



# Prostate Insights

The Latest Developments in Prostate Cancer Care

November 2016 // Vol. 19, Is. 4

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**Fabio Almeida, MD, Explains Newly Approved PET/CT Agents  
Highlights from the 2016 Prostate Cancer Conference  
Donate to PCRI with Dr. Moyad  
Carl Rossi, MD, Overviews Proton Therapy  
Race Cars, Women, and Prostates  
2017 Mid-Year Update**

# Editorial

**Peter Scholz** // PCRI Creative Director

Greetings Researcher! Welcome to another issue of Prostate Insights, providing the latest information in the prostate cancer world. This has been an amazing year of developments.

In this issue, Fabio Almeida, MD, writes about new PET/CT agents that have been approved by the FDA for use in men with recurrent prostate cancer. His article discusses all the pros and cons of each agent, and gives full and up-to-date picture of the state of prostate cancer imaging. Dr. Almeida is a pioneer in the field of imaging for prostate cancer.

Dr. Fabio Almeida recently won the Grand Prix of Scottsdale with a team of prostate cancer survivors! Dr. Almeida is helping to bring critically needed awareness about prostate cancer to a large audience. Xan Oakley, our educational writer, shares her experience assisting the racing team and how these cars made an impact.

DVD's of our 2016 Patient Conference are available! This year's conference featured MLB All-Star Ken Griffey Sr. His talk, along with major highlights from the event are recorded on a 4-DVD set and can be obtained with a \$150.00 donation. Many of the experts who spoke at the conference covered developments that occurred only in the past 3-6 months. Game-changing information was presented and you don't want to miss out!

Our 2017 Mid-Year Update is coming up this March, and we are proud to feature Carl Rossi, MD, talking about Proton Therapy, Mark Scholz, MD, discussing active surveillance, and Robert Dreicer, MD, a world-famous prostate oncologist, reviewing treatment for advanced prostate cancer. Additionally, in this issue, Dr. Rossi will give us an introduction to a new form of proton therapy that is only available in a few centers around the country. He will compare it to other forms of radiation therapy. Dr. Dreicer will explain the latest pharmaceuticals used for treating advanced disease.

We are approaching the end of the year, and Dr. Moyad has written a letter explaining why PCRI's mission is so crucial to the world of prostate cancer and how a donation to PCRI can directly impact the lives of patients and caregivers that are facing this disease.

I hope you enjoy this new issue of Prostate Insights. I wish you all the best as we enter the holiday season.

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## 2017 Mid-Year Update

PCRI Staff

Our 2017 Mid-Year Update is on March 25, 2017, and will be held at a new location. See this article for information about the topics, speakers, our new location and how to register. This is an event you won't want to miss!

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# AN OVERVIEW OF CURRENT POSITRON EMISSION TOMOGRAPHY (PET) SCANS

**Fabio Almeida, MD**

Phoenix Molecular Imaging

*There is a great clinical need for more accurate scans, empowering the trend toward more personalized care. PET imaging is a critical component of managing recurrent and advanced disease, and some newly diagnosed cases as well. This article provides an updated summary of new imaging approaches to prostate cancer, focusing on current and emerging positron emission tomography (PET) scans.*

## CONVENTIONAL TYPES OF IMAGING

**Ultrasound** has a role in doing prostate biopsies and the placement of radioactive seeds in primary prostate cancer. It is also for evaluating local recurrence after surgery in patients with an increasing PSA. **CT Scans** are commonly used for staging men with newly-diagnosed disease, looking for enlarged lymph nodes in the pelvis. However, it is inaccurate for detecting cancer in the lymph nodes. If cancer is present in the nodes, a CT scan only finds it 35% of the time. **Prostate MRI** is used for staging, biopsy guidance, surgical planning, radiation planning, and restaging after PSA relapse. Multi-parametric MRI is being found to be very helpful for detection and local staging of untreated prostate cancer, to reveal features such as extra-capsular extension or seminal vesicle invasion, thus helping to confirm local (organ confined) disease. Additionally, multi-parametric MRI is a useful imaging tool for following changes in the prostate gland for men on active surveillance.

