

Radon By The Numbers

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TRINITY TEST 1945



Don't fly South!

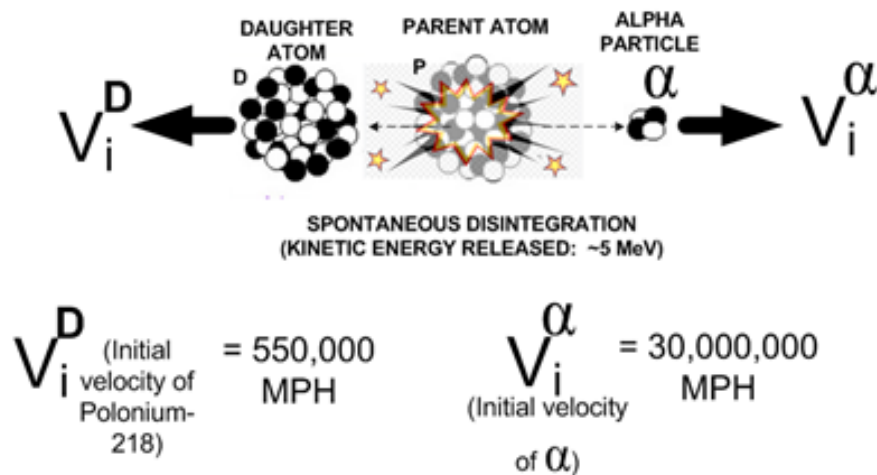


Plutonium is an alpha emitter,
along with radium and radon.

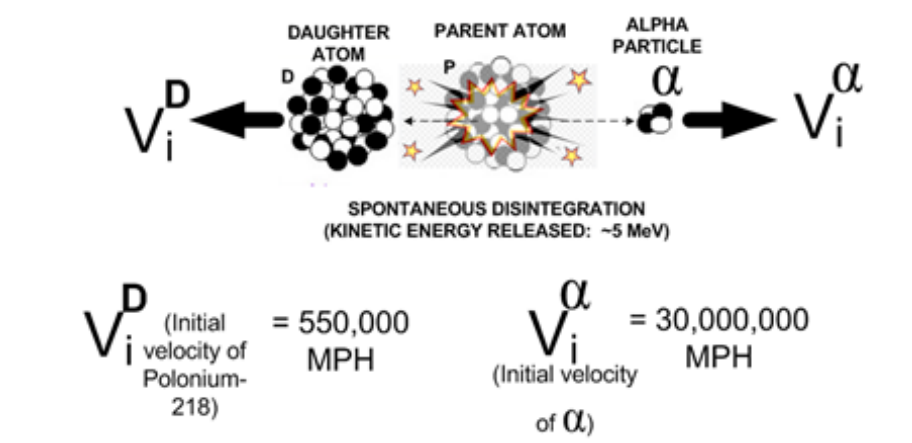
What is “Alpha Radiation?”

Alpha Decay Mechanics

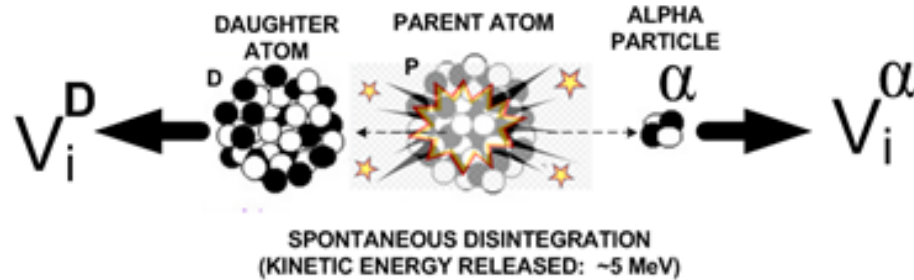
Spontaneous disintegration of the parent atom^P releases ~5 MeV of kinetic energy, propelling resulting nuclear fragments (Daughter^D and α) in opposite directions.



For metals, like plutonium, uranium, and radium, the crystalline structure helps restrain the daughter atom recoil.

