

## **Radiation Dosimetry and Safety of Re-188 Labeled Metal Stents in Treating Restenosis**

Stents were labeled with Re-188 ( $\beta^- E_{\text{max}} = 2.1 \text{ MeV}$ ) via a chelating microfilm for use in intravascular brachytherapy and dosimetry evaluated in tissue phantoms and animals. Depth-dose of Re-188 was measured using a stack of tissue equivalent radiochromic dosimetry films (0.24 mm each) layered on a Re-188 wafer, and on stents in cylindrical Solid Water™. Two types of stents were used, one made of Ni-Ti alloy measuring 26 x 3 mm and the other made of stainless steel measuring 15 x 3 mm. In phantom studies, the longer stents deposited doses of 0.085 Gy/ $\mu\text{Ci}$  at 2 mm, a relevant target depth; the shorter stents deposited 0.171 Gy/ $\mu\text{Ci}$ . However, for stents of similar length and diameter the dose delivered was essentially the same. For stents of different length, a 20 Gy dose at 2 mm would require an estimated 100 to 400  $\mu\text{Ci}$  depending on stent length. Gamma camera imaging (155 keV) demonstrated that little radioactivity eluted from the site of stent placement for up to 24 hours after stent placement in adult pigs. Radiation safety procedures consisted primarily of monitoring and confining minor contamination. The whole-body radiation exposure to potential patients and medical staff was comparable or less than most diagnostic nuclear medicine procedures. Funding ORNL-98-0501, DE-AC02-98CH10886, and InnerDyne.