The Use of Computed Tomography (CT Scan) and Magnetic Resonance Imaging

(MRI) in Diagnosing Rabbit Disease

By Dr. Kristen Love, DVM

We already have ultrasound, x-ray, and endoscopy, why do we need another imaging technique? Every imaging technique does certain things better than another type. Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) offer 3-D views and are good for areas difficult to see with x-rays and ultrasound.

CT scanning uses x-ray beams traveling through the tissues of the body in a circular pattern. A computer then creates a 3-D image from the results. It is not as detailed for tissues of similar density, like a fluid cyst next to the normally fluid-filled ventricles of the brain, because they both pass through the same amount of x-rays. This may result in a similar exposure on the receiver of the CT scan and the same color being assigned.

MRI scanning uses the natural magnetic alignment of atoms and calculates their varying electromagnetic field responses to the machine's magnet; a computer converts this into a 3-D image. Because of the power of the magnetic field, MRI

scanning cannot be used on pets with any metal in their bodies, such as pins and plates from fracture repairs, gold beads from acupuncture treatments, metal clips from internal surgery, and so forth.

Even though MRI can provide improved detail in some tissues, both it and CT give better diagnostic information than plain x-rays. Both methods also require that the patient be stable enough for anesthesia, in order to obtain the perfect stillness needed for accurate images.

Nothing prior to CT and MRI scanning would allow us to look

at the brain, spine, sinuses, or inner ear until the damage was so great that the bones were changed on x-ray. The dense bones in the skull and spine prevent x-rays from showing any images of the soft tissues of the brain, spinal cord, or nasal passages. Now we can diagnose and accurately treat diseases earlier and even start to learn the true rates of infections, tumors,



A bunny is about to go through a CT scanner. The equipment ensures that the heart rate, oxygenation, blood pressure, and depth of anesthesia are adequate. 1



Harelines, the Buckeye House Rabbit Society Newsletter, is published by the all-volunteer, non-profit Buckeye House Rabbit Society, Athens, OH.

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Visit the House Rabbit Society at http://www.rabbit.org and the **Buckeye House Rabbit Society at** http://www.ohare.org

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Special Thanks to:

Mark Kerley, for graciously donating his custom art services for our holiday raffle (see page 8 for details).

Katie Liepold and the Verizon Volunteers Volunteer Incentive **Program**, for a very generous grant.

Doris Mastroquiseppe, for her kind donation in memory of their beloved Chili.

Linda Gardner, for her generous contribution in honor of dear Chloe, who passed away recently.

Linda Sigismondi, for her tribute to **Sadie**.

Barb Roberts, for her donation in memory of Flopsy,

Gary and Sue Embree, for their generous gift in honor of David and Herta's Richmond, who passed away in July.

The following members, whose monetary and in-kind donations allow us to meet our ongoing fostering and educational goals:

Erika Sharp, Jim and Nancy Reed, Renée Falcone, Junko Rogers, Mike and Rhonda Wadsworth, Carol Danko, Kendra and Joe Minadeo, Sue Milewski, Carmella Coia, Karyn Harshbarger, Judy O'Neil, Donna Waldorf, Janet Reed, the Brumbaugh family.

Our new and continuing Sanctuary Rabbit Sponsors! This program would not be possible without your compassion and generosity. These special rabbits, who must spend the rest of their lives in foster care due to serious medical conditions, have you to thank.

As always, the Monks Copy Shop of downtown Columbus, for their discount on printing our newsletter.







What Happens to Your Rabbit if ...?

By Karen Salvagno

What happens to your rabbit if something happens to you? We love our rabbits dearly and would never want them to be accidentally neglected due to unforeseen circumstances. A realistic assessment of our current capabilities and future needs can help us all deal effectively with the unexpected. Do you have a plan?

I recently helped out with a llama rescue. A gentleman in his 80's called a fellow llama owner for assistance because he was in over his head. When she went out to his farm, there were 86 live llamas and several dead ones. The elderly gentleman's physical health had declined so much that he could no longer properly care for his animals. A llama rescue group was immediately called and luckily all the llamas will eventually be placed in new homes.