## TECHNETIUM-MDP

Prostate cancer frequently metastasizes to the bone, therefore the mainstay of imaging for advanced prostate cancer has been technetium-labeled bisphospho-

nate bone scintigraphy. T-99 bone scans are used for initial staging of intermediate-to-high-risk disease and for restaging after PSA relapse. Unfortunately, it is not sensitive enough to detect small skeletal metastases. False positives are common due to interference from non-cancerous arthritic changes and/or prior trauma.

## SODIUM FLUORIDE (NAF) PET/CT SCANS

NaF PET is similar to standard bone scans, but uses PET imaging which is significantly more sensitive and specific than T-99. Another advantage of NaF PET is the shorter scan time, typically less than one hour, compared to 4 hours.

## <sup>11</sup>C CHOLINE AND ACETATE PET SCANS

Prostate cancer cells rely on fatty acid metabolism as their energy source. <sup>11</sup>C-choline and <sup>11</sup>C-acetate are lipid-metabolism PET agents. Both of these agents are useful for detecting recurrent disease after a PSA relapse. <sup>11</sup>C-choline has been approved for use at Mayo Clinic. <sup>11</sup>C-acetate is available under expanded access clinical trials at multiple institutions. Small direct comparison studies of <sup>11</sup>C-acetate and <sup>11</sup>C-choline have revealed no clear clinical differences

between these agents, although a few studies have suggested a slightly higher detection rate of local recurrences and small pelvic lymph node metastases with <sup>11</sup>C-acetate. In a large-scale study of <sup>11</sup>C-acetate PET/CT imaging in 887 patients with relapsing PSA (at Phoenix Molecular Imaging), the overall detection rate of recurrent prostate cancer was 88%. A PSA threshold of 1.09 ng/mL was established for optimal imaging. However, if the PSA was less than 1.0 ng/mL but the PSA doubling rate was brisk (less than 3 months), the detection rate was better than 90%. The reported detection rate for <sup>11</sup>C-choline generally ranges from 42-82% with a PSA threshold of 2.0 recommended for optimal imaging. However, at least one study in 102 patients has demonstrated a significant influence of the PSA doubling time on <sup>11</sup>C-choline with a 93% detection rate noted in a PSA range of 0.67-1.1 ng/mL if the PSA doubling rate was under seven months.

## AXUMIN PET SCANNING (<sup>18</sup>F-FACBC)

Amino acids, such as leucine, methionine, and glutamine, are absorbed into the cancer cells because of the increased metabolic demands of the growing cancer cells. The FDA recently approved Axumin

**Amino acids, such as leucine, methionine, and glutamine, are absorbed into the cancer cells because of the increased metabolic demands of the growing cancer cells.**

(Fluciclovine or 18F-FACBC), which is a fluorine-18 radiolabeled synthetic leucine amino acid. The FDA approved Axumin for the detection of recurrent cancer in men with rising PSA after previous surgery or radiation.

### CLINICAL TRIALS OF AXUMIN

Scans were performed in 105 patients. The results were checked for accuracy with biopsy or surgery after the scan. Three independent reviewers analyzed the scan results. For men who had biopsy confirmation of cancer in the prostate bed, the true-positive rate ranged from 49-58%. The false positive rates ranged from 16-30%. For patients who had positive biopsies outside of the prostate bed, the results were much better, with a true-positive rate of 88-93% and a false-positive rate of only 7-8%. Optimal detection rates were seen when the PSA was above 1.78.

In another clinical trial of 96 patients, a comparison was made between Axumin and <sup>11</sup>C-choline PET. The scans showed equivalent findings 61-77% of the time. However, this study did not include biopsy confirmation. In a third study performed in Italy, 89 patients with a rising PSA were studied. The overall cancer de-

tection rate was 37%. In those patients with a PSA of less than 1.0 ng/mL, the detection rate was 21%, with a PSA of 1.0-2.0 ng/mL detection was 29%, and when the PSA was higher than 3.0 the detection rate was 59%. Direct comparison to <sup>11</sup>C-choline indicated better performance for Axumin. However, the detection rates they achieved with <sup>11</sup>C-choline were far below that seen in nearly all previously published studies. Hopefully, the performance of Axumin will improve as time goes by and investigators learn how to use this new tool in an optimal way.