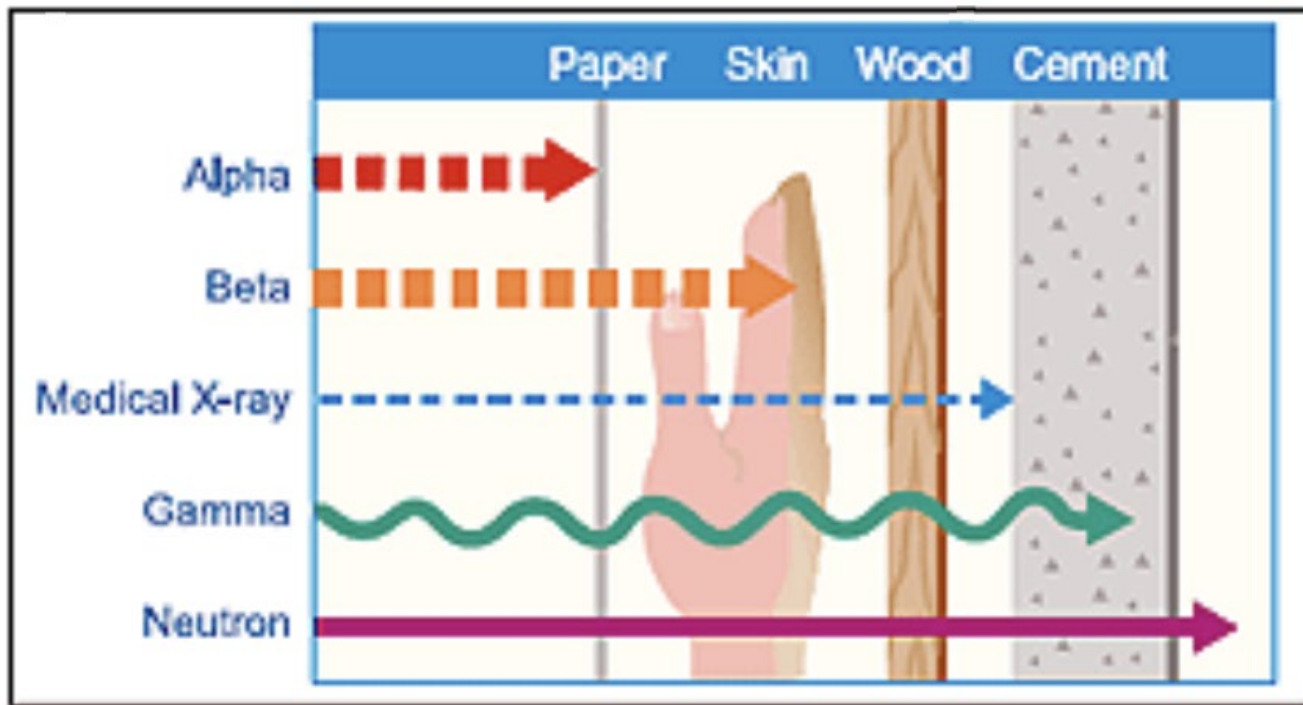


In the case of gaseous radon, the daughter (polonium-218) will be free to recoil in the direction opposite the alpha particle.



