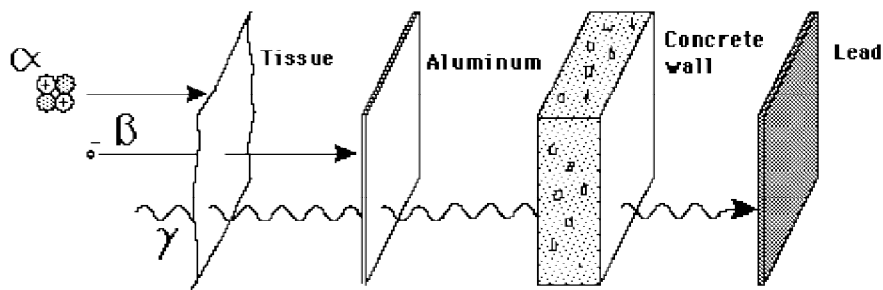


Lecture 5

Penetration of Matter

Though the most massive and most energetic of [radioactive](#) emissions, the [alpha](#) particle is the shortest in range because of its strong interaction with matter. The electromagnetic [gamma](#) ray is extremely penetrating, even penetrating considerable thicknesses of concrete. The electron of [beta](#) radioactivity strongly interacts with matter and has a short range.



Half Life ($T^{1/2}$)

A sample of radioactive substance will decay into various particles. The rate of decay is measured by how long it takes for half the sample to decay. The decay of an individual atom is totally random, but for a large sample size, we can get a good prediction of the half life.

Application of Radioisotope to Animal Nutrition Research

An isotopic tracer technique is a useful tool in biological study to monitor the movement of nutrients through digestion, absorption and excretion.

- Radio isotopes are useful in studying volume in animal system e.g estimation of plasma volume and rumen fluid in cattle. This is known as isotopic dilution techniques.
- It can be used to test the efficiency of a particular nutrient in diet.
- It can be used to monitor the distribution of elements and compounds to various organs and tissues of the body.

- The measurement of radioactive isotopic potassium makes it possible to estimate the amount of lean meat in animal body.
- It is used to determine substrate and product relationship i.e to determine if substrate A is converted to product B within the animal.
- It is also used in the analysis of rate of processes e.g a body store of particular substances can be labeled through administration of an isotopic tracers and the disappearance of the tracers subsequently monitored.