This made me think about my own animals and how they would be cared for if something happened to me. Could my husband or I work full time, care for the other spouse, assume all the domestic responsibilities, and care for our animals as well? Who could help out for a short period of time? Who could our bunnies count on for extended care? Most importantly, who would be willing to take them permanently in the event of a disability or an untimely death? My family lives an hour away, so they can't come on a daily basis. Furthermore, they are not animal lovers and would not be willing to take any of our animals home with them. Luckily, we have friends close by who could help. Nevertheless, we did realize that we need to devise a better long-term arrangement.

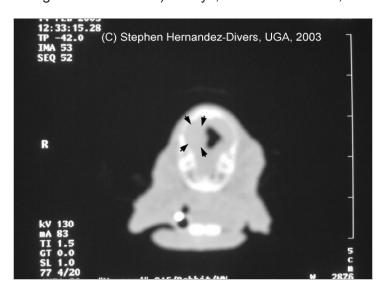
Before anything happens to you, have a workable plan for your rabbit's care. Talk to friends and relatives and find out who is willing to commit to your rabbit and for how long. Who has a key to your home and knows your rabbit's routine and needs? Who can you call on short notice? Who is willing to take the rabbit permanently? Would you consider adding that person to your will and leaving him or her enough money to cover your bunny's care? These are just a few of the questions that require solid, dependable answers well before something happens. Have a plan!



The Use of Computed Tomography (CT Scan) and Magnetic Resonance Imaging (MRI) in Diagnosing Rabbit Disease Cont'd.

and strokes. Veterinarians now have an alternative to x-ray in the diagnosis of dental disease. It takes several x-rays of the skull, under sedation, to try and create a mental 3-D picture of where the most severely affected teeth are and how much bone remains to support the jaw. Since rabbits' mouths do not open very far, it's hard to avoid x-rays with the bones superimposed on each other. It is sometimes difficult to accurately see changes, if a larger bone is blocking the view of the smaller ones. A scan, however, can create an actual picture that can be rotated and even separated into digital sections.

For what specific diseases or problems are we finding CT and MRI scanning to be of particular help? If a rabbit or guinea pig is having trouble opening its mouth, both scanning methods can tell the veterinarian if the problem is due to teeth abscesses, TMJ (jaw joint) problems, tongue or tonsil abscesses, or a combination of problems. Tooth root abscesses appear on most x-rays only after the bone is badly damaged and may not show teeth that could be helped with earlier intervention. If a rabbit has a head tilt, CT and MRI scans can tell us if the problem is due to an inner ear infection, a tumor in the brain, a stroke event, bone build up in the middle and inner ears (usually due to chronic infections), polyps deep in the ears, or an infection of the brain (E. cuniculi or Pasteurella are thought to be common). X-rays, on the other hand,



The arrows show a tumor in the brain of a rabbit.¹



This scan shows that the bones of the skull (irregular white areas) are being destroyed by an infection.1

can only find inner ear infections once they are so damaging that bone is filling the canals; a CT/MRI scan may help us find infections before there is bone build up and the rabbit is deaf. For bulging eyes in rabbits, the CT/MRI scan can tell us if there is an abscess behind the eyes, a brain or sinus tumor, thymoma in the chest increasing blood pressure, bruising from trauma, or even glaucoma. It can also help us determine whether surgery or medication is the best approach and what the likely outcome would be. For a rabbit who cannot use the hind legs well, MRI and CT scans can differentiate between vertebrae fractures, disk rupture, spinal and brain tumors, spinal and brain abscesses from many types of infections and parasites, or possibly a stroke to spinal cords. All of this information can greatly help the veterinarian and owner decide the most appropriate and accurate treatment and predict the likely outcome.

In Rabbit and Rodent Dentistry, Vittorio Capello states that CT "likely represents the next step in diagnostic imaging for diagnosis of dental diseases in pet rabbits and rodents." (110) Many newer books, journal articles, and veterinary conferences are including references and pictures of CT scans of all pet species because of the improved ability to diagnose difficult diseases. Currently, CT and MRI scanning -- \$1,500 to \$2,500 -- are beyond many people's means, but prices are beginning to fall, similar to the ultrasound and digital x-ray. Universities and some large emergency referral practices either have an MRI or CT scan or borrow



a human scanner at night, but it may require driving several hours to reach these facilities. Some companies are working to start a mobile unit that would be able to travel from clinic to clinic, thereby offering local services when needed.

