

- Radioactivity may have damaging effects on humans but can also be used for medical imaging to potentially save lives. Which of alpha and gamma radiation is better suited for medical imaging? Give reasons.

Marks
4

Gamma radiation is more useful as it is more penetrating (so can be detected by detector placed outside the body) and is less damaging to human tissue than alpha radiation. As alpha radiation is charged, it leads ionisation and causes more damage and is less penetrating.

Given nuclides with half-lives of minutes, hours or years, which would be best used for medical imaging? Explain.

Nuclides with half-lives of hours are best suited. This allows time for production of nuclide, administration to patient, and for it to accumulate in the tissue of interest. Activity is high enough to give good quality image with small amount of nuclide. A long half-life means a lower activity and hence more nuclide needs to be used to generate a quality image.