V_i^D (Initial velocity of Polonium-218) = 550,000 MPH

V_i^α (Initial velocity of α) = 30,000,000 MPH



NRC.GOV

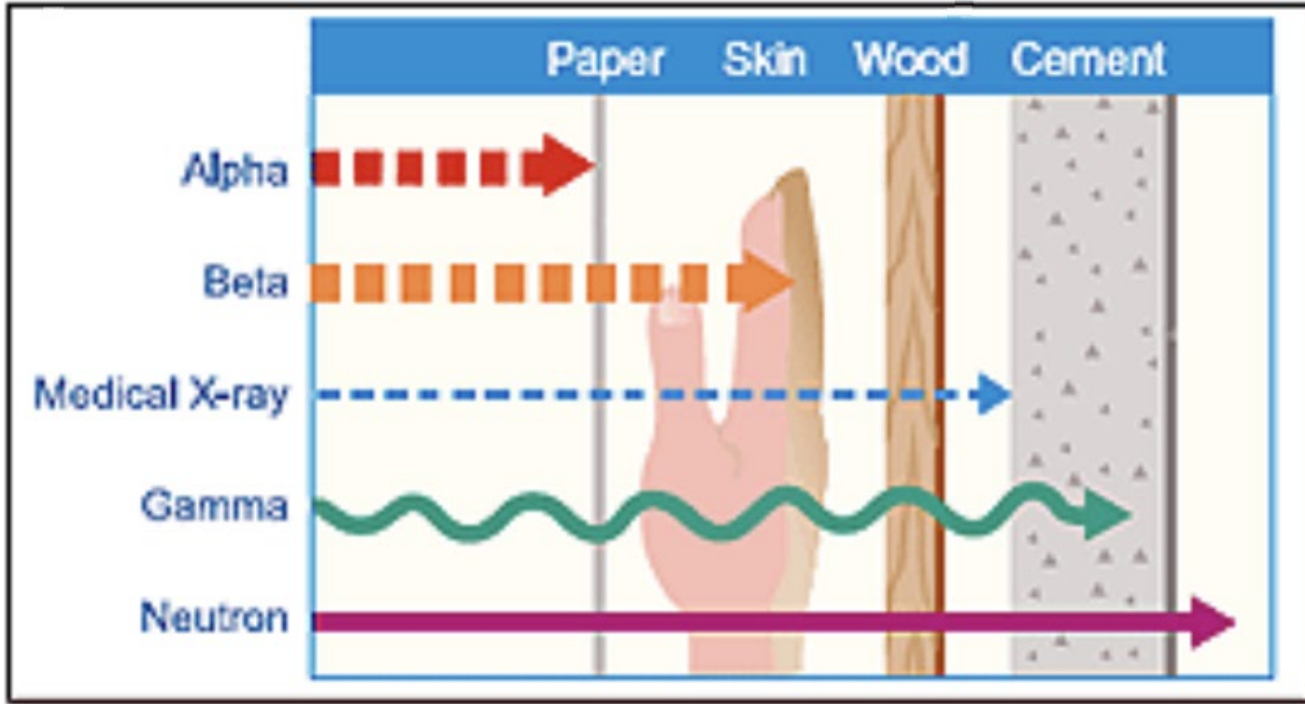



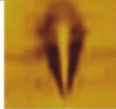


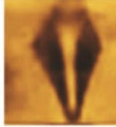








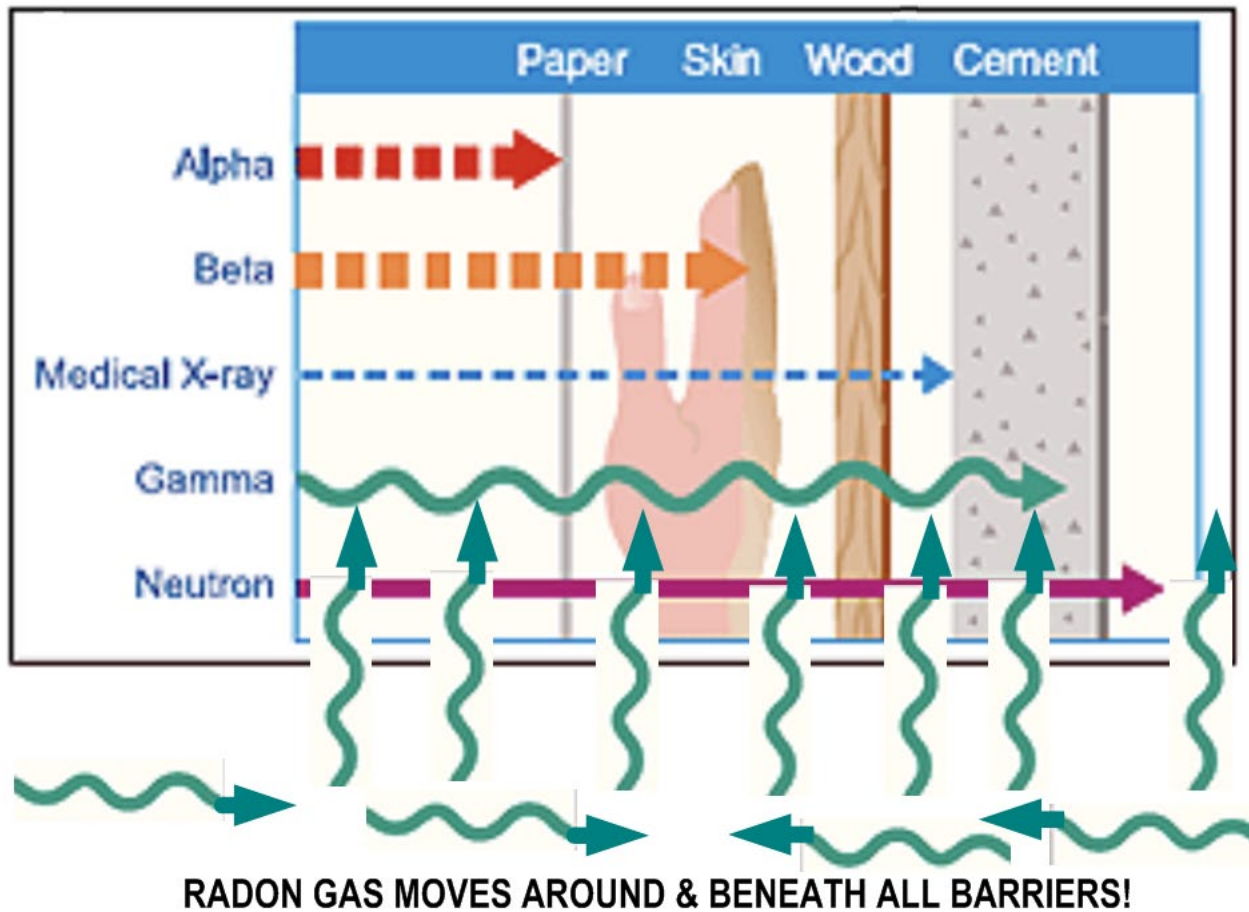


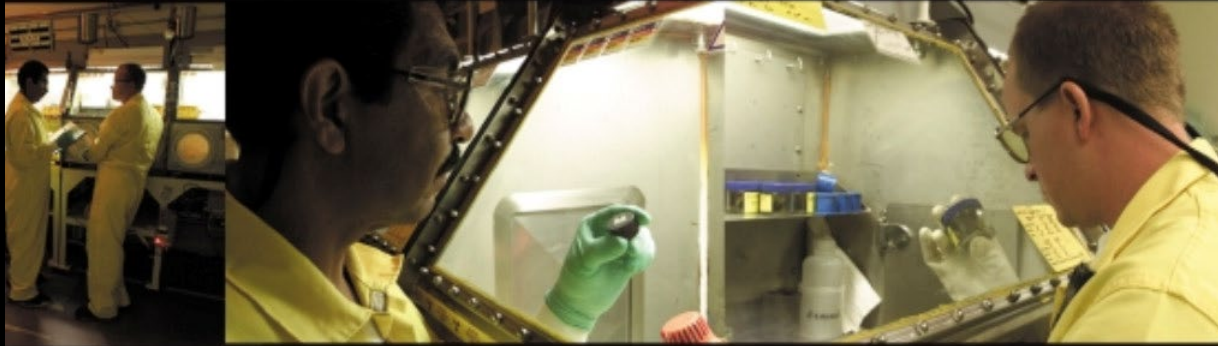
CHART UNDERSTATES ALPHA!

