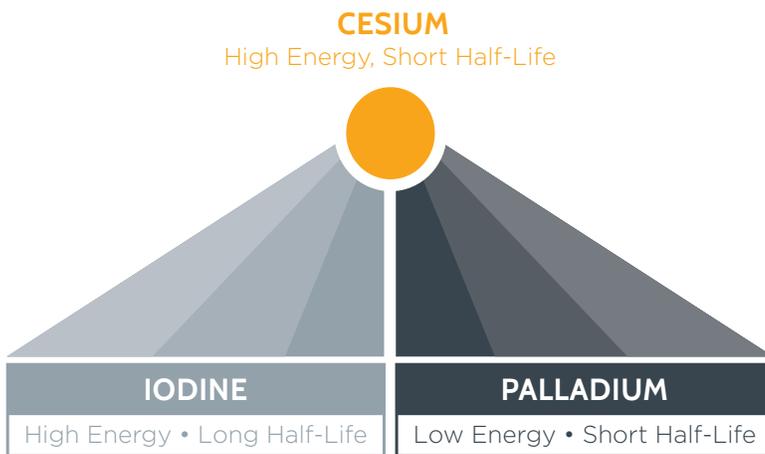




Cesium-131 is the most significant technological advancement in prostate brachytherapy in over 20 years.

## CESIUM-131 BY ISORAY



With a shorter half-life and higher energy than other commonly used radioisotopes, Cesium-131 by Isoray has been shown to be a highly effective cancer treatment with less side effects when planned appropriately and quicker recovery time<sup>1,2,3</sup>.

- **BRIEF SIDE EFFECTS**
- **QUICK RECOVERY**
- **SPEEDY RETURN TO PSA BASELINE**

Isoray passionately designs and develops innovative and personalized brachytherapy products that effectively treat many forms of cancer.

**We believe in pioneering solutions for life beyond your cancer.**

### 1958

Cesium-131 proposed as an isotope for cancer treatment

### 1965

First human implant with Cesium-131

### 1967

Cesium-131 seed design is patented

### 1998

Isoray Medical founded to explore the medical use of Cesium-131

### MARCH 2003

Cesium-131 was cleared by FDA for treatment of cancer

### OCTOBER 2004

The first patient was implanted with IsoRay Cs-131 seeds

### JUNE 2009

Cesium-131 used for the treatment of a Head & Neck cancer

### AUGUST 2009

Cesium-131 used for the treatment of Lung cancer

### AUGUST 2010

Cesium-131 used for the treatment of a gynecological cancer

### SEPTEMBER 2010

Cesium-131 used for the treatment of a brain tumor

### 2013

Five year data with Cesium-131 is published establishing the treatment as a viable alternate for prostate cancer treatment

# NOT ALL ISOTOPES ARE EQUAL

Cesium-131 has unique properties for cancer treatment



## HIGHER ENERGY

Cs-131 has a higher average energy than any other commonly used prostate cancer brachytherapy isotope on the market. Energy is a key factor in how uniformly the radiation dose can be delivered throughout the prostate.



## SHORTER HALF-LIFE

Cs-131 has the shortest half-life of any commonly used prostate cancer brachytherapy isotope at 9.7 days. Cs-131 delivers 90% of the prescribed dose to the prostate gland in just 33 days compared to 58 days for Pd-103 and 204 days for I-125.



## LOCAL DISEASE CONTROL

Investigators tracking PSA in both single arm and randomized prostate cancer treatment trials have concluded Cs-131's PSA response rates show similar early tumor control to I-125, long considered the gold standard in permanent seed brachytherapy.<sup>4</sup>



## RAPID RESOLUTION OF SIDE EFFECTS

Studies demonstrate that objective measures of common prostate side-effects showing an early peak in symptoms in the 2-week to 1-month time frame. Resolution of morbidity resolved rapidly within 4-6 months.<sup>3</sup>



