benefited greatly from his presentations on campus and from his wisdom and wealth of experience.” And he added, “Evan Werling is proof that the American Dream is real, but, as stated in this book, it is not free. It must be earned.”

In turn, Werling extols Purdue’s entrepreneurial education and the experience it provides. “Purdue has absolutely one of the best entrepreneurial programs opportunities in the nation, because its students have exposure to science, technology, and to research and development — all of which are very important components, when developing a top-notch entrepreneurial company. From experience, I know that entrepreneurship is not just a business program. It is through science and technology that entrepreneurs make the improvements and contributions that are needed for today’s society. This is what distinguished each of my companies from the competition.”

He is currently in discussions with Dr. Nathalie Duval-Couetil, director of the Certificate in Entrepreneurship and Innovation Program, to share his professional expertise and insight with the program’s students.

Sue Ann also grew up in a small Indiana town. She worked her way through college as a waitress. During her career, she and her husband rebuilt a failing and insolvent company into the largest privately-owned high-tech print communications company in the United States. When doing so, she was named one of the Top Ten Women Business Entrepreneurs in America. Today, as co-chairman of the Werling Charitable Foundation, she champions saving rescue animals and ensuring that they are placed into loving homes after receiving the medical care and healing they need. It is a passion that fills the couple’s home life, as foster parents for homeless pets.

“Animals have been very important in our lives,” Sue Ann says. “Every day that we wake up, we devote our lives to animals.”

Despite the deeply personal reasons and the relationships that have inspired their giving, the Werlings prefer that any publicity focus on Purdue University, its leadership and the wonderful benefits Purdue graduates bring to our economy and to our society.
“It’s not about us,” they say in unison. It is about supporting great causes — such as Purdue’s dedication to excellence in higher education and Dr. Knapp’s leadership in research to develop cures for cancer and other serious medical problems that afflict both pet animals and humans.

“We know how we felt when we lost Brandi, and we don’t want others to have to go through such an ordeal if we can help support a cure or treat a condition,” the Werlings say.

Dr. Knapp says the timely Werling Foundation-Walther Cancer Foundation matching-gift endowment will benefit the program’s research teams for decades to come.

“This gift is tremendously important,” she says. “Some of our greatest discoveries in fighting cancer are made through philanthropic support.”

At a time when grant budgets are being cut and research costs are increasing — and as research dollars are needed in so many diverse areas — Dr. Knapp says important studies are being accomplished by combining research grants and private gift support.

“This allows us to continue to offer clinical trials for pet animals facing cancer — trials that offer hope for a better outcome and trials that typically offer more affordable therapies than the current standard of care,” she says.

The new endowment will be administered by the PCCR under the direction of Dr. Timothy Ratliff, Distinguished Professor in the Department of Comparative Pathobiology and the Robert Wallace Miller Director of the National Cancer Institute designated PCCR, and its more than 100 faculty scientists from a range of academic disciplines who are working on new and better cancer treatments.

Dr. Ratliff says the center jointly manages the endowment with the College of Veterinary Medicine leadership on how to spend the dedicated funds to empower work led by Dr. Knapp to improve the outlook for animals and humans with cancer.

“We are grateful to the donors for this matching-gift program to support our research into spontaneous, naturally occurring canine cancers that not only enable us to better treat canine cancers, but also to better understand and treat human cancers,” he says.

More than that, the gift inspired by love will help others love their pets just a little longer.

About the Walther Cancer Foundation

The Indianapolis-based Walther Cancer Foundation is an independent, private grantmaking foundation committed to eliminating cancer as a cause of suffering and death through supporting and promoting interdisciplinary and inter-institutional basic laboratory, clinical, and behavioral cancer research. The foundation is particularly interested in supporting efforts to strengthen cancer research institutions in Indiana.

