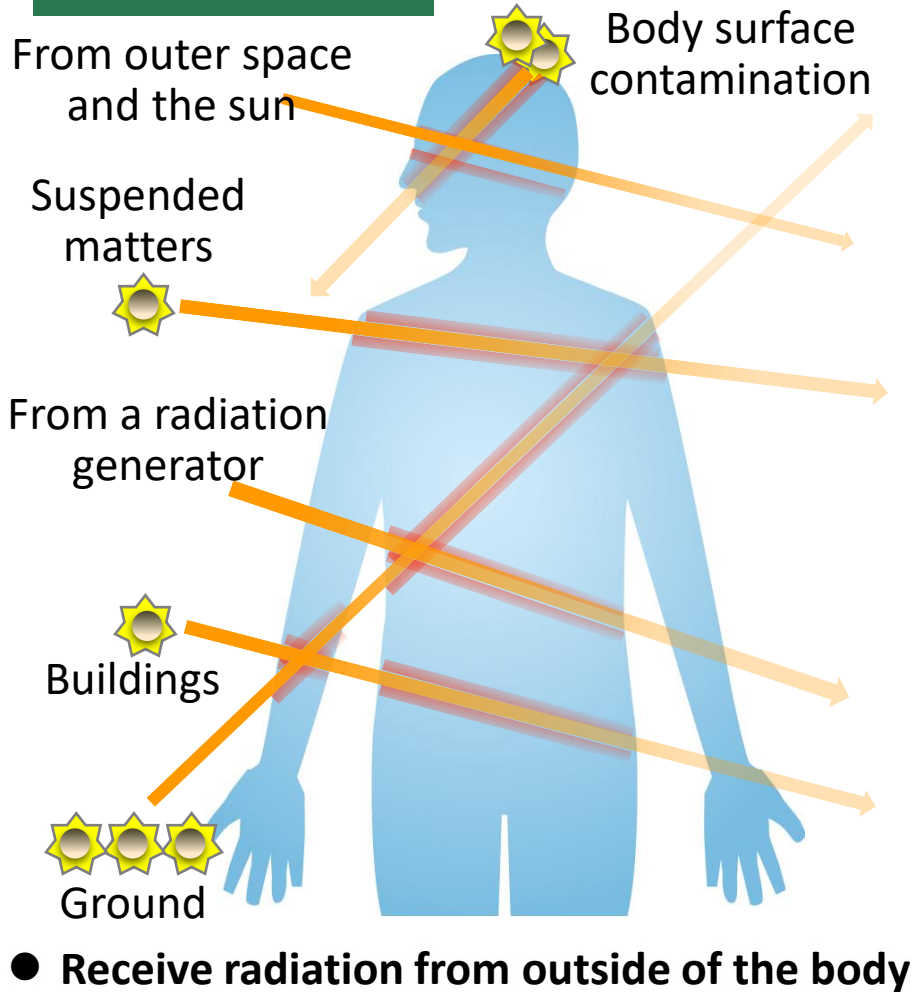
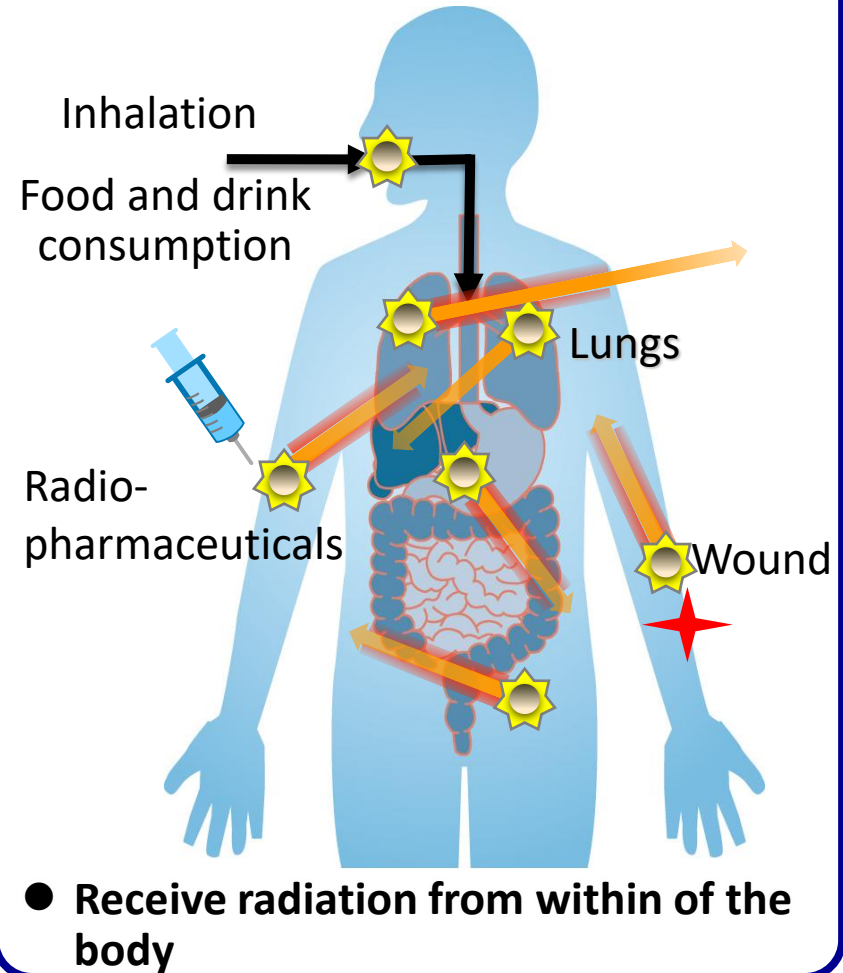