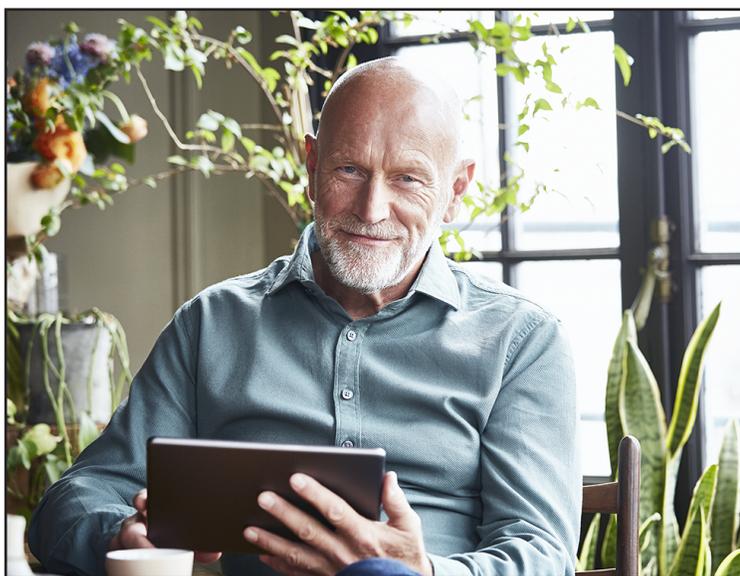
## HIGHER BIOLOGICALLY EFFECTIVE DOSE

Another benefit to the short half-life of Cs-131 is what is known as the "biological effective dose" or BED. Studies have shown Cs-131 is able to deliver a higher BED across a wide range of tumor types than either I-125 or Pd-103.<sup>5</sup>



## IMPROVED EFFICIENCY OF DOSE COVERAGE

Permanent prostate cancer brachytherapy utilizing Cs-131 seeds allows for better dose homogeneity and the sparing of the urethra and rectum while providing comparable prostate coverage compared to other seeds with comparable or fewer seeds and needles.<sup>6</sup>



"My doctor said Brachy and Cesium was the best answer to my cancer."

- Merle B. from San Diego, CA Cancer Free for 9 Years

## DIFFERENCES BETWEEN BRACHYTHERAPY ISOTOPES

	Cesium-131	Iodine-125	Palladium-103
Half-life, days	9.7	60	17
90% dose, days	33	204	58
Total dose, Gy	115	145	125
Energy, KeV	30	29	21

Of the three available brachytherapy isotopes, **Cs-131 has the shortest half-life, the fastest delivery of a therapeutic dose of radiation (90% dose), and the lowest total radiation exposure.**

1. Benoit, R.M., et al. Five year prostate-specific antigen outcomes after caesium prostate brachytherapy. Clin Oncol (R Coll Radiol), 2014. 26(12): p. 776-80. 2. Prestidge, B.P., et al. Five-year biochemical control following cesium-131 permanent prostate brachytherapy in a multi-institutional trial. Brachytherapy, 2011. 10(S1): p. S27-8. 3. Shah, A.B., et al. A comparison of AUA symptom scores following permanent low-dose-rate prostate brachytherapy with iodine-125 and cesium-131. Brachytherapy, 2013. 12(S1): p. S64-5. 4. Moran, B. and M.H. Braccioforte. PSA outcomes in a single institution, prospective randomized 131Cs/125I permanent prostate brachytherapy trial. Brachytherapy, 2014. 13(S1): p. S34-5. 5. Armpilia, C.I., et al. The determination of radiobiologically optimized half-lives for radionuclides used in permanent brachytherapy implants. Int J Radiat Oncol Biol Phys, 2003. 55(2): p. 378-85. 6. Yaparpalvi, R., et al. Is Cs-131 or I-125 or Pd-103 the "ideal" isotope for prostate boost brachytherapy? - A dosimetric view point. Int J Radiat Oncol Biol Phys, 2007. 69(3S): p. S677-8.