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## The use of beta-gamma source for HDR brachytherapy

Brachytherapy is generally done with photon emitting isotopes (I-125 for LDR and Ir-192 for HDR). Beta Emitters are rarely used. We have found that beta-gamma emitters have some important benefits as sources for brachytherapy. The main benefit is saving millions of Dollars in building expensive treatment rooms with remote control systems. The second benefit is that the medical personnel can stand by the patient while treatment is done, without radiation hazard. High dose to the tumor can be obtained, evenly distributed with very little radiation damage to surrounding organs. Experimental work where Tm-170 HDR source (3 Ci) was used, to cure cancer on rats was carried out. It demonstrates the potential of using Tm-170 for medical brachytherapy. Tm-170 emits gamma ray of energy 84 keV and a number of X-ray in the range 50-60 keV. It also emits a large number of beta rays of E-max= 968 (80%) and E-max=883 keV (20%). An HDR source was made by sealing a thulium wire, 0.6 mm diameter, to 4 mm long in titanium tubes and activated by neutrons at the end of a 20 cm long stainless steel rod. Experiments were done with Lewis rats, carrying tumor developed from implantation of CNS1 Rat Brain Tumor Astrocytoma cells, under the thigh skin. 75% of the treated rats were completely cured, 16.7% had their tumor delayed and 8.3% were not cured. The total dose delivered to the different rats was 30-60 Sv photon dose and  $2.5 \times 10^{-3}$ - $5 \times 10^{-3}$  Sv beta dose at 2 mm from the source.

## Biography

Gad Shani has completed his PhD at Cornell University in 1970. He has been on the Faculty of Ben Gurion University in Israel since then. He served as the Head of the Department of Nuclear Engineering and later as the Head of the Department of Biomedical Engineering. He has published more than 90 papers in referred journals and served on many universities, national and international bodies.

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