SCIENCEDIRECT.COM shows alpha track profiles bored into CR-39 detector slides. These borings may not be as thick as a sheet of paper, but they clearly demonstrate alpha particles do not harmlessly “bounce off” without ballistic damage. (30 Million MPH helium atom collisions, likely damage any material.)

h μm	The energy of alpha 5.48 MeV		The energy of alpha 5 MeV		The energy of alpha 4 MeV	
	Le μm	Track profile	Le μm	Track profile	Le μm	Track profile
5.12	4.80		6.20		7.00	
7.68	6.82		10.00		12.20	
12.48	15.10		17.40		12.02	
14.08	19.80		17.20		10.34	
16.64	19.60		17.20		10.23	



55 YEARS AFTER TRINITY: YEAR 2000



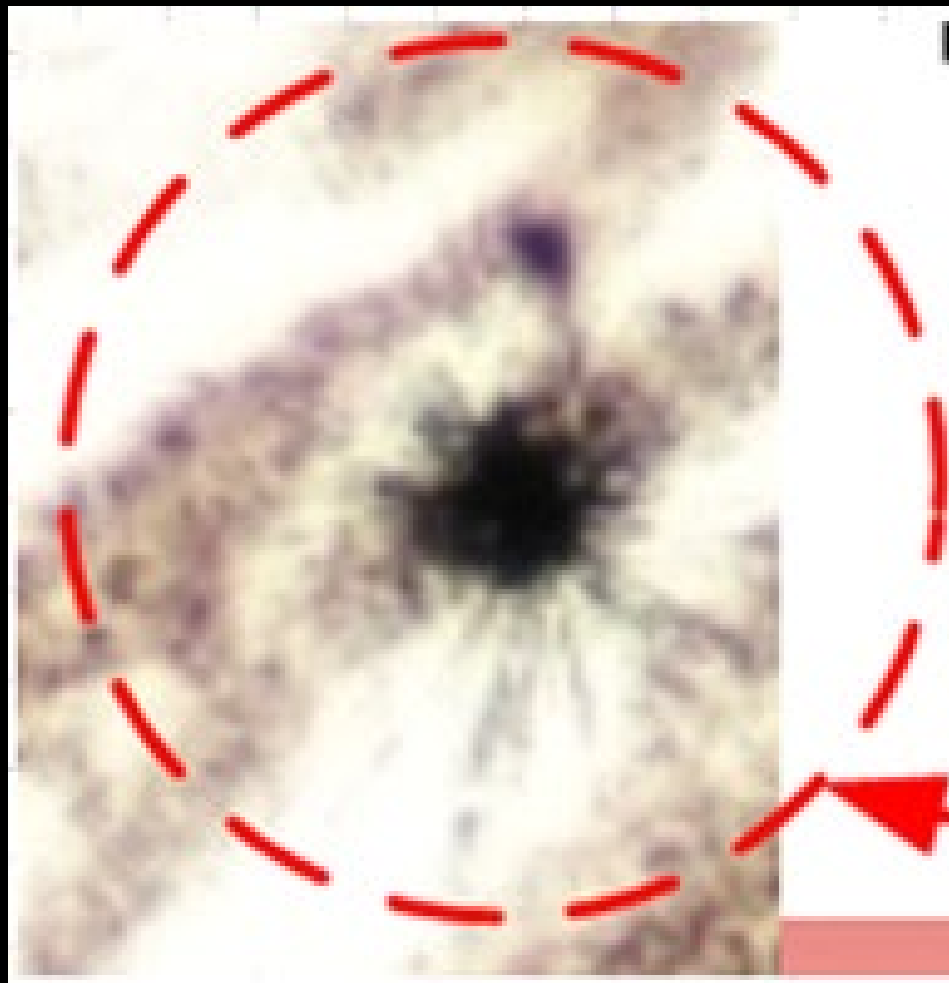
Plutonium and Health *How great is the risk?*



George L. Voelz as told to Ileana G. Buican

LANL
PLUTONIUM
HEALTH:

AUTOPSY
LUNG TISSUE
SLIDE



Pu DUST
EMBEDDED IN
WORKER'S
LUNG.

ALPHA TRACKS
RADIATE FROM
Pu DUST

How does the alpha radiation produced by one gram of radon, compare with that produced by one gram of radium, and one gram of plutonium-239?

1 g Radon : 1 g Radium : 1 g Plutonium

Estimate Alpha Particles Per Second.

How does the alpha radiation produced by one gram of radon, compare with that produced by one gram of radium, and one gram of plutonium-239?

