



## Profile: Donald Fuller, M.D.

### Radiation oncologist uses new noninvasive system to attack difficult-to-reach tumors throughout the body



Radiation oncologist Dr. Donald Fuller is one of a growing number of specialists using the noninvasive CyberKnife® robotic radiosurgery system to attack difficult-to-reach tumors throughout the body. CyberKnife was developed by a team of Stanford University scientists.  
Photo/Jon Clark

By Arthur Lightbourn

The 'instrument' is a \$4 million CyberKnife®, a room-size robotic radiosurgery system, developed by a team of Stanford University scientists, that zaps even the most difficult-to-reach tumors anywhere in the body with precise, highly-focused radiation beams and without the use of traditional surgery, incisions or anesthesia.

The CyberKnife system, using a continual image guidance technology and a computer controlled robotic arm, automatically tracks, detects and corrects for tumor and patient movement in real-time throughout the treatment.

Treatments are delivered on an outpatient basis in one to five high-dosage sessions lasting between 30 and 120 minutes. Patients feel no pain during the treatment and are able to go home immediately

## Quick Facts

**Name:** Donald Fuller, M.D.

**Distinction:** Radiation oncologist Dr. Donald Fuller is one of a growing number of specialists using the noninvasive CyberKnife® robotic radiosurgery system to attack difficult-to-reach tumors throughout the body. CyberKnife was developed by a team of Stanford University scientists.

**Resident of:** Rancho Santa Fe since 1999.

**Born:** Seattle, Washington, 50 years ago.

**Education:** B.S. degree in zoology, Washington State University, 1980; M.D., University of Washington, 1984; internship, Santa Barbara

afterwards.

Although the procedure does not remove a tumor, it can destroy tumor cells or stop the growth of active tissue.

Fuller said the fastest growing use of the procedure in his practice is its use in treating lung and prostate cancer, followed by upper abdominal cancers.

He and his eight radiation oncology partners at the CyberKnife Centers of San Diego began using the CyberKnife technology in their downtown San Diego center in June 2006, and in their Encinitas center in late 2007.

They currently treat 200 to 300 patients a year with the CyberKnife. They also treat patients with conventional radiation therapies.

"In this specialty, no one tool is the solution to every problem.

"Sometimes we use both.

Sometimes we use CyberKnife and normal radiation, CyberKnife to take out the core, the bulk of the tumor, and normal radiation to mop up the edges."

CyberKnife technology was cleared by the FDA for intercranial applications in 1999 and for full-body usage in 2001.

To date, the CyberKnife system has been used to treat more than 40,000 patients worldwide, at more than 125 system medical sites, according to Accuray Inc., the Sunnyvale, California company that markets CyberKnife.

Fuller, however, recently gained international attention when he published a study revealing that the CyberKnife system, in addition to its ability to attack prostate and other cancers directly, can also be used as a non-invasive delivery system for the more traditional high dose rate (HDR) brachytherapy without the insertion of multiple catheters into the prostate.

HDR brachytherapy, with its complex dosage pattern to various regions of the prostate gland, has a track record for being an extremely effective approach for treating prostate cancer, with substantial clinical evidence supporting its usage, Fuller said.

But, he added, the required insertion of multiple catheters into the prostate, where they have to remain for the duration of the brachytherapy procedure, typically one to three days, classifies it as an invasive procedure.

The study is important, Fuller said, because it demonstrates that prostate cancer can be treated effectively with the noninvasive CyberKnife while avoiding side effects such as long recovery times, incontinence and impotency often associated with invasive treatments.

"Our study concluded that CyberKnife radiosurgery can offer the benefits of HDR brachytherapy noninvasively on an outpatient basis that is both easy to deliver and comfortable for patients," Fuller said.

Cottage Hospital; and radiation oncology residency, LDS Hospital, Salt Lake City, Utah.

**Family:** Married going on 25 years to Mary Ann (nee Ivy); four children, Loni, 17, a junior at Torrey Pines High; Lacey, 15, a freshman at Cathedral Catholic High; Kimberly, 13, 8th grader at RSF Middle School; and son, Blake, 8, a 2nd grader at RSF School.

**Favorite Getaway:** Ski trips to Sun Valley, Idaho.

**Favorite Author:** Jon Krakauer, writer and mountaineer, whose books include, Into Thin Air, Into the Wild, and Under the Banner of Heaven.

**Favorite Foods:** Italian

**Favorite Film:** "Cool Hand Luke"

**Philosophy:** Borrowed from a Sherpa in Nepal: "Better to live one year as the tiger than 100 years as the sheep."

Early clinical outcomes of the study show a rapid reduction in prostate specific antigen (PSA) levels with minimal short-term side effects.

The study was published in the recent issue of the International Journal of Radiation Oncology, Biology and Physics.

Fuller considers his discovery his most important contribution to his field in his 20 years of practice.

We interviewed the youthful-looking 50-year-old physician in the Encinitas offices of the Radiation Medical Group (RMG), the medical group that operates CyberKnife Centers of San Diego. Fuller joined RMG in 1988.

Born in Seattle, Washington, Fuller, the eldest of five children in his family, grew up in the small town of Wenatchee, Wash.

He inherited a love of science and a facility and liking for math and physics from his physician father who was a pulmonary specialist.

Ever since high school, Fuller was drawn to medicine as a career.

"It almost seemed to be pre-ordained," he said. "I never really thought about doing much else."

As a pre-med student at Washington State University, he majored in zoology, graduating in 1980 with a B.S. degree. Four years later, he earned his M.D. from the University of Washington, followed by an internship in medicine at Santa Barbara Cottage Hospital, and a radiation oncology residency at LDS Hospital in Salt Lake City, Utah, in 1988.

It was in medical school during a two-week elective clinical rotation in radiation oncology that he discovered the field of medicine he wanted to devote his life to.

"Radiation oncology is a little bit like engineering and yet it has good patient contact too. So it's a great combination if you like patient contact with math, geometry and physics. It's very technologically sophisticated."

It suited his personality, he said, and within 24 hours of being introduced to the specialty, "I was hooked."

Also, in med school, he met his wife to be, Mary Ann Ivy, who was working in retail at the time. They will celebrate their 25th wedding anniversary this year.

Recalling the balmy 76-degree temperature when he first arrived in San Diego in December 1988, for an interview with the Radiation Medical Group, he said to himself, "This is it." San Diego was the place for him. "And it stuck," he said. "I've remained with RMG ever since."

Looking back over his 20 years of practice as a radiation oncologist, Fuller is amazed and proud of the progress made in his field.

Thanks to the introduction of the computer, he said, radiation oncology has morphed into a much more powerful cancer-killing weapon, aided and assisted by advances in radiology, "so we have MRIs [magnetic resonance imaging] and [cancer detecting] PET Scans and the resolution is so much higher, we can map the location of tumors with very much greater precision than we used to."

Another critical development, he said, is the ability to import radiology information into planning computers to design conformal radiation beams, precisely mold radiation dosages around tumors and report the results.

"It's really not appreciated in medicine what a powerful cancer-killing tool radiation is,"

Fuller concluded. "It's as powerful as surgery. It kills cancers. It just doesn't knock them down. It kills them, if you know what you're doing and have the right equipment."

He describes himself as a contrarian and an early adopter of new technologies.

"I don't wish to be constrained by old paradigms."