

Background radiation



Scientists assume that there is no 'safe' level of radioactivity. Even low doses of radiation carry some risk (although very low levels of some types of radiation may be beneficial). One way of deciding whether this risk is significant is to compare the level of radiation with the background radiation.

We are constantly exposed to radioactive material. Our food, the air and our homes all give out radiation. We also receive ionising radiation from outer space in the form of cosmic rays. About 100 cosmic rays pass through you each second.

The dose that people in the UK are exposed to does vary from place to place. In the UK, background radiation levels are highest in Yorkshire, Aberdeen and Cornwall. Most of the radioactivity in rocks comes from uranium-238 and thorium-232, which have unstable nuclei. The nuclei become more stable by emitting radiation.

Radiation from the air comes from radon gas which is produced when uranium decays. When we breathe in radon gas the radon may emit radiation in our lungs. When radiation from a source reaches our body then our cells can be damaged by direct irradiation.

When radioactive material touches our skin, is eaten or breathed in then our bodies become contaminated. When radioactive materials dissolve in water, plants take them up and they may become part of the food chain. Food and drink in our diet that contain radioactive materials include tea, coffee and Brazil nuts. Since we ingest radioactive materials, we are all slightly radioactive, at a level of about 5000 counts per second.

- 1 Is there such a thing as a 'safe' level of radiation? Explain your answer.
- 2 How do scientists decide whether a level of radiation is 'safe'?
- 3 Is the dose that each person receives in the UK a safe level of radiation? Explain your answer.
- 4 Name **three** sources of background radiation.
- 5 **a** What are cosmic rays?
b Do you think the number of cosmic rays passing through you is always the same for every person? Explain your answer.
- 6 Which places in the UK have the highest background radiation levels?
- 7 What produces background radiation on Earth?
- 8 Explain how direct irradiation is different from contamination.
- 9 Explain what the final sentence of the text means in your own words.