1 g Radon : 1 g Radium : 1 g Plutonium

4.1×10^{15} : 3.7×10^9 : 1.66×10^9

DPS

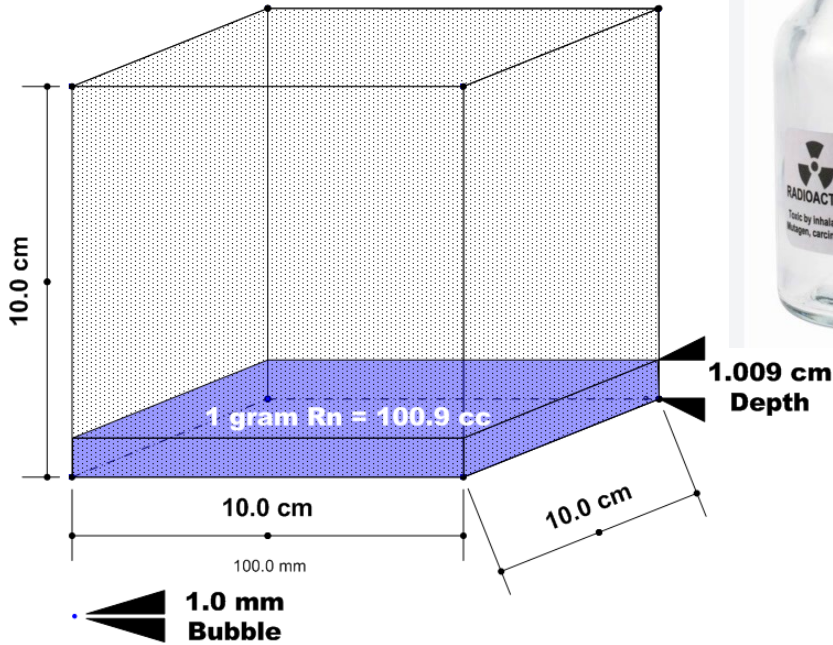
DPS

DPS

Radon produces a million times Ra+Pu Combined !!!!!!!!

How much alpha radiation is produced by a 1.0 mm diameter bubble of pure Radon gas?

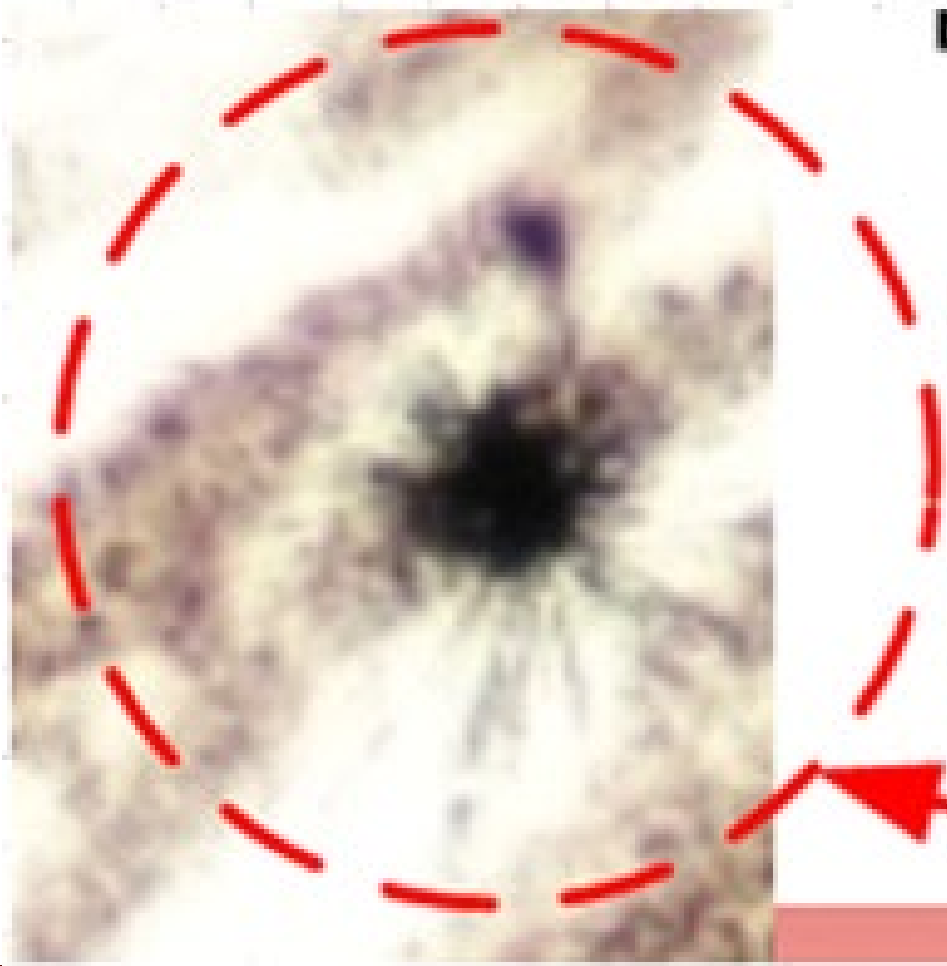
Reference: 1 Liter = 1000 cc = 1000 ml



1.0mm Radon bubble is about $\frac{1}{2}$ part per million of a liter.

1.0 mm diameter radon bubble?

20 Billion Alpha Particles per second.



**Has alpha
radiation tissue
damage been
underestimated?**

The alpha radiation from radon is so high (compared to radium and plutonium) it suggests ballistic fragmentation damage could occur throughout the body.