### PSMA PET SCANS

The prostate-specific membrane antigen (PSMA) is a transmembrane glycoprotein that occurs much more commonly in prostate cancer cells compared to benign prostate tissue. The clinically approved imaging method using PSMA was ProstaScint. ProstaScint, however, has several limitations. The technique uses an intact antibody which targets the internal portion of the cell membrane glycoprotein (PSMA) which requires long circulating times. There is prolonged blood-pool retention leading to high background signals, low detection rates, and much lower spatial resolution compared to PET. →



**Fabio Almeida, MD**, is the Medical Director of Phoenix Molecular Imaging in Phoenix, Arizona. Dr. Almeida is one of the pioneers in the development and implementation of cross modality fusion for cancer imaging (SPECT, PET, CT and MRI) and PET/CT. He led the creation of the first combined PET/CT imaging program in southern Arizona and established the routine integration of PET/CT imaging into radiation oncology planning. He has authored and participated in several publications in radiology, oncology and information science. Now, as Medical Director of Phoenix Molecular Imaging and Southwest PET/CT Institute in Yuma, Dr. Almeida oversees clinics in Phoenix, Yuma, and Tucson, providing his extensive clinical expertise in PET/CT imaging. He actively participates in several oncology and neurologic clinical trials, and is the principal investigator for a novel Carbon-11 PET agent for prostate cancer imaging.

**The FDA recently approved Axumin (18F-FACBC) which is a fluorine-18 radiolabeled synthetic leucine amino acid. The approval is for the detection of recurrent cancer in men with rising PSA after previous surgery or radiation.**



Learn more about  
PET/CT Imaging at  
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Better agents for detecting PSMA have been developed, such as 68gallium-PSMA-11. Several retrospective studies have indicated a higher diagnostic efficiency of 68Ga-PSMA PET/CT compared to <sup>11</sup>C-choline PET. In one study, for example, with 319 patients with PSA relapse, an overall 82.8% detection rate was seen. As would be expected, the probability of detecting lesions was correlated with PSA level. A 50% detection was seen when the PSA was 0.2-0.5, 58.3% detection with a PSA of 0.5-1.0, 71.8% detection with a PSA of 1.0-2.0, and 93% detection when the PSA was over 2.0. 68Ga-PSMA is under clinical trial investigation in multiple U.S. institutions (e.g. UCSF, UCLA, and Stanford University).

A few limitations of PSMA-targeting agents are important to understand. Not all prostate cancers exhibit PSMA overexpression. In one study, about 8% of patients with prostate cancer did not show PSMA overexpression. Additionally, PSMA ligands are not completely specific for prostate cancer and several benign lesions such as thyroid adenoma, Paget's disease, schwannoma, adrenal adenomas, and several types of vascular tumors (colon, breast, renal, liver, thyroid) may also exhibit increased PSMA

expression. False positive celiac lymph nodes frequently have been noted in the upper abdomen. Finally, the PSMA-targeting agents to date are significantly excreted in the urinary tract and urinary bladder, which often obscures the prostate bed, making detection of small locally recurrent lesions and lymph nodes in the lower pelvis challenging.

In summary, the excitement surrounding the current and emerging PET agents is appropriately exuberant. Despite the radical breakthroughs that are occurring in the area of imaging, a fair amount of confusion also exists. There is still no "perfect" imaging methodology with 100% accuracy. The recent FDA approval of Axumin is cause for celebration. In addition, our experience at Phoenix Molecular has shown <sup>11</sup>C-acetate PET to be a very valuable tool. But <sup>11</sup>C-acetate PET is unlikely to become widely available due to the requirement for an on-site cyclotron. PSMA-targeted agents are becoming the major focus for future attention and development. Despite some limitations, PSMA-targeted imaging appears to provide high sensitivity and specificity, and is likely to become part of the routine evaluation and management of men with prostate cancer in the near future. ■



Photo Credit: Lindsay Meggers



## RACE CARS, WOMEN, AND PROSTATES

By Xan Oakley // PCRI Educational Writer

***To raise awareness about prostate cancer and PSA screening, our board member Fabio Almeida, MD, created a racing team of prostate cancer survivors. His cars are displayed at car shows across the nation along with a no-cost PSA testing booth. The Scottsdale Grand Prix is the hallmark event for the vintage racers. This year, his team took home the grand prize and through his team's victory, brought prostate cancer awareness to the forefront of attention in Scottsdale. Our Educational Writer, Alexandra "Xan" Oakley, and Lindsay Meggers assisted Dr. Almeida and his team at the event.***

