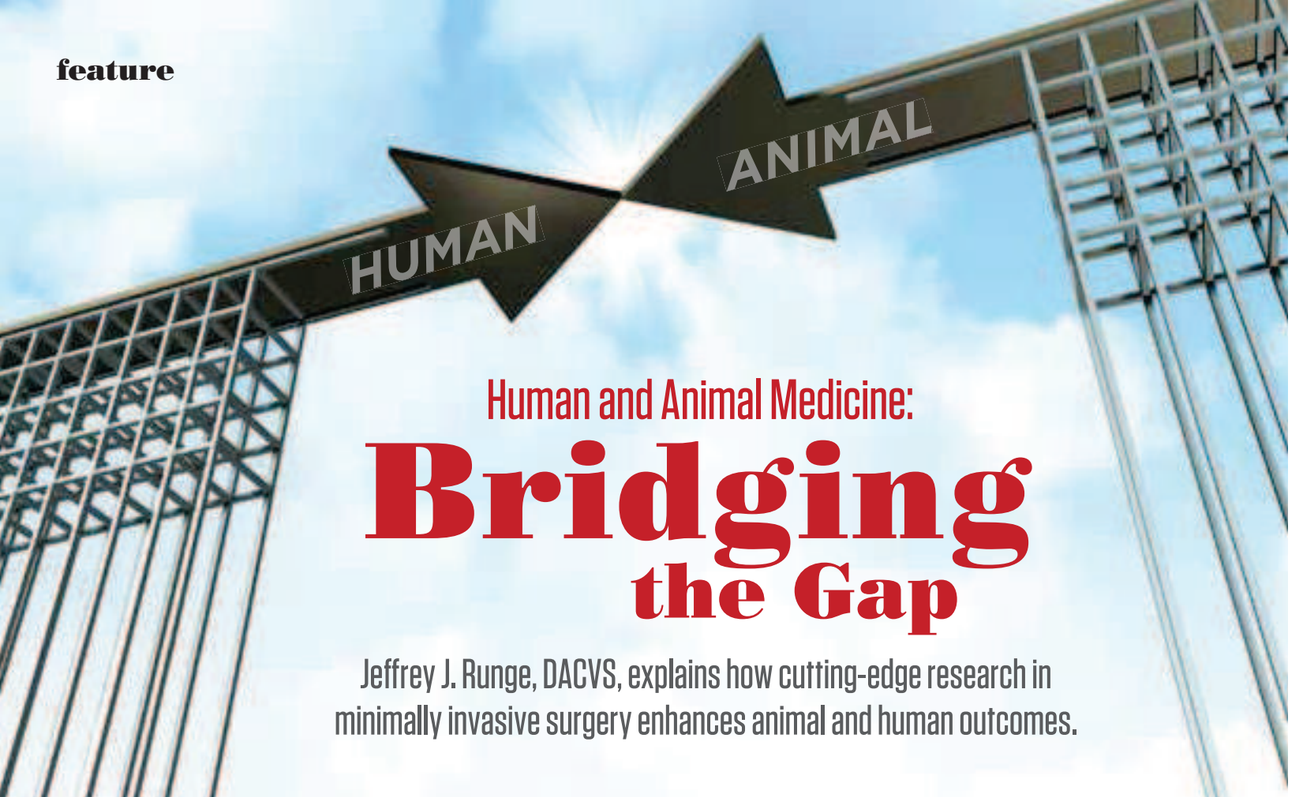


Human and Animal Medicine:

Bridging the Gap

Jeffrey J. Runge, DACVS, explains how cutting-edge research in minimally invasive surgery enhances animal and human outcomes.

As any person with a postoperative pet knows, assessing Fido's pain levels can be difficult. Unlike humans, pets can't describe what hurts, how much, and where. This can result in discomfort for the pet and concern among owners. But according to Jeffrey J. Runge, DACVS ('05), assistant professor and head of the minimally invasive surgery program at the University of Pennsylvania School of Veterinary Medicine, new surgical technologies offer a better alternative.