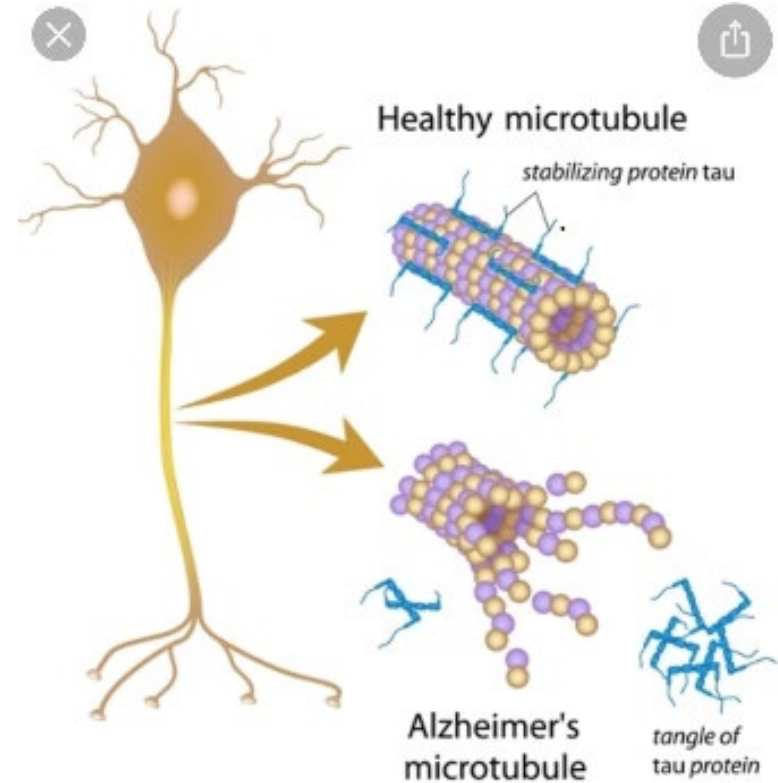
Radon, moving through the blood, would produce random alpha tracks, virtually invisible, masking the ballistic cause.

If radon is a global hazard, and if nuclear physics accurately describes the abundance of radon alpha decay, there is very likely visible damage as alpha radiation is circulated throughout the blood stream.

Medical research is finding many indications linking degenerative diseases to radon exposure.

This desk study presents six microscopic biomarkers linked to radon exposure, with indications of ballistic fragmentation tissue damage.

Alzheimer's Disease was reported by Alois Alzheimer, Psychiatrist and pathologist in 1907, when he found structural brain cell damage during a patient autopsy. He found visible damage to the axon (microtubule) and tau protein tangles (normally stabilizing, protecting, and securing the brain cell in place.)



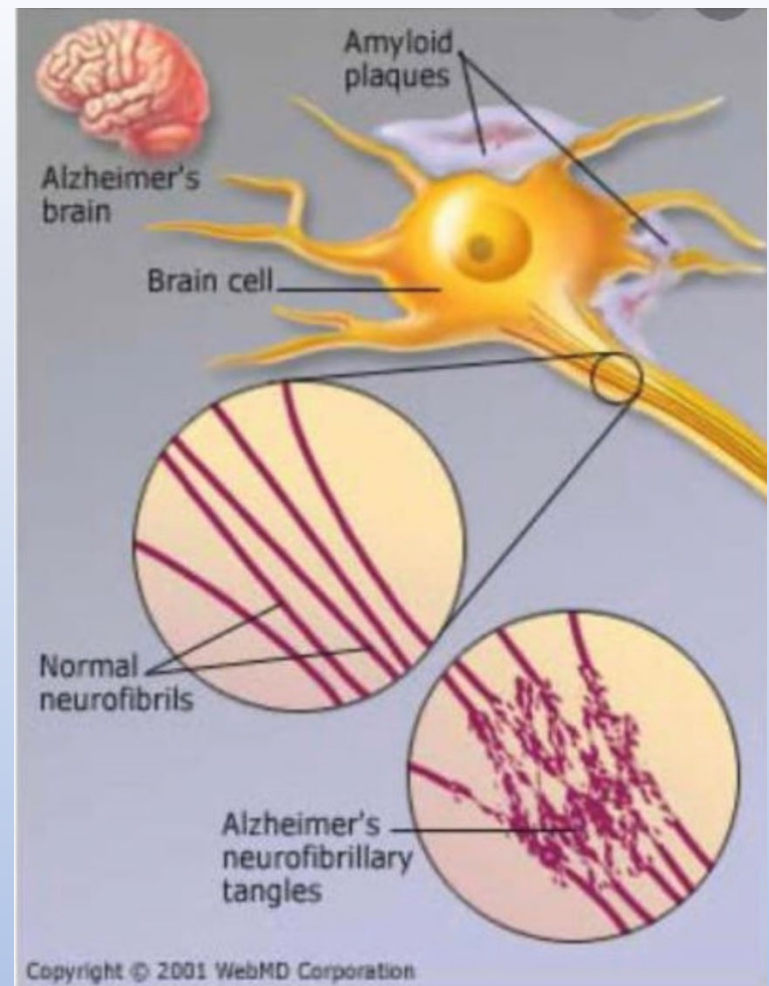
alzheimersnewstoday.com

Tau Protein Leads To Neuronal ...



Read About How the Tau Protein Leads To Neuronal Death in Alzheimer's.

Alzheimer's Disease:
Brain Cell degeneration
known as Neurofibrillary
Tangles (NFTs) could
result from blood borne
radon & alpha radiation.