When you hear "Vintage Kart Grand Prix," I know you might not be thinking "prostate cancer." In early November, my co-worker, Lindsay Meggers and I received many surprised looks when we represented the PCRI at the 2016 Grand Prix in Scottsdale, Arizona. We experienced the same surprised reactions at a Vintage Kart event in Pebble Beach, back in August. We were invited to both events by Fabio Almeida, MD, a PCRI board member and the Medical Director of Phoenix Molecular Imaging (PHXMI). He invited us to help educate men on prostate cancer, which is his great passion! But how does his mission to educate have anything to do with cars?

I remember thinking that very thing at the Pebble Beach show. Both Lindsay and I were overjoyed by the opportunity to represent PCRI and were more than happy to educate attendees about prostate cancer. However, I couldn't help but think: What kind of looks are we going to get? Are men going to be re-

ceptive? As women, we allow ourselves to talk about things like breast cancer openly. But prostate cancer, tends to be a private subject for men. So, the question was, how can we put men at ease? Dr. Almeida's answer: Cars. An enjoyable setting with a different focus of interest.

The idea unfolded when Dr. and Mrs. Almeida met with Ron Kotloff, the owner of Vintage Kart Co., a company that makes Vintage Mini Racers honoring cyclecars of the past. Their cars are artfully crafted, easily drivable, and immensely fun! After some discussion and a great vision, the 'prostate cancer awareness' cars were born. The idea works. The cars capture everyone's imagination. Everyone stops and stares.

Dr. Almeida thinks big. "Let's not just settle for showing off pretty cars. Why not enter our cars into the race?" So that's exactly what Dr. Almeida did. →



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The Grand Prix of Scottsdale was stylized as a 1920s Gatsby themed event. All the women were adorned in ornate headpieces, flapper dresses, pearls, and ruby lips. The men donned spectacular vintage suits and top hats. Glenn Miller, Louis Armstrong, Sidney Bechet, and many others sounded over the speakers as all the dolled up people danced their hearts away. The prostate cancer awareness karts displayed the PCRI logo, along with the logos of other prostate cancer organizations. These cars were perfectly placed close to the stage throughout the entire event. What an icebreaker! What a conversation piece! Just like that, we had people talking, raising awareness for prostate cancer.

The conversations were incredible. Even people who had never dealt with prostate cancer thanked us for their raising awareness and for educating people about the disease. Many of the men never had a PSA test. Many didn't even know what PSA stood for! Men came to Dr. Almeida's booth for the no-cost PSA tests that were being provided. The opportunity to share and educate on such a crucial subject was something we didn't even feel we should be thanked for; we just felt blessed to have the opportunity to help. Almost every casual conversation led to, "So, what do you do?" This gave us many opportunities to talk about PCRI, our passion in raising awareness, our drive in helping people find the best treatment options, and the importance of regular PSA testing.

On the day of the Grand Prix, all 40 teams were in a competitive, racing mode. Everyone with one objective: to win the race. There are 4 heats in a Grand Prix. Each heat is supposed to last for 45 minutes, and the race is so intense that it's hard to keep up with everyone's times. Times are deducted for all sorts of offenses on the track, but each team keeps faith that their team is in the lead. We, of course, did the same. When the fourth heat came to an end, our team's drivers (two of which were professional race car drivers) said they thought we might have won. I was so overwhelmed by the excitement, the Arizona heat, and the intense race environment, I couldn't keep track either. It came down to meeting at the finish line to find out. That's when the glorious moment came; it was announced that our team won! The car built for prostate cancer awareness won the Grand Prix!

The PCRI commends Dr. and Mrs. Almeida and their team for their amazing win and for developing such an imaginative idea to raise awareness about prostate cancer at high profile events across the nation. They have created an unprecedented opportunity to share invaluable information with thousands of people. Vintage cars are opening a gate to men who would have otherwise been passed by. Thank you Dr. and Mrs. Almeida for your amazing vision, your wonderful success in winning the Grand Prix, and for all your hard work! ■



