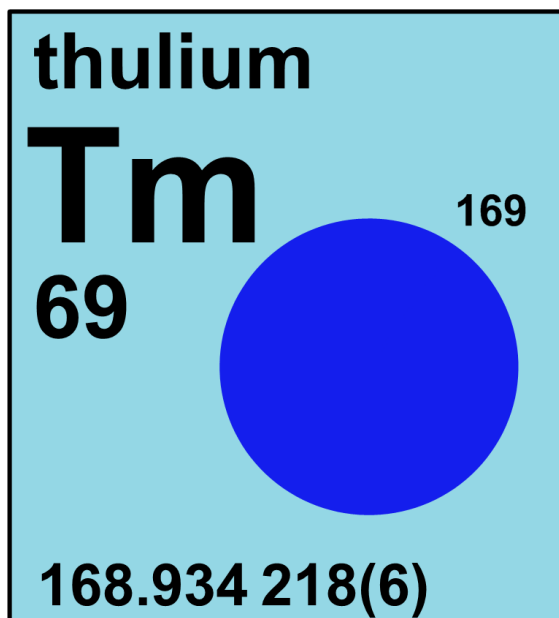





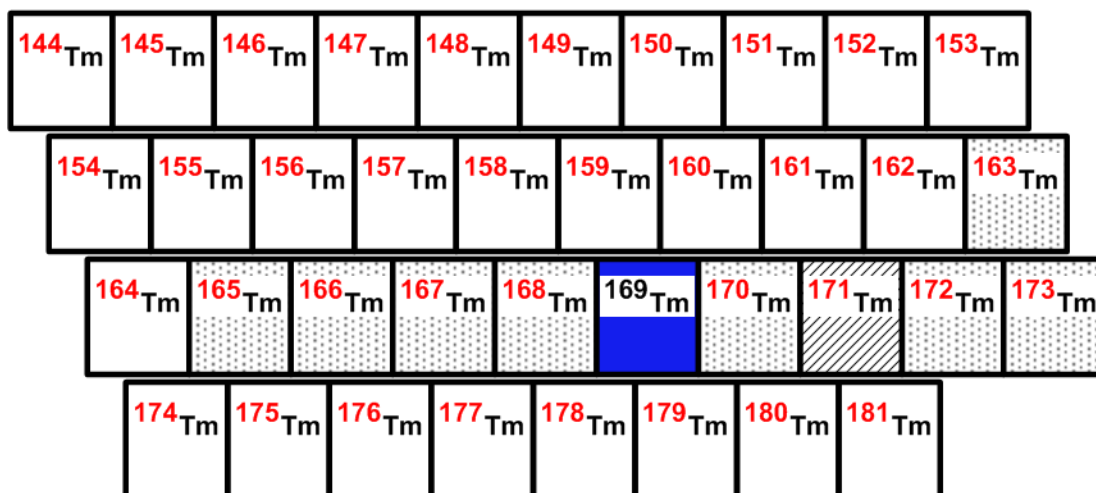
4.69 thulium



Stable isotope	Relative atomic mass	Mole fraction
^{169}Tm	168.934 22	1

Half-life of radioactive isotope

Less than 1 hour	
Between 1 hour and 1 year	
Greater than 1 year	



4.69.1 Thulium isotopes in industry

^{170}Tm (with a **half-life** of 130 days) is used in the **petrochemical** industry for industrial **radiography** to test welds in pipes and tanks [483].

4.69.2 Thulium isotopes in medicine

IUPAC

^{167}Tm (with a half-life of 9.2 days) is useful for tumor and bone studies [484]. Stable ^{169}Tm can be bombarded in a nuclear reactor to create ^{170}Tm , via the $^{169}\text{Tm}(n, \gamma)^{170}\text{Tm}$ reaction, which emits **X-rays** and has been used in portable X-ray equipment as a radiation source [485]. ^{170}Tm has been used in high-dose-rate (HDR) **brachytherapy** [486] and for use in **radiosynovectomy** of medium sized joints (Figure 4.69.1) [487].

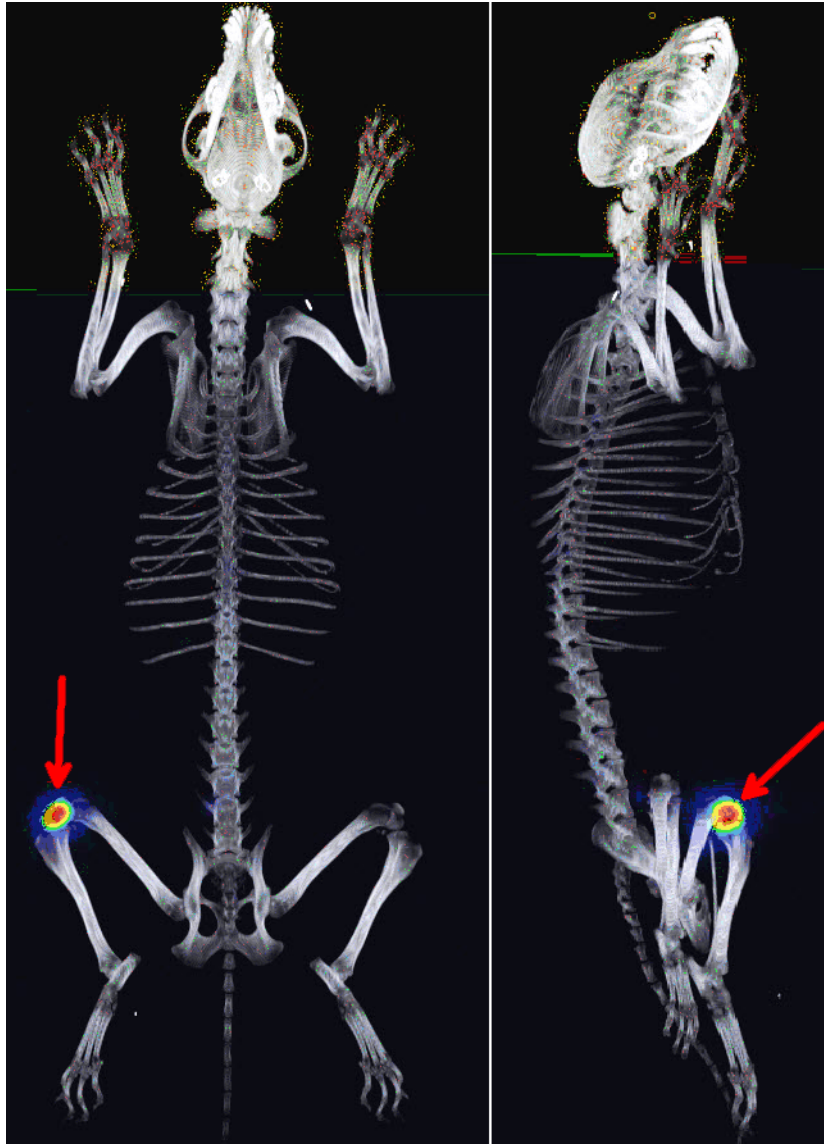


Fig. 4.69.1: Wholebody **single-photon emission computed spectroscopy** (colored layer in image) and CT scan of Beagle dog recorded after 4-hr of administration of ^{170}Tm -labeled microparticles [487]. Radioactive-colloid accumulation is displayed in the right knee joint. The Beagle did not suffer any health impairment. Image kindly provided by Dr. Andras Polyak (Dept. of Nuclear Medicine, Hannover Medical School, Germany).