¹ Thanks to *Drs. Susan Kelleher, Stephen Hernandez-Divers*, and *Alessandro Melillo*, for providing pictures for this article and for advancing the use of MRI and CT scanning.

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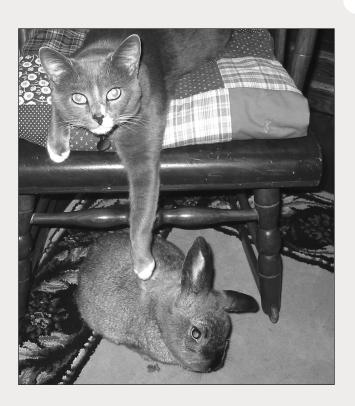


Caring for a Chronically III Bunny

By Marae Martin & Gretchen Steinkamp Reprinted with the authors' permission. First published in Vol. 5, Issue 1, Columbus House Rabbit Society Newsletter.

Callie Jane is a big, beautiful bun with tons of personality who loves life, but it wasn't always this way. Callie was rescued from an outdoor cage. Her owner had her for about six months, when she and her boyfriend purchased a large dog. Need I say more? Marae walked up to the door and asked the people if they wanted to find a home for their bun. To our surprise, they said yes! Callie has been in our hearts ever since.

About a year after taking her in, Callie (then about three years old) developed an abscess in





Somebunny Needs YOU!



Big, beautiful **Diva** will want a star on her door while she enchants you with her gentle ways and loving nature. An excellent litterbox performer with a strong appetite, her fondness for tunneling through paper bags adds

to this eight-pound bunny's character. Her past is a mystery and her age unknown, but don't let that stop you from inviting Diva to play a leading role in your home. Please contact Herta Rodina (herta@ohare.org) 740-797-7616.



This is **Lucy**. She is a minirex with beautiful gray and white velvet fur, born in the spring of 2006 and weighing about three pounds. Look at her and you would never know that she had been very dehydrated and near death. Curious, she loves to see what is going on and is also starting to enjoy attention. Lucy is good with her litterbox

habits and loves her food. She is ready for that special person to give her lots of love and attention. Please contact Sue Zimmerman (sue@ohare.org) 419-355-8433.



Freud has a beautiful white coat with light gray ears and a light gray nose and weighs roughly 6 lbs. He had been sitting at Wood County Humane Society for a few months when we decided to take him in and find him a new home. Freud is very friendly and loves to be petted. He also likes to play with his plastic slinky and the many other toys in his pen. Please contact Kristen Doherty 440-543-4959.



Cinderella is a graceful young beauty. She doesn't need Prince Charming; all she needs is a loving home. Give her a happily ever after by calling today and making her part of your family. Please contact Michele Roth Kerley (michele@ohare.org) 859-261-0556.



Tazwell is one of the bunnies rescued from the Elyria overcrowding situation, from one of the last litters born there (Jan – Apr 2006). A little shy, Taz will need time with you to warm up and develop trust. He's on the small side, full-grown at about four pounds. He loves his bamboo paper plate holders

for chewing and is perfect with his litter box. Please contact Kristen Doherty 440-543-4959.



J.J. is a funny and confident bunny who loves to play with his toys and be around people. He weighs about five pounds, is perfect with his litter box, and is used to being around dogs. J.J. would be a good choice for a family with kids. Please contact Kristen Doherty 440-543-4959.



Bruner lived with the other 18 bunnies in the Willoughby situation. He had bright orange fur that all came out during a major shed, then in came the most beautiful dark chocolate brown fur with white markings, as he transformed into an almost completely different bunny. Bruner weighs about 5 lbs and loves to be petted all over. Bruner would do well with children. Please contact Kristen Doherty 440-543-4959.





