

Detection of the Radioactive Burden of Injected Beagles

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The decay schemes of the radium and mesothorium series were reviewed, and opportunities for in vivo assay were pointed out. These occur at places in the decay series where penetrating γ -rays are emitted and where radon is produced. The complications due to possible daughter relocation were discussed, especially in the mesothorium series (where the daughters RdTh, ThX, Tn, and ThB are suspect).

In the case of the radium dogs, the in vivo assay is carried out by breath radon exhalation measurements (giving radon exhalation) and measurements of γ -ray emission from the body (giving radon retention). The exhaled radon is measured by collecting the exhaled breath in a large plastic bag and sampling with a specially designed scintillation counter. The γ -ray emission from the body is determined by placing the dog (lightly anesthetized) inside a large, 4π liquid scintillation counter (K-9). Results to date on 3 dogs injected a year ago ($t = 1$ year) and on 5 dogs ($t = 1$ month) were discussed. The one year dogs showed about 80% radon exhalation, while the one month dogs showed a higher fractional exhalation (that decreased with time).

In the case of dogs injected with mesothorium and/or radiothorium, thoron exhalation is very likely negligible due to the short 54 second half-life involved (this point will be checked, however). Measurements on eight dogs amounted to $(16 \pm 2)\%$ in excellent agreement with the value obtained with a phantom. Although the RdTh retention was about 80% at the end of a month, K-9 measurements showed a drop by a factor of two in the same period. This shows that daughter products (probably ThX) retention is considerably less efficient; this is under investigation at present.

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