

## Not even skin deep

•New treatments and diagnostics work from the outside. •Encourages in veterinary medicine mean that your dog can get better treatment with less pain and invasiveness. Four recent growths offer effective and more benignant methods of imaging organs and vessels and of treating or diagnosing cancer, urinary stones, and ophthalmologic tumors and illness. Currently available mainly at the institutions that developed them, these technologies will filter down to recommendation hospitals in the next few years. •Ophthalmic ultrasound: Forming from the same basic principle as general ultrasound, ophthalmic ultrasound utilizes higher frequency probes to produce a detailed image of the eye's small structures. •As a result, veterinarians can differentiate between tumors and cysts in the iris. "This is crucial because a tumor requires to either be treated or the eye removed, while a cyst requires no treatment," explains Ellison Bentley, DVM, diplomate of the American College of Veterinary Ophthalmologists and an assistant professor of comparative ophthalmology at the University of Wisconsin-Madison School of Veterinary Medicine. "We can also more objectively monitor tumor size after treatment in cases where the eye is not removed, making it easier to treat tumors without removing the eye, so the animals can preserve imagination longer," •Additionally, ophthalmic ultrasound yields exact information on opaque corneal wounds (such as tumors), allowing for a better idea of the prognosis and the cost of surgical treatment. Plus, the smaller probe requires only topical anesthesia of the eye. •Contrast ultrasound: Also under investigation at the University of Wisconsin Madison, contrast ultrasound develops images of minuscule bubbles injected into a patient applying conventional ultrasound equipment. "Contrast ultrasound permits us to image blood, including blood in very small vessels, without the need for general anesthesia, radioactive substances, injection of iodine-containing drugs, or placement of needles into organs for certain diagnoses," says Robert O'Brien, DVM, M.S., diplomate of the American College of Veterinary Radiology and chief of staff of small animal services at the university. The technology may assist veterinarians distinguish among cancerous and benign nodules in the liver; diagnose porto systemic shunts (which cause abnormal blood supply to the liver), and identify any illness that might be accompanied by abnormal blood flow, says O'Brien, also a clinical associate professor of radiology. •Extracorporeal shock-wave lithotripsy: Traditionally, urinary and kidney stones requite surgical removal. However, researchers at the University of Tennessee in Knoxville and Purdue University in West Lafayette, Ind., use extracorporeal shock-wave lithotripsy (ESWL) to break them up from outside the body instead. Anesthetized dogs are laid above a soft cushion filled with water. Then shock waves, generated by an electrohydraulic or electromagnetic source, are transmitted through the cushion to the stones, explains urology researcher India F. Lane, DVM, M.S., associate professor and director of medical services in the department of small animal clinical sciences at the University of Tennessee College of Veterinary Medicine. The fragmented stones and then pass harmlessly through the kidney and bladder, generally inside various weeks. A two-night hospitalization adopts the hour-long treatment. •Linear accelerators: A new type of radiation equipment, linear accelerators elaborate the types of cancerous tumors treatable by radiation. "In the past, lower energy radiation machines in effect treated superficial tumors but did not penetrate also to more deeply seated tumors," says Margaret C. McEntee, DVM, diplomate of the American College of Veterinary Radiology and the American College of Veterinary Internal Medicine and an associate professor of oncology at Cornell University College of Veterinary Medicine in Ithaca, N.Y.' In contrast, mid- to high-energy linear accelerators appropriate the use of different types of radiation (photons and electrons) to treat both deeper and superficial tumors. The two types of radiation also allow treatment of tumors overlying normal tissues, such as the lung and heart, without causing significant radiation damage to the tissue of those organs.