This is **Pumpkin!** She is a very sweet young lady. Just look at her awesome blue/gray fur! What a beautiful bunny! Pumpkin enjoys playing with her toys and she especially loves to chomp on hay. Wouldn't you love

to make Pumpkin a member of your family? Please contact Sue Zimmerman (sue@ohare.org) 419-355-8433.



Meet **Benji**. He's a domestic bun who looks a lot like a wild cottontail. Benji was part of a group of over 20 rabbits seized from a backyard breeder who was not feeding and caring for them. Benji is an active young male. Since he was never kept as a "pet" bunny,

he needs some socialization time with a family who will help him to learn to trust humans. He's not afraid of people, he just needs to bond with someone who will take the place of his former hutchmates! Please contact Sue Zimmerman (sue@ohare.org) 419-355-8433.



Flo is a beautiful fawn-colored girl with short agouti-like fur and long narrow ears. She likes to jump up on you while you're watching T.V., then goes along her way to explore as much as she can in her surroundings. Flo weighs roughly 5 lbs and will take a little time to develop trust, but once she does, she's your friend for life. Please contact Kristen Doherty 440-543-4959.



Belle is a real cutie! She loves to be petted on her little nose. Belle also enjoys digging in her hay box and napping in her cardboard tunnel. She is a bit on the shy side but is really coming around. Can you welcome Belle into your home? Please contact Sue Zimmerman (sue@ohare. org) 419-355-8433.



Sylvester is quite a unique looking bunny with his stripes and two-toned face! He LOVES his free time and pellets. This handsome guy would make a great addition to your home. He has lots of love to give. Why not make an appointment to meet him? Please contact Sue Zimmerman (sue@ohare. org) 419-355-8433.



Winslow also came from Willoughby and because of his docile personality, we think he was the "peacemaker" of the group. Winslow is a gray bunny with "airplane ears" that can stay up, down, or stick out to the sides. He weighs about 4 lbs and loves to be petted all over. Winslow would do well with children. Please contact Kristen Doherty 440-543-4959.



Big Red is one of the 19 rabbits rescued from the Willoughby situation. He's a big, lazy, laid-back bunny with a funny personality. He has a beautiful coat of orangish-red fur and weighs roughly 8 lbs. Because of his easy-going nature, Big Red would do well in a family with children. Please contact Kristen Doherty 440-543-4959.



Esther is beautiful dark brown agouti girl with long ears that stand straight and tall. She is an independent spirit with a mind of her own, and she'll keep you amused for hours as she hops about and exerts her assertive personality. She weighs about 5 lbs and is perfect with her litterbox. Please contact Kristen Doherty 440-543-4959.



Adopted!



Dave has run of the entire condo and is the center of attention at Lorrie and Len Plut's in Mentor.♥

Maggie was adopted by Mary and Al of Pepper Pike and became fast friends with pal Joey.♥ Caleb

easily made the transition from being an outdoor bunny to sharing indoor space with Robbi and family

of Twinsburg.♥

Holiday Raffle to Benefit Buckeye HRS Foster Rabbits!

Just in time for that extra-special holiday gift, Northern Kentucky artist Mark Kerley is generously donating an 8" by 8" custom pet painting for our fourth annual holiday raffle. The winner will simply choose a favorite photo of his or her bunny and Mark will produce a painting.

All proceeds will go directly to our foster program and will ensure that needy bunnies have a safe and happy holiday season while they await the ultimate gift, a permanent home. Tickets cost \$1 each and you may buy as many as you wish. All entries must be postmarked no later than December 1, 2008. Please include your phone number and email (if available) with your check or money order and indicate it's for the raffle. Mail your request to: Buckeye HRS, P.O. Box 5767, Athens, OH 45701. The lucky winner will be notified in early December and will receive the custom certificate in time for holiday gift-giving.

Below is a sample of Mark's work, which can also be viewed in color on our website at www.ohare.org/gifts.htm#raffle. About this painting, Mark says: "This lil guy's name is Bun Bun and it's a memorial for a rabbit who had recently passed away. So I really tried to capture a little extra sweetness and put a big sparkle in his eyes."