About the Purdue Cancer Center

Since 1978, the Purdue University Center for Cancer Research has been a National Cancer Institute-designated basic-research cancer center. Only seven institutions in the United States have earned this title. Being a basic-research center means it does not treat cancer patients directly. Its work focuses on investigating cancers where they begin — at the cellular level — to investigate the cause of, and cure for, one of the most devastating killers of our time. Doctors and scientists throughout the world use the center’s discoveries to develop methods, medicines, and medical devices to save and enhance patient lives.
Special Love for Pets and from Pets During the Pandemic

Although some would suggest that taking care of pets could add even more stress to an already stressful time during the pandemic, that is often not the case! There have been dramatic increases in pet adoptions and offers to foster pets during the COVID-19 pandemic. Pet owners are telling us that their pets make the pandemic more bearable by keeping them from being lonely, making them laugh, or by getting them out for a walk. Their pet brings happiness to their day and helps them cope with the pandemic and social distancing. We asked a few pet owners if they would be willing to share their thoughts. Please enjoy some of their words:

From the owner of Memphis: “No matter the circumstance, we know we can find a bit of sunshine each day. May this time be an opportunity to pause and simply enjoy what is right in front of you. No doubt our pets could not be happier about the situation! There have been way more walks, play, cuddling and belly rubs happening in our homes right now.”

From the owners of Oscar and Auggie: “As enjoyable as it is to have the dogs keeping us company, the most important thing they provide for us during this time of pandemic is perspective. Oscar continues chemotherapy and Auggie manages with his wonky leg. They bravely and without complaint carry on with their lives as best they can, despite their medical issues. And how does that compare with not going out to dinner? With not attending parties? With limited travel? With seeing family only on a computer screen? Knowing what our lovely dogs are enduring without complaint makes our social limitations seem like the minor and temporary inconveniences we know them to be.”

From the owner of Sunny: “Our three canine family members are thoroughly enjoying having us all home during this time of quarantine. The extra time, attention, and companionship is something that benefits all of us right now! But probably none is more overjoyed than our sweet Sunny girl. She is in her second round of chemo for non-curative lymphoma, and getting to spend every waking moment with us makes her an extraordinarily happy girl. We are now able to have daily adventures with her (long walks and short fishing trips) and can devote special time and attention to her - and for that we are incredibly grateful! There is always something good that comes out of every bad situation.”

From the owner of Shalily: “I have some new words in my vocabulary these days. Social distancing and shelter-in-place. Neither fits my lifestyle. Apprehension and anxiety over both the virus and the economy cloud my day. As one day rolls into the next, I realize there is no place I would rather be than home because that is where everything I hold most dear is found, especially the two loving dogs at my feet.”

Editor’s note: Sadly, Shalily lost her battle with cancer this month. She was a very sweet and courageous dog and a delightful companion. Our thoughts and condolences continue to go out to her family.
Hasty, an adorable Norfolk terrier puppy, joined our family in September 2009. She was born on July 4th in New Jersey, and in recognition of her auspicious birth date and Yankee roots, we named her “Hasty Pudding.” She was greeted by Poppy, a 4 ½-year-old Norfolk terrier, and Ivy, an 8-year-old West Highland White terrier. Hasty was a very happy, energetic, and agreeable little dog who seemed content for her “siblings” to be the dominant players. When Poppy died unexpectedly at age 10, we adopted Charlotte, a lovely 5-year-old Golden Retriever rescue. Charlotte’s presence induced a personality change in Hasty who apparently decided that the time had come for her to assert herself. She began to zealously monitor the doggie door and determined who was allowed in and out. She would hide behind doors – with her tail wagging madly – in order to spy on the other dogs – chiefly Charlotte, but the other dogs were completely unfazed by her bossiness.

Hasty was constantly on alert for any “intruder,” i.e. squirrels, in our yard and didn’t hesitate to rush out the door to try to catch one. She loved her toys and shook them to within an inch of their lives to get the squeakers out. She was fearless except when she sensed a thunderstorm on the horizon and trembled violently until it passed.

Hasty had definite ideas about what she wanted and devised clever strategies to achieve her goals. For example, she loved going for car rides and learned that the best way to get a ride was to feign enthusiasm for a walk, go a reasonable distance, then stop and refuse to budge until we called someone to come and pick her up.

Hasty’s bladder cancer was discovered serendipitously. In advance of a routine teeth cleaning in May 2018, our veterinarian had performed routine blood work and noted abnormal liver values. She ordered imaging which revealed a normal liver but evidence of a bladder mass. We were surprised because we had not noticed any urinary symptoms. Our veterinarian felt that there was a high likelihood that the mass was malignant due to its appearance and the prevalence of bladder cancer in dogs. She presented several options for treatment. While we wouldn’t embark on or continue a treatment that adversely affected Hasty’s quality of life, we wanted to do whatever we could to help her. We had the good fortune that our veterinarian is extremely skilled and current on the latest developments in veterinary medicine. She was familiar with Dr. Knapp’s unparalleled reputation in canine bladder cancer and strongly recommended that we...
consider taking Hasty to Purdue for evaluation and possibly treatment. We embraced this recommendation and set up an appointment.