PARKINSON'S DISEASE

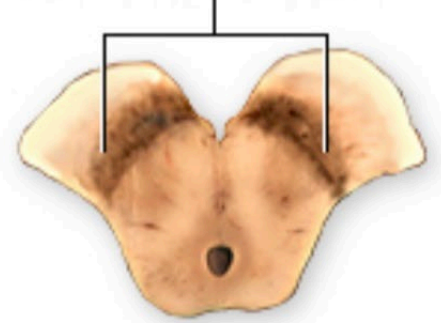
Studies have found elevated radon decay products at 10x healthy patient levels. Also, elevated iron levels in the Substantia nigra region (could be related to ballistic fragmentation of red blood cells.)



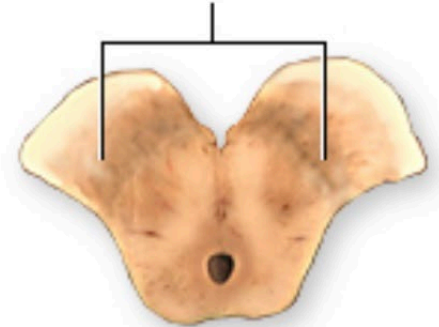
Cut section of the midbrain where a portion of the substantia nigra is visible



Substantia nigra

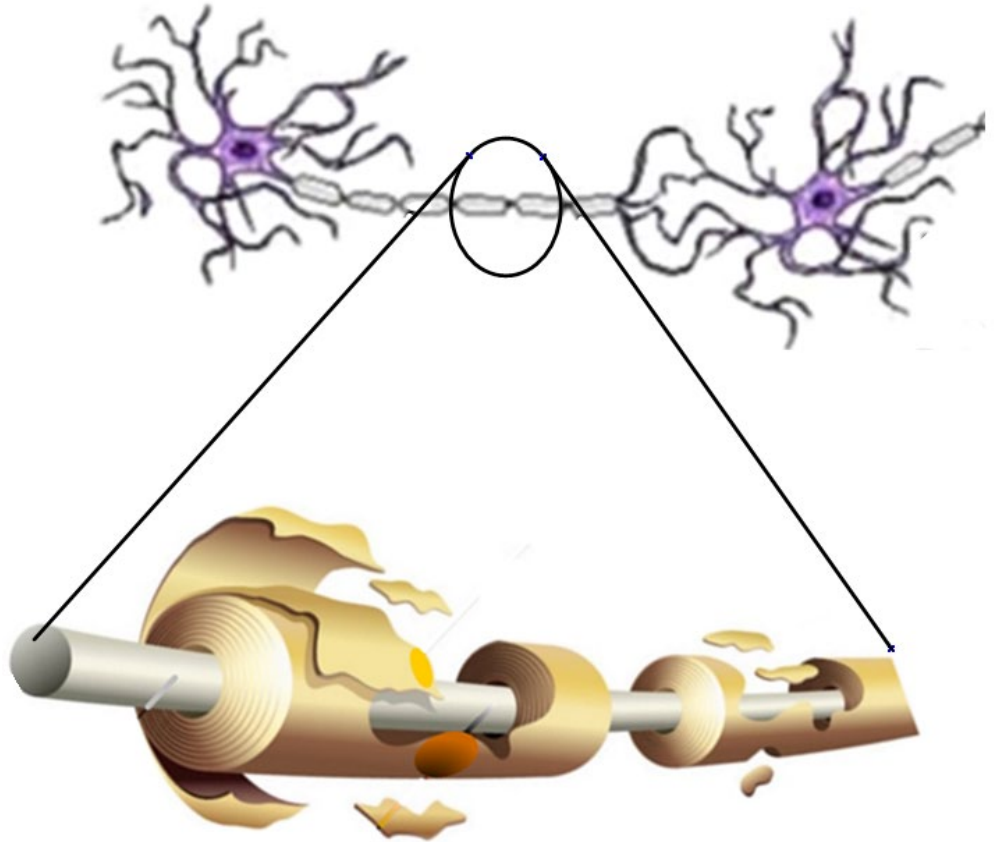


Diminished substantia nigra as seen in Parkinson's disease



ADAM

Multiple Sclerosis: Neurodegenerative disease involving progressive degradation of the axon myelin sheath, and eventual neuron cell death. Swiss pathologist George Eduard Rindfleisch noted in 1863 that the inflammation associated lesions were distributed around blood vessels. (Wikipedia.org)

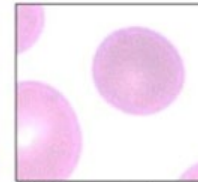


FRAGMENTED BLOOD CELLS:
CLASSIFIED BASED ON SHAPE, AND
ATTRIBUTED TO CIRCULATORY
DEFECTS, AUTOIMMUNE ISSUES,
DRUG INTERACTIONS, OR GENETICS.

STUDIES OFTEN LACK ALPHA
RADIATION OR RADON
MEASUREMENTS.