About the Artist

Mark Kerley is an accomplished graphic designer and occasional artist. As the owner of Lucky Rabbit Studio, he not only provides quality design solutions but also donates 5% of his profits to the House Rabbit Society for the rescue and adoption of abandoned rabbits. Mark also enjoys the outdoors, books and the wind in his face when out riding his bike. He and his wife, Cindy, reside in historic Bellevue, Kentucky with their house rabbit (and logo to Mark's company), Sophie.

Contact information:

www.LuckyRabbitStudio.com

Phone: 859-803-3293

Email: luckyrabbit@fuse.net







Happier Holidays for your Rabbit



By Karen Salvagno

Holidays are usually very busy times for us. Especially in December, when we're out shopping for gifts. decorating the house, and attending Christmas parties or other festivities. We all know how a joyous time can also be a very stressful time for people. It can also stress our rabbits. Here are a few things to keep in mind as the holidays approach:

What kind of time do we have for our rabbits?

Obviously, we must still carry out the regular chores of feeding and keeping bunny's area clean. And, s/he still needs an adequate amount of daily exercise. Remember, too, that no matter how busy you are, your rabbit also needs lots of love and attention from you. This ensures bunny's mental and emotional well being and also helps you detect any physical problem that may be developing.

What additional items may be present in your home for

rabbits to chew or eat?

Many of us put up artificial Christmas trees. Some buy poinsettias. Both can cause digestive problems if your rabbit ingests them. Contrary to popular belief, however, poinsettias are not poisonous; like all house plants, they should nevertheless be kept out of bunny's reach. In addition, make sure your rabbit cannot chew or eat low-hanging ornaments

or tinsel; keep bunny away from the tree or simply don't decorate the branches that are within his or her reach. The same holds true for other tempting holiday decorations, such as garlands and lights.

Who will be visiting and how many houseguests might be present at one time?

If you have parties at your home during this time of year, think carefully about how your rabbit reacts to strangers. For large gatherings, consider putting your rabbit in another room, where the atmosphere will be quiet and calm. Your rabbit may dislike all the commotion and noise of a large group of people. And, guests who are not used to freeroaming rabbits won't be looking out for them and may accidentally kick or step on them. If children will be visiting, ensure that any interaction with your bunny has adequate adult supervision. A rabbit who isn't used to children can be very stressed - not to

> mention seriously injured -- when picked up, held, or even just petted in an unfamiliar way.

If you keep your rabbit's overall schedule as normal as possible and minimize holiday stresses and dangers, both bunny and you will enjoy safe and happy celebrations.





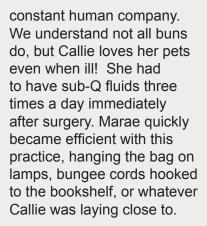
Caring for a Chronically III Bunny Cont'd.

her jaw just under her eye. Her vet at the time removed what he could and placed antibiotic pellets in the pocket of the abscessed area. This worked for a short time, but the abscess soon returned. Karalee Curry hooked us up with Dr. Herrli in Columbus. We lived in Cincinnati at the time, so that was quite a drive. Dr. Herrli's expertise was well worth the trip. She did a CT scan and other tests to determine the problem. Surgery #2 occurred. Much necrotic tissue was removed and Callie was sent home with tons of post-care instructions. We had to write a schedule of care and check off each element as we did it. Fluids, antibiotics, tummy meds, Critical Care formula, pain meds. Some medications were injectable, some oral. We crushed and mixed meds, poked and prodded the poor bun. Her eye drooped a bit after

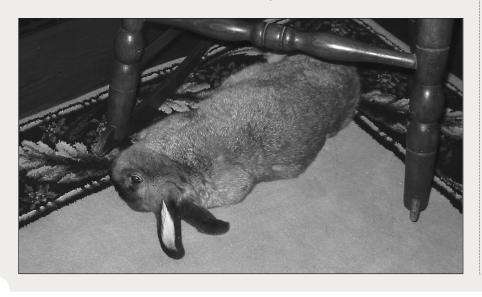


surgery due to some minor nerve damage and her tear duct remains clogged to this day. The clog was not a result of the surgery. Daily warm water compresses help keep the eye clean.

