

Cobalt-60

(⁶⁰Co)

July 2002

Fact Sheet 320-078

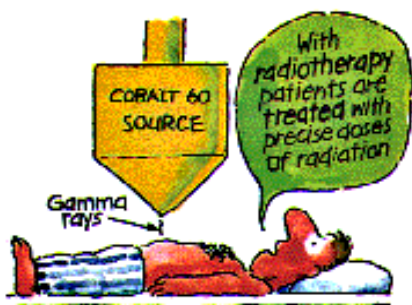
Division of Environmental Health
Office of Radiation Protection



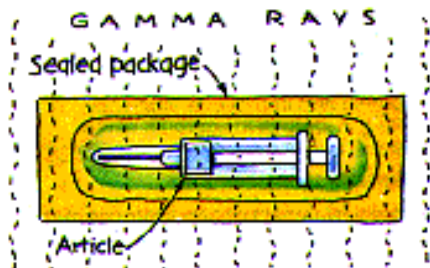
WHO DISCOVERED COBALT?

Cobalt was discovered by Georg Brandt, a Swedish chemist, in 1735. Brandt was attempting to prove that the ability of certain minerals to color glass blue was due to an unknown element and not to bismuth, as was commonly believed at the time.

WHAT IS COBALT-60 USED FOR?



Therapy: An external sealed source of cobalt-60 is used in a teletherapy unit as a source of intense gamma radiation for the treatment of a variety of cancers. Cobalt-60 is also used as a medical tracer. A medical tracer is a material that is introduced into the body to make possible the observation of chemical, physical or biological processes in the body.



Sterilization: Many medical products today are sterilized by gamma rays from a cobalt-60 source, a technique which is generally much cheaper and more effective than steam heat sterilization. The disposable syringe is an example of a product sterilized by gamma rays. Because it is a 'cold' process, radiation can be used to sterilize a range of heat-sensitive items such as powders, ointments and solutions and biological preparations such as

bone, nerve, skin, etc, used in tissue grafts. It is also safer and cheaper than heat methods because it can be done after the item is packaged.

Cobalt-60 is also used for industrial radiography, detecting flaws in metal parts, and in density and fill height switches.

WHERE DOES COBALT-60 COME FROM AND WHERE IS IT FOUND?

Cobalt-60 is artificially produced by bombarding a target material, either cobalt-59 or nickel-60, with neutrons. This reaction is produced by nuclear weapons detonations and in nuclear reactors.

IS COBALT-60 HAZARDOUS?

Cobalt-60 emits two high energy gamma rays, making cobalt-60 both an internal and external hazard. The primary exposure pathways of concern are ingestion (drinking water and fish consumption), and exposure by inhalation and external exposure.

PROPERTIES OF COBALT-60 (^{60}Co)

Half-Life:

Physical: 5.2714 years

Biological: 0.5 day (transfer compartment), 6 days (0.6 in all tissues), 60 days (0.2 in all tissues), 800 days (0.2 in all tissues)

Principal Modes of Decay (MeV):

Beta-average 0.0958, maximum 0.318 (99%)

Gamma 1.33 (100%), 1.17 (100%)

Principal Organ:

Liver and Whole Body

Amount of Element in Body:

1.5 mg

Daily Intake of Element in Food and Fluids:

300 μg

Sources

Jefferson Lab, <http://education.jlab.org/itselemental/ele027.html>

World Nuclear Association,

[The Peaceful Atom - http://www.world-nuclear.org/education/peac.htm](http://www.world-nuclear.org/education/peac.htm)

Environmental Radioactivity, Eisenbud, Merrill & Gesell, Thomas, 1997

Links to external resources are provided as a public service and do not imply endorsement by the Washington State Department of Health.