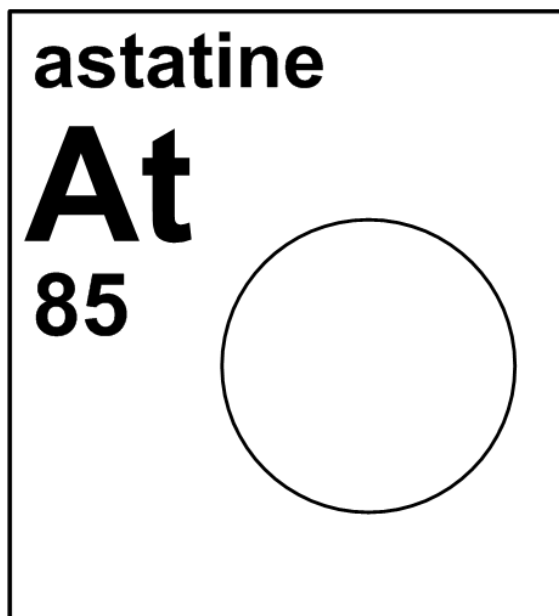




4.85 astatine



Stable isotope	Relative atomic mass	Mole fraction
(none)		

Half-life of radioactive isotope

Less than 1 hour 
 Between 1 hour and 1 year 

191 At	192 At	193 At	194 At	195 At	196 At	197 At	198 At	199 At	200 At
201 At	202 At	203 At	204 At	205 At	206 At	207 At	208 At	209 At	210 At
211 At	212 At	213 At	214 At	215 At	216 At	217 At	218 At	219 At	220 At
221 At	222 At	223 At	224 At	225 At	226 At	227 At	228 At	229 At	230 At

4.85.1 Astatine isotopes in medicine

^{211}At (with a **half-life** of 7.2 hours) is known to accumulate in the thyroid and occasionally is the preferred treatment for **hyperthyroidism** and thyroid cancer because the particles emitted from ^{211}At provide more energy than **radiolabeled** iodine, the other treatment method (Figure 4.85.1). However, astatine has shown a tendency to induce tumors, so its use is limited [562]. The ^{211}At -labeled di-carborane (cluster of boron, carbon, and hydrogen atoms) **ligand** known as the Venus Flytrap Cluster (VFC) has been used as a robust pharmaceutical in **radiotherapy** treatment [563].

Anatomy of the Thyroid and Parathyroid Glands

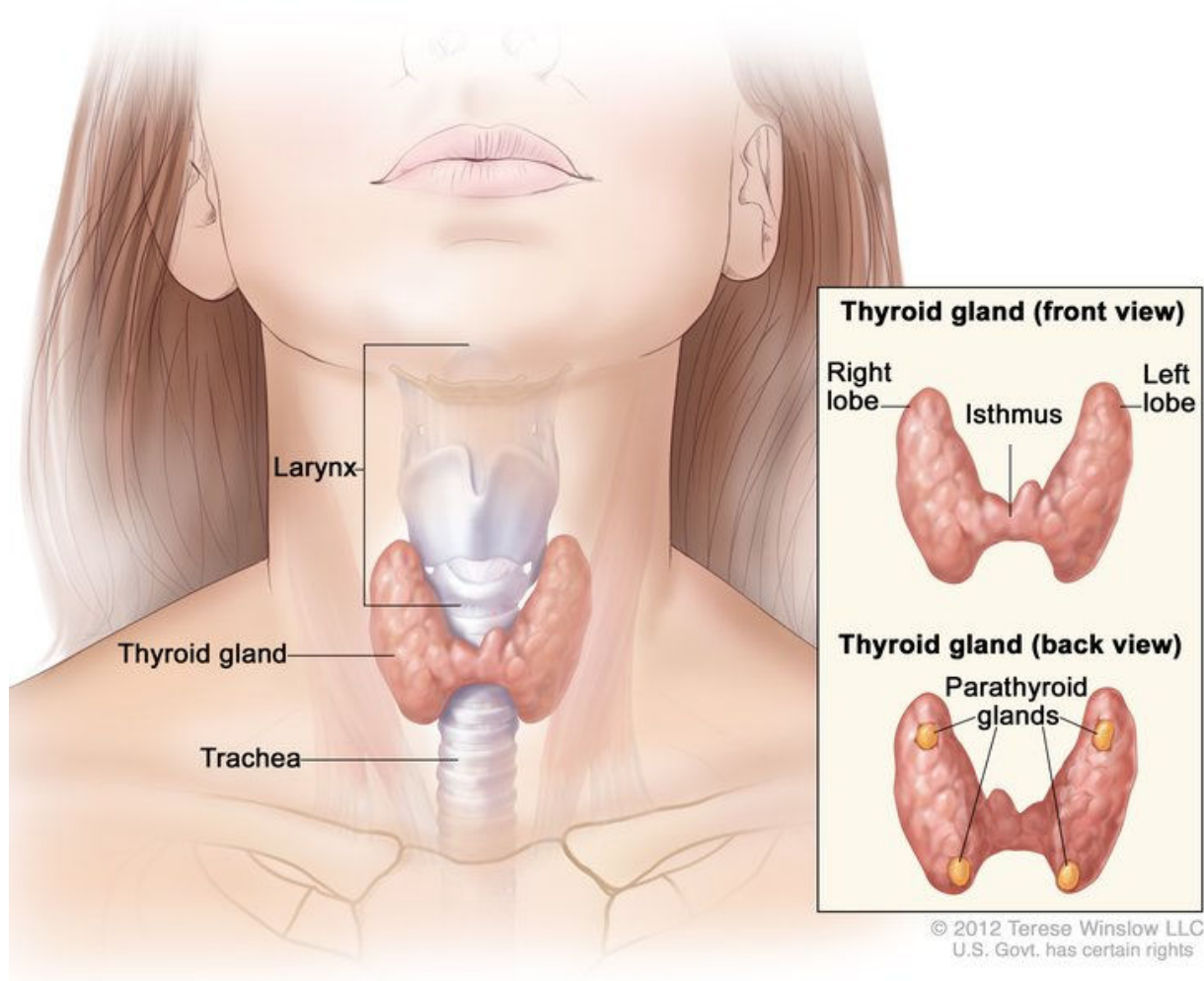


Fig. 4.85.1: ²¹¹At treats **hyperthyroidism** and thyroid cancer. (Image Source: © 2012 Terese Winslow LLC, U.S. Govt. has specified rights) [564].