## 2016 PROSTATE CANCER CONFERENCE HIGHLIGHTS

**A Photo Essay by Peter Scholz // PCRI Creative Director**

The 2016 Prostate Cancer Conference is the largest educational gathering of patients and caregivers. The goal is to provide an all-encompassing educational experience. The formula is simple: Invite the best doctors to present the latest information to patients and caregivers who are hungry for knowledge about the disease and how to minimize the side effects of the treatments. Through Q+A, we ensure that the information the doctors present is relevant,

unbiased, applicable, and accessible to those without medical degrees. But, this large volume of medical information can become overwhelming, so we make every effort to present it within an entertaining, collaborative, and supportive environment. The keynote presentations are followed by Q+A with Conference Moderator, Mark Moyad, MD, and after that, by a smaller Q+A session where patient questions are answered directly by the speaker. Also, throughout the

weekend, support groups and breakout sessions with leading physicians, allow for a more personalized learning experience for each attendee. This year we added new sessions that focused on the needs of the caregiver, with art therapy classes, a yoga session, and multiple intimacy breakout sessions. Overall it was a one-of-a-kind event with many memorable moments. The following pictures are some of the highlights from the event.

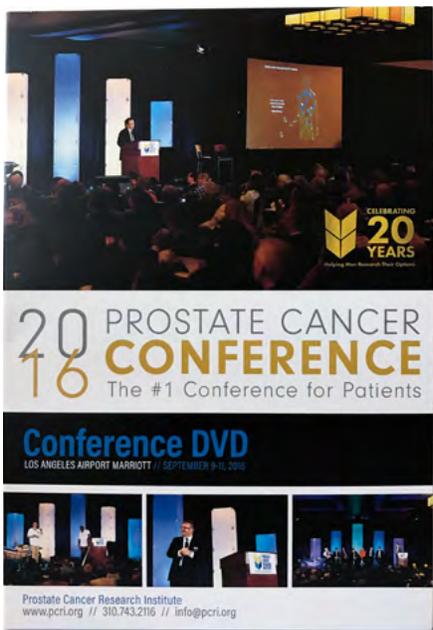


*Clockwise from upper left: Conference Moderator, Mark Moyad, MD; Gary Leach, MD, a urologist, demonstrates an artificial sphincter in his presentation about treatments for urinary incontinence; Mark Emberton, MD, who flew in from London, gives a lively presentation about focal therapy; Moyad's Q+A with Nicholas Vogelzang, MD, a medical oncologist, gives an in-depth presentation about treatments and pharmaceuticals for advanced prostate cancer; Eugene Kwon, MD, from the Mayo Clinic, discusses the significance of accurate imaging, and provides actual cases to explain its use; Mark Scholz, MD, leads the Round Table Discussion, a unique session where multiple experts from various specialties provide their medical opinion on the best way to treat specific cases; Howard Sandler, MD, from the Mayo Clinic, and principal investigator on some of the largest clinical studies in prostate cancer, presents breaking news about chemotherapy and data about radiation therapy.*



*Clockwise from top: Ken Griffey Sr. during his revealing interview with Mark Moyad, MD; Charles "Snuffy" Myers, MD, leads the breakout Q+A after his keynote presentation; Surprise guest, Eric Darious, an extraordinarily talented saxophone player, closes the evening with "Happy" by Pharrell Williams. Drs. Moyad and Scholz with Ken Griffey Sr.*





*By row from top left: Myers vs. Moyad: "Mayhem at the Marriott"; Drs. Moyad and Scholz during the Saturday Presentation Review. Darryl Mitteldorf with Malecare receives the 2016 Harry Pinchot Award—presented by Arthur Lurvey, MD—for his outstanding contribution to the Prostate Cancer Community; Darryl gives his acceptance speech; Kirk Hawkins from KTLA 5 News hosts the 2016 Gala Dinner; Kirk Hawkins interviews Emmy Award-Winning Actor Ed Asner; Attendees Dance at the Gala Dinner; The Steve McCann Band performs at the Gala Dinner*

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*Clockwise from top left: Ted Talk speaker Michael Russer, leads a breakout session about maintaining and rebuilding sexual intimacy after treatment; Champions for a Cause Happy Hour with the NFL Players Association; Patients socializing at the happy hour; Ask the Experts Breakout Session with Charles "Snuffy" Myers, MD; Free yoga session for patients and caregivers; 2014 Harry Pinchot Award Winner Joel Nowak of Malecare with wife and women's support group leader, Wendy Leibowitz; Advanced cancer support group.*