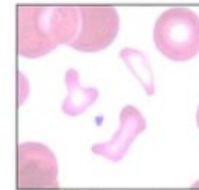
Elliptocyte



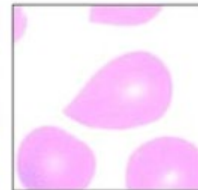
Spherocyte



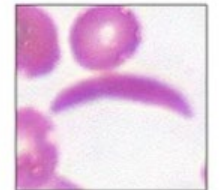
Stomatocyte



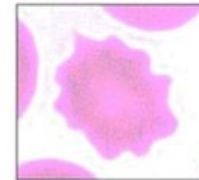
Schistocytes



Tear drop cell
(dacrocyte)



Sickle cell



Burr cell
(echinocyte)



Spur cell
(acanthocyte)

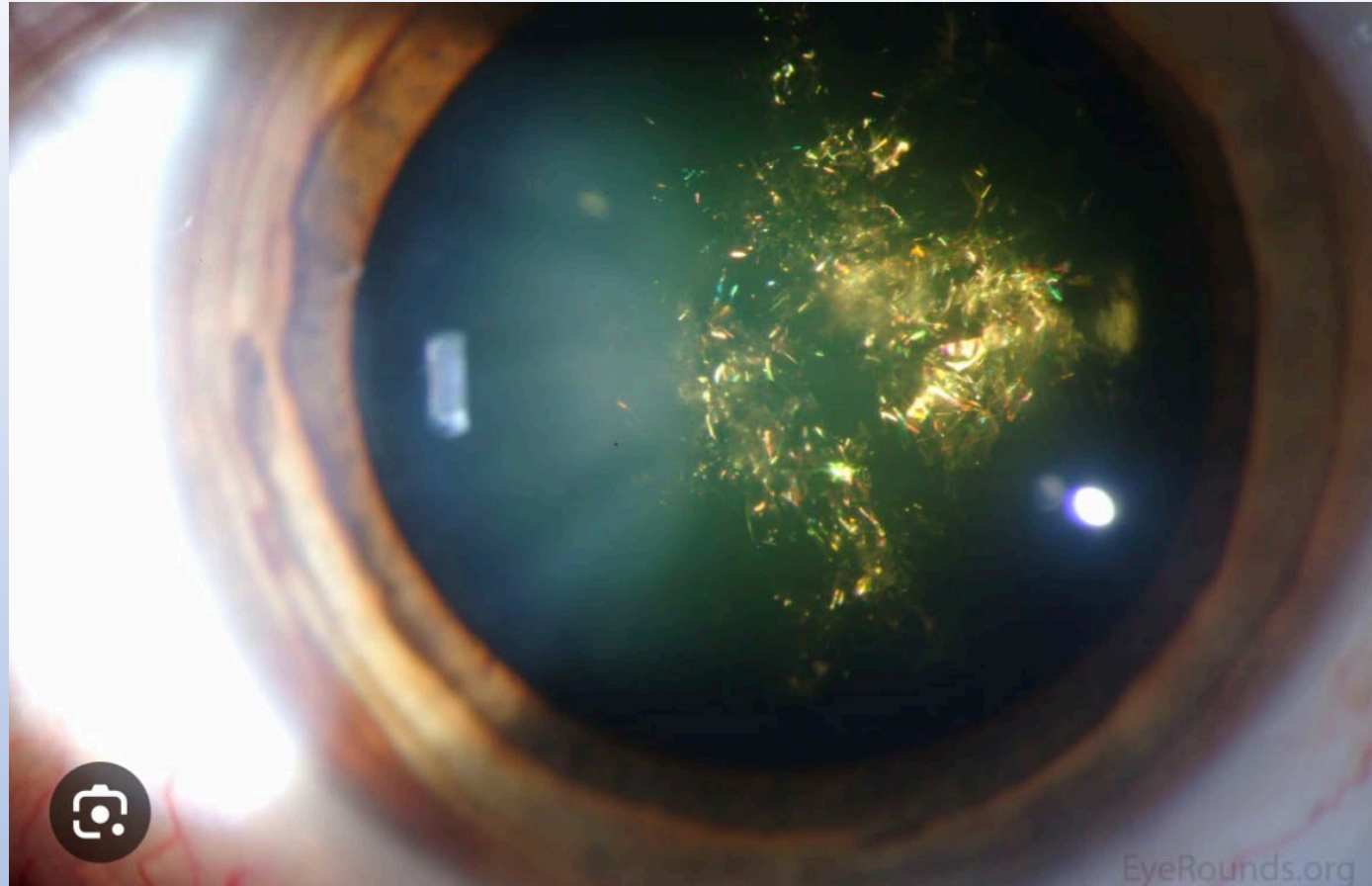


Target cell
(codocyte)

CATARACTS

Christmas Tree Cataracts are often found during routine exams of older adults. Some young children have been reported with this condition. Home or workplace radon levels are rarely available.

Medical studies have found increased cataract incidence related to radon exposure.



CONCLUSIONS

Additional research is required to confirm radon links to any medical conditions referenced by this desk study. This study is not a medical diagnosis or treatment program. Licensed Medical professionals should be consulted for evaluation or treatment of personal health conditions.

CONCLUSIONS Continued...

This desk study supports the reduction of indoor radon levels...

“AS LOW AS REASONABLY ATTAINABLE.”

Radon links to cataract incidence, hearing loss, sexual dysfunction, and peripheral nerve damage, challenge old views tolerating ambient radon levels.

THANK YOU!

QUESTIONS ARE WELCOME!

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