

# MARCIA PROCTOR HYPNOTHERAPY

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## RADIOACTIVE POLONIUM IN CIGARETTE SMOKE

Cigarette smoke has been called many things – smelly, dangerous and cancer-causing for a start. But radioactive? Yes, that too. Tobacco smoke contains a radioactive chemical element called polonium-210. It's the same substance that poisoned the Russian Alexander Litvinenko in London two years ago.

Now, a new study reported in the Independent and to be published in the American Journal of Public Health suggests that tobacco companies have known about the danger of polonium in cigarette smoke for over 40 years. Monique Muggli, who led the review, examined over 1,500 internal documents from tobacco companies. Most of these have never been published and were made available through legal action.

Muggli wrote, "Internal tobacco industry documents reveal that the companies suppressed publication of their own internal research to avoid heightening the public's awareness of radioactivity in cigarettes."

### What happens when you inhale polonium?

Polonium-210 emits a type of radiation called alpha-radiation, which is very energetic and can seriously damage DNA. Thankfully, what alpha-radiation has in destructive ability, it lacks in penetrating power. Human skin is usually enough to stop it, but that's of little consolation to people who inhale particles of polonium-210. That places the tissues of their lungs and airways in direct and close contact with these powerful sources of radiation.

Indeed, studies have detected polonium-210 in the airways of smokers, where they are concentrated in hot spots. They remain there because other chemicals in cigarette smoke damage the body's cleaning systems, which would normally get rid of gunk in our airways.

As a result, polonium builds up and subjects nearby cells to higher doses of alpha-radiation. These localized build-ups lead to far greater and longer exposures to radiation than people would usually get from natural sources.

For example, one study found that a person smoking two packs a day is exposed to about 5 times as much polonium as a non-smoker but specific parts of their lungs could be exposed to hundreds of times more radiation. Another study estimated that smoking a pack-and-a-half every day exposes a smoker to a dose of radiation equivalent to 300 chest X-rays a year.

Do these doses lead to lung cancer? It's hard to say, especially since the effects of polonium are only part of a wider range of damaging consequences caused by inhaling cigarette smoke. But animal studies certainly give us cause for concern.

Absorbed doses of radiation can be measured using units called rads, and experiments have shown that as little as 15 rads of polonium can induce lung cancers in mice. That's only about a fifth of what a smoker would get if they averaged 2 packs a day for 25 years. Indeed, the lung tissues of smokers who have died of lung cancer have absorbed about 80-100 rads of radiation.

### Where does polonium come from?

Some tobacco plants are grown using fertilizers that contain a mineral called apatite. Apatite contains a radioactive element called radium, which can eventually decay into polonium-210.

But tobacco plants can also absorb radioactive elements directly from the air around them. These include both polonium, and other radioactive elements that eventually decay into it. Tobacco leaves are covered in sticky hairs, making them especially good at catching chemicals from the atmosphere around them. Studies in countries all over the world have found significant levels of polonium in local tobacco brands.

Is it possible to create a 'safe' cigarette by removing polonium? Simple answer – no. The newly retrieved documents reveal that the tobacco industry has tried in vain to remove the radioactive element by washing tobacco leaves, genetically modifying the plants or using filters. None of these methods appears to have worked, and indeed, an independent Polish study found that filters only absorb a very small amount of polonium-210.

Even if polonium could be removed, it would be a shallow victory, for the radioactive element is just one of at least 69 cancer-causing chemicals found in tobacco smoke. They are 69 very good reasons to never touch a cigarette again.