We met Dr. Knapp and her team in early July 2018. They were extraordinarily professional, thorough, and kind. We knew immediately that this was a group who cared deeply about their patients and their patients’ families. Over the course of a day and a half, Hasty underwent a complete physical examination and a battery of tests, including a CT scan and biopsy of the bladder mass. Dr. Knapp met with us and carefully explained the findings which confirmed the malignancy, its type, and degree of aggression. She indicated that surgery was not an option due to the location of the tumor and its infiltration of the bladder. Instead she recommended that Hasty receive an intravenous chemotherapy (vinblastine which had been shown to be efficacious in some dogs) every two weeks in addition to a daily oral medication with the goal of shrinking the tumor. She felt very comfortable that our local veterinarian could administer the drug and monitor Hasty for negative side effects. Fortunately, Hasty tolerated the vinblastine well with no nausea or GI problems and maintained her appetite. Occasionally on the first day or two after treatments she exhibited fatigue but regained her normal energy level after a few days. Sometimes we noticed small drops of red-tinged urine and/or small blood clots, but throughout the course of her disease, she did not experience incontinence which is a common occurrence in dogs with bladder cancer.

Fortuitously, we have an association with Dovetail Genomics, a California company that performs very sophisticated genomic sequencing. Dovetail agreed to sequence Hasty’s tumor which provided a detailed map of Hasty’s tumor type and enabled Dr. Knapp to have a clearer understanding of how best to treat Hasty. We are hopeful that Dr. Knapp’s collaboration with Dovetail will continue to be beneficial in her work to gain insight into bladder cancer.

We had a good year with the cancer seemingly under control. During the summer of 2019, however, Hasty began to have increasing difficulty while urinating. She would squat for a long time and strain, although she didn’t have to go more often than usual. Imaging confirmed that the tumor was growing and also revealed that lung metastases had developed. Nonetheless, Hasty continued to be happy and relatively active, although she did begin to sleep more. We had another visit with Dr. Knapp who presented several new treatment options including a newer drug currently being studied which could become available under a “compassionate use” standard. Given the side effects of the other medications, we concurred with Dr. Knapp’s recommendation that Hasty be given the newer drug. While we hoped that this would somehow be a miracle cure for Hasty, we recognized that this was an unlikely outcome and that her life might be extended for a few months at the most. Dr. Knapp requested that if/when Hasty succumbed to the cancer, we allow an autopsy and direct that specimens be sent to Purdue for study.

We started Hasty on the new medication which she tolerated well. Several weeks later at a visit, our local veterinarian performed blood work which indicated decreased kidney function. She ordered imaging which showed that the tumor was blocking the flow of urine into her bladder and causing damage to the kidneys which ultimately would cause failure. She recommended euthanasia in order to spare Hasty a painful death. With heavy hearts, we accepted her recommendation, and Hasty died peacefully at our vet’s office. She performed the autopsy and sent the specimens to Dr. Knapp for review. We learned that the compassionate use drug had not affected the progression of the primary tumor in the bladder, but had actually reduced the lung metastases.

While Hasty’s disease was emotionally difficult for us, working with Dr. Knapp and her colleagues at Purdue was extremely rewarding and most gratifying. They are working tirelessly to defeat the scourge of canine bladder cancer and to gain insight into the commonalities between canine and human bladder cancer. We have no doubt that they will ultimately be successful in finding treatments that benefit both populations. We would enthusiastically recommend the Purdue team to anyone whose dog develops bladder cancer. We encourage those whose lives have been affected by this disease to support Dr. Knapp and this wonderful program.
who make this possible,

As we mentioned before, our gratitude begins with our dedicated pet owners. They carry on no matter what, even in the face of an unprecedented pandemic and other major challenges looming. Our gratitude continues with our donors. These donations propel us to push over or through barriers to really impact the fight against cancer, and help the program thrive even when grant budgets continue to shrink. Your support, no matter the size, helps us to maximize our work and continue the ongoing fight against cancer in pet dogs and humans!

Please continue to learn about our program and how to be a part of it. Visit us today at: purdue.edu/vet/pcop.

To learn more about matching gift opportunities, major giving, or legacy contributions, please contact the Purdue Veterinary Medicine Advancement Office at: pvmgiving@prf.org or call 765-494-6304.

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