# PROSTATE CANCER RESEARCH INSTITUTE

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Helping Men Research Their Options

Dear PCRI Supporter,

*Please Please (two "pleases" for emphasis) Consider Giving A Donation To PCRI This Year (AKA "Now please") Because I Said So, And It Would Also Hurt My Feelings If You Did Not Donate Because I Am An Extremely Sensitive XY Chromosome (aka "man").*

Look, let's be serious for just one second. You have to send a donation to PCRI this year, which of course is tax deductible! Why? Because PCRI continues to be one of the most influential groups in the world in terms of prostate cancer advocacy, education, and even research. However, the real reason you should donate to PCRI this year, whether it is a dollar or a million dollars, is because of what you are not seeing behind the scenes—what I see. So let me give you a peek for just a moment (sounds dirty, but this is clean). The staff and team at PCRI are some of the most wonderful and dedicated individuals to the cause I have ever met in my 25+ years of working in medicine.

They have a Helpline, educational conferences, newsletters, videos, state-of-the-art education, and a love for patients like I have never witnessed. And, they come from all ages and backgrounds. This kind of environment and dedication needs to be rewarded or validated by dollars to allow them to continue to bring you the latest, greatest, and most innovative information to make sure that every person dealing with prostate cancer has everything they need to fight this disease by knowing about everything that is available!

Plain and simple, I hear weekly about how great the conference, newsletter, and personalized help center...and all the things that PCRI is! But it is because of YOU and your donations that PCRI has the resource to provide services to the community which are second to none! Please keep that in mind and please give now! Thanks so much and see you in March for the next conference!

Lots of Love and Massive Bear Hugs,

Dr. Mark "I hope you are writing a check to PCRI right now" Moyad



**Mark Moyad, MD**  
University of Michigan Medical Center



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# PROTON THERAPY FOR PROSTATE CANCER

Carl Rossi, MD // Scripps Proton Therapy Center

*Proton beam therapy, a form of external beam radiation, has been around for a while but is less commonly utilized than other forms of radiation therapy, which is partly due to availability. Certain properties of protons show potential for a different approach to radiation therapy. This article also considers how implementation of imaging helps improve treatment outcomes.*

## BASICS OF PROTON THERAPY

Proton therapy for prostate cancer was first performed in 1977, long before the development of intensity modulated radiation (IMRT). Proton therapy first became clinically available in 1990. Proton therapy is a type of external beam radiation. However, unlike the commonly available type of x-ray therapy such as IMRT, SBRT (ex. Cyberknife), proton therapy utilizes subatomic particles (protons). Protons and x-rays have equal anticancer effects. The advantage of protons lies in their ability to reduce radiation exposure to the normal body tissues surrounding the prostate.

Protons interact with human tissue differently than x-rays. X-rays pass straight through the body with a substantial amount of radiation energy exiting out of the body. Everything within the path of the beam receives radiation. In contrast, protons deliver a low "entrance dose" (radiation dose to tissues in front of the target), place their highest dose within the target, and sharply limit exposure beyond the target. These unique physical properties are called the "Bragg Peak." The Bragg Peak phenomenon is unique to proton therapy.

## ENHANCED PROTON TECHNOLOGY

To date, the vast majority of prostate cancer patients who have been treated with proton therapy have been treated with passive-scatter proton therapy (PSPT). With PSPT, the proton beam is shaped by solid lead block which is manufactured and customized for each individual patient. The type of beam it creates completely covers the target volume with a uniform dose of radiation. However, with PSPT it is impossible to vary the radiation dose within the target area. So PSPT, for example, is unable to boost the dose to high-value target area or dose attenuate (minimize radiation) in adjacent normal structures. In addition, PSPT technology, due to limitations inherent to its lead-block methodology, is unable to treat larger target areas, such as the pelvic lymph nodes in the pelvis.

These limitations with PSPT have motivated the development of intensity-modulated proton therapy (IMPT). IMPT steers the proton beam to the target using electromagnetic forces. The proton dose is laid down throughout the target volume in a fashion analogous to a 3D printer manufacturing a complex solid object, with the protons typically being placed in layers that are approximately 1 millimeter thick. This ability to "paint" the proton dose makes

it possible to create differential radiation doses throughout the target volume, so that areas containing the greatest amount of tumor can receive substantially higher doses. IMPT is not constrained by field size limits as was PSPT, making it feasible to treat targets within the pelvis. Commencing in February 2014, the Scripps Proton Therapy Center in San Diego was the first facility in the United States to implement intensity-modulated proton treatment.

