In summary, Professor Wagner said that while the radioactive tracers carbon-14, tritium, and phosphorous-32 played a major role in the founding of modern biochemistry after World War II and remain the backbone of modern biological science; carbon-11, iodine-123, fluorine-18, and technetium-99m used with PET and SPECT are leading the way in *in vivo* chemistry.

The authors found other promising maturing applications including the uses of nuclear medicine to: predict a person's risk of having a heart attack, identify those who would benefit from bypass surgery, evaluate the effects of cancer therapy, locate occult abscesses, and relieve pain in cancer patients. It seems that nuclear medicine can touch all of us in some way.

Radiation Sterilization and Food Treatment

It has been estimated that about 45% of all single use medical products (syringes, surgeons gloves, and a large variety of other goods) are sterilized by irradiation in the United States. While most of these use cobalt-60 as the radiation source, one irradiator still uses a cesium-137 source and others use machine generated radiation. About 100 million curies of cobalt-60 are currently in use worldwide irradiating about 100 million cubic feet of product each year. A significant fraction of this is in use in the U. S. with about 50 large irradiators licensed by NRC or agreement states.

The use of irradiation for processing of food for insect disinfestation, control of food borne diseases, and shelf life extension is also increasing at a rather slow but steady rate when viewed on a global scale. Thirty six countries have approved some irradiation of food. In total, over 50 different commodities have been approved including many varieties of meats, grains, fruits, vegetables and spices. The most popular as measured by the number of countries approving them are potatoes, onions, and spices.[10] Eighteen of the 36 countries are irradiating food products commercially with the worldwide throughput approaching 450,000 metric tonnes each year; 90% of this total is from the irradiation of grain in the Odessa Port Elevator in the USSR using a machine generated source. The second largest commercial irradiation facility is the Shihoro Agricultural Irradiator in Hokkaido, Japan which irradiates about 20,000 metric tonnes of potatoes each year.[11] Although several commodities are now approved for irradiation in the U. S., commercial irradiation is limited, for the most part, to spices. There are two primary reasons for this limited use. The first is that current handling, distribution, and storage practices effectively minimize losses of fresh foods by spoilage. The second is that food irradiation has not yet been fully accepted by the general public as a safe process.

Other applications of radiation technology include sterilization of male insects, disinfestation of sewage sludge, curing of wood-polymer composites, polymerization, radiation grafting, and the vulcanization of rubber.

In 1984, the availability of cobalt-60 was less than the demand and the Atomic Energy of Canada, Limited (AECL) distributed the sale to its customers with some restrictions. At the same time they took steps to increase production with the goal of more than 100 MCi/year before the turn of the century. This seems to have alleviated the shortage and the supply now appears to be adequate. The U. S. production is minimal with the 1988 total of just over 1 MCi.[2] Cesium-137 was used in three large medical products irradiators and a smaller one for curing