"As surgeons, we used to require larger incisions to complete operative procedures. But at the turn of the century, surgeons began realizing that we could do a lot more with small incisions," he says. "Through small incisions, we can now introduce cameras and tiny instruments, essentially improving our view and extending the reach and capabilities of our fingers."

Minimally invasive surgery is the gold standard in human medicine today, and for many reasons: a smaller incision

means less pain, quicker recovery, shorter hospital stays, faster return to function, and fewer complications. "We already know the same benefits that exist for humans also translate to animals," says Dr. Runge, "as many of the pivotal studies that proved the benefits of minimally invasive surgery were done using animals for translational research models."

The operations he can perform via minimally invasive surgery include complex thoracic procedures on the heart and lung (including abscess and tumor removal), procedures in the abdominal cavity as basic as a spay or gastropexy, and more challenging procedures like bladder and urethra stone removal, cryptorchid corrections, adrenalectomy, and intestinal surgery. But it's in his research and innovation where Runge and his team are making a widespread impact for animal and human patients alike.

MINIMALLY INVASIVE ABDOMINAL SURGERY

One of Dr. Runge's major contributions to his field is a new minimally invasive access approach for veterinary laparoscopy called single port surgery.

This single port platform has shown promise as a potentially less invasive and less traumatic alternative to multiport laparoscopic techniques because, as he explains, "This platform enables all of the individual laparoscopic instruments and the camera telescope to pass through the same single abdominal incision, through a specially designed port, without compromising the safety and efficacy of the surgical procedure."

And because Dr. Runge's animal patients are small, he has begun collaborating with minimally invasive pediatric surgeons as they work to justify and validate new operative techniques for their patients. "Animals are a translational research model," he says. "It opens the doors for collaboration and it's an unbelievable relationship. My clinical research enables me to help not only veterinary patients but also children and adults."

SUPERIOR TUMOR DETECTION

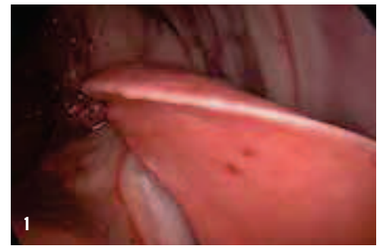
"When it comes to curing cancer, in humans and animals, typically the first line of defense we have in giving the best outcome is to surgically remove the tumor in its entirety," explains Dr. Runge. The problem lies in the possibility of any cancerous tissue being left behind after the procedure, as this can dramatically affect the prognosis. But thanks to groundbreaking research at the University of Pennsylvania, led by Dr. Sunil Singhal and Dr. David Holt, a new surgical imaging technology was developed that enables tumors to glow intraoperatively, giving surgeons one more tool in their detection arsenal.

Their method relies on injecting a special dye that accumulates in the cancerous tissue; upon shining an infrared light on the cancerous area, the entire tumor glows. "Our group at Penn had previously shown that lung tumors can be visually enhanced during open chest surgery using near-infrared (NIR) imaging," Dr. Runge says. "This opened the doors to evaluate how it would translate to the minimally invasive arena.

"I was fortunate to be asked to join this exciting research to help prove how the use of this new type of imaging would work during minimally invasive tumor removal in veterinary surgery."

"I was fortunate to be asked to join this exciting research to help prove how the use of this new type of imaging would work during minimally invasive tumor removal in veterinary surgery," he adds. Dr. Runge and his team are currently evaluating dogs having thoracoscopic lung resection for cancer, because this translational research model is almost identical in both humans and dogs. And since minimally invasive surgery prevents surgeons from fully using their fingers for palpation to locate lung nodules, this advanced imaging can help these surgeons find cancer in their patients.

"So far, our research has been very promising," says Dr. Runge. "Dogs and cats play an integral role in scientific research, and it's the right time to be a veterinarian in research. Pet owners are realizing it's not just about their dog—they can help kids and adults, too." ■



Above: Image 1 shows pink lung tissue, with no tumor visible to the eye. Image 2 is the same view of the lung, but by using a near infrared light, a tumor glows blue.

Opposite page and above: Dr. Runge and his team performing minimally invasive surgery in their state-of-the-art operating room. Photos courtesy of John Donges.