## OPTIMAL TREATMENT PLANNING AND TARGETING

Multi-modality imaging enables the creation of a three-dimensional map of the target area. At Scripps, all prostate cancer patients undergo a thin-slice pelvic CT and a multi-parametric prostate MRI. The image sets are combined to create a composite, three-dimensional reconstruction of the prostate and pelvis. The addition of multi-parametric MRI has been a significant advance which has enabled us to target intra-prostate disease with a higher radiation dose. The planning session is performed with a rectal balloon, which stabilizes the prostate, and minimizes gland motion. All patients are treated on a six-degree-of-freedom robotic couch that can move in sub-millimeter increments. Patients are typically treated lying on their back.

**The advantage of protons lies in their ability to reduce radiation exposure to the normal body tissues surrounding the prostate.**

Prior to entering the treatment room, each patient undergoes a daily bladder ultrasound to verify that a minimum amount of fluid is present within the bladder. The patient's position is verified by performing a daily CT scan in the treatment room. A planning system then analyzes his position and commands the robotic treatment table to move in such a fashion as to match the original treatment plan developed at the patient's first visit.

Typically, the "beam on" time is approximately 20–30 seconds per radiation field. The average time spent by the patient in the treatment room, including all of the above set-up and positioning, is less than 20 minutes. There are no restrictions placed on physical activity during treatment and most patients tolerate treatment with little if any difficulty.

### **A SHORTER COURSE OF TREATMENT**

Historically, a course of proton therapy was administered over a 9-week period. At Scripps, our most common protocol requires 5 1/2 weeks to complete. During that time, the entire prostate receives a radiation dose equivalent to 80 Gray. The cancer itself is boosted an additional 10 Gray to a radiation dose equivalent of approximately 90 Gray.

### **CLINICAL RESULTS WITH IMPT**

Since the availability of IMPT in the United States is very new, the number of IMPT-specific prostate publications remains limited. The largest study comparing patients treated with IMPT and patients treated with PSPT concluded that the cure rates were identical (as might have been expected), however, there was a decrease in gastrointestinal toxicity (primarily rectal toxicity) favoring those patients treated with IMPT.

### **FUTURE DIRECTIONS**

IMPT technology is rapidly evolving with the primary advances being in more sophisticated planning and delivery systems. For example, we expect that within five years that patients will be able to be planned in "real time." This means that the treatment plan can be adjusted as necessary on a daily basis to reflect any changes in tumor size or patient anatomy. In addition, there are a number of trials taking place which examine the feasibility of shortening the duration of treatment further. Hopefully, these efforts will prove successful which would permit a greater number of prostate patients to take advantage of this technology. ■



**Carl Rossi, MD**, is a radiation oncologist specializing in proton beam therapy, specifically for prostate cancer and lymphomas. He is also the current medical director for the Scripps Proton Therapy Center, which will provide treatment to target tumors with high control and precision. Dr. Rossi has a research focus on the quality of life and cure rate in prostate cancer and lymphoma treated with proton beam radiation.

# PCRI

Is proud to announce:

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# 2017

MOYAD + SCHOLZ  
**MID-YEAR UPDATE**  
A One-Day PCRI Conference

**Saturday, March 25, 2017** // Marina Del Rey Marriott  
**Come visit our new event location!**

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A unique educational experience featuring in-depth lectures about specific prostate cancer topics followed by extended Q+A with leading doctors.

This year we are proud to feature presentations by:

**Robert Dreicer, MD** // Emily Couric Clinical Cancer Center // **Advanced Prostate Cancer**  
**Carl Rossi, MD** // Scripps Proton Therapy Center // **Proton Therapy**  
**Mark Scholz, MD** // Prostate Oncology Specialists // **Active Surveillance**

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*The Prostate Cancer Research Institute is a 501 (c)(3) charitable not-for-profit organization located in Los Angeles, California. Our mission is to help men research their options. We assist them with their research by disseminating information that educates and empowers. Our programs help them understand their type of prostate cancer and the best way to treat and manage it.*



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