Marae spent the first two nights on the floor, sleeping sporadically, next to Callie Jane. She was given Metacam for pain several times a day, but remained uncomfortable and undoubtedly frightened. Despite that, she seemed to relish the



In spite of our best efforts, the tooth abscesses kept occurring. Dr. Herrli said this is common and that Callie's teeth were especially "gnarly." After each of Callie's four abscess surgeries, we took some vacation days to care for her. It was intense. Most of Callie's meds had to be crushed and mixed with banana so she would take them. This worked for a minute. Smart bun! We soon had to resort to other modes of administration. Oral medications were specially mixed and dispensed through Hills Pharmacy in Milford, Ohio (they send it out by mail). Expensive, but worth it! We've since learned that we can crush most medications and put the powder in 100% carrot juice (Kroger produce section). Check with your vet to make sure this is ok first. A 3cc syringe (no needle, obviously) will accommodate that nicely. We use a shot glass, pour in some carrot juice, draw the syringe about 3/4 full of juice, then pour the remaining juice from the shot glass back into the bottle. We shoot the syringe full of juice



back into the shot glass, mix it with the powder, and put it back in the syringe. We've found it works best if you shoot the syringe into the side of bun's mouth. Callie likes the juice, so she tolerates the syringe.

When Callie's fever spiked after her operation, we used an ice pack wrapped in a towel placed under her chest to bring it down, following our vet's direction. Every two hours, critical care formula was given to her by mouth through a large syringe to keep her gut moving. She didn't like that. We found that placing her bunny butt between our knees as we kneeled on the floor, then leaning over, was the best way to do this. That way, she was safely contained while we looked for her mouth!

We also learned how to take Callie's temperature. What fun! She didn't like that either, but tolerated our violation of her bunny bun. Your vet can show how to administer fluids, give injections, and take your bunny's temperature without hurting her.

Some medications did have to be given by injection. We were informed that you have to be careful doing this. Dr. Herrli told us to draw out after we penetrate the skin and prior to injecting the meds so that we're sure we haven't hit a vein. If you see blood in the syringe, pick a different spot. Who knew? We also had to

change injection sites frequently to avoid the formation of HUGE scabs on her skin. The scabs that did form came off in time with a warm water compress, iodine, and gentle pulling. Dr. Herrli said it's best to get them off the skin as soon as they loosen rather than leave them to come off in their own time.

We fed her alfalfa hay and bunny junk food (aka Fiesta -- no seeds -- rabbit food from the pet store) to get her to start eating on her own again. As we did this, we slowly decreased the critical care and fluids, following Dr. Herrli's instruction. We watch Callie Jane daily for behavior changes. If she stops eating her pellets or is less active for a few days, she needs to see Dr. Cron (our Cincinnati vet). Dr. Cron said she is still learning about tooth care and is not afraid to refer to someone with more experience in that area. My kind of doctor! Drs. Cron and Herrli have worked very closely together to coordinate Callie's care.

Here we are four years later. Callie is seven years old.

She had her last abscess surgery nine months ago. Dr. Herrli removed a lot of necrotic tissue from her neck (the latest abscess site). We thought we would lose her that day, but didn't. She's a fighter. Recently, Callie developed a nasty sinus infection. She is on Zenequin, a very heavy-duty. expensive antibiotic (\$200 per month). When it stops working, there will be no other treatment available. We've decided that she won't go through any more surgery. She will live out her little bunny life in our living room with all the pets and kisses we have time to give her.

We've spent about \$3,000 and countless hours caring for Callie Jane. As a result of her intensive care, she has gone from a frightened, shy bunny in a cage to the most loving, trusting bun we've seen to date. If we had to do it all over again, we'd invest the cash and time. The love she's given us has been more than worth it.





MEMBERSHIP FORM ———

Your \$33.00 annual membership in the Buckeye HRS includes:

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- Local membership (\$15.00) and issues of Harelines If you are already a national member, your local fee is \$15.00

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I would like to volunteer to:

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- ☐ Help at Buckeye HRS booth at Pet Expos and fairs □ Other_____

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