Internal and External Exposure

External exposure



Internal exposure



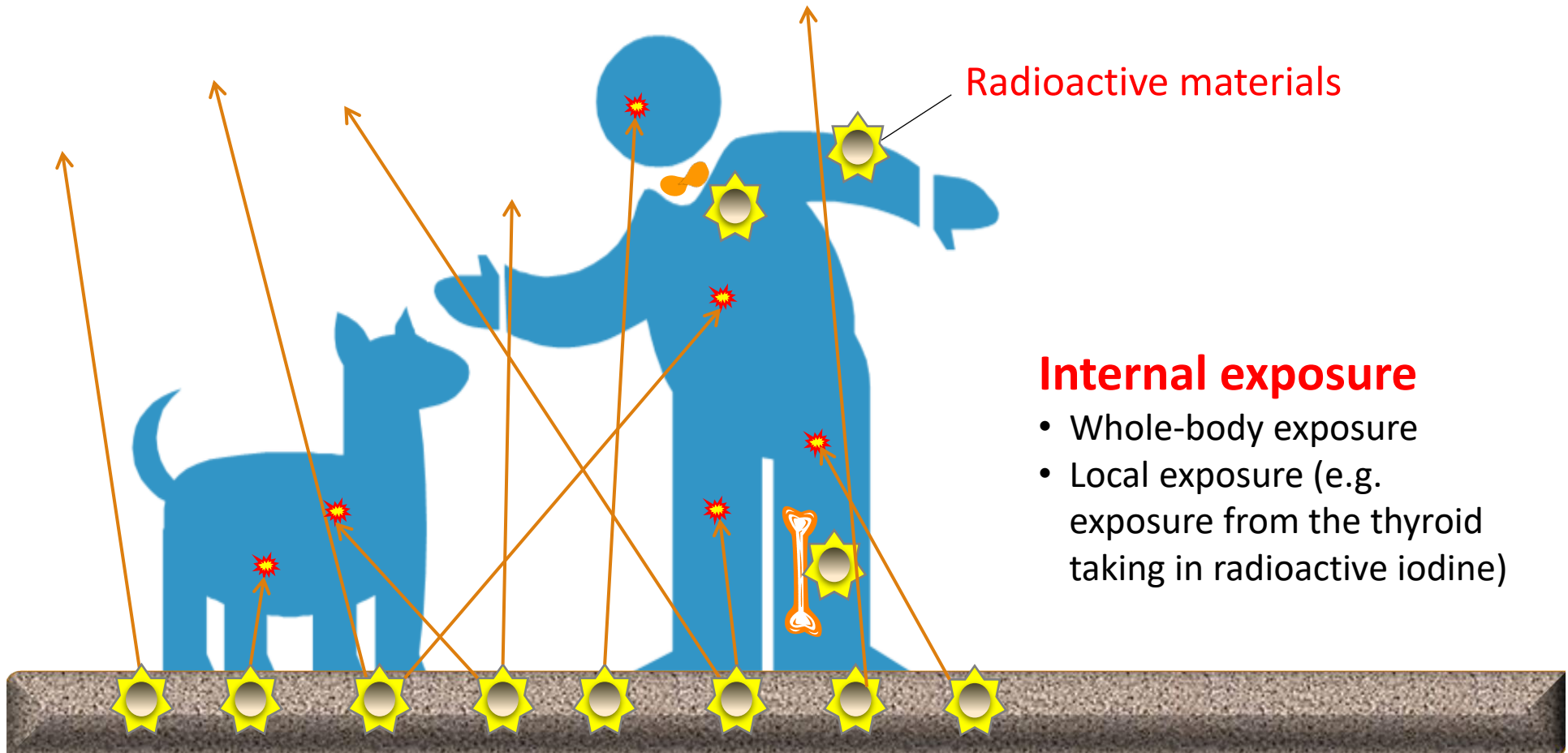
The body is equally exposed to radiation in both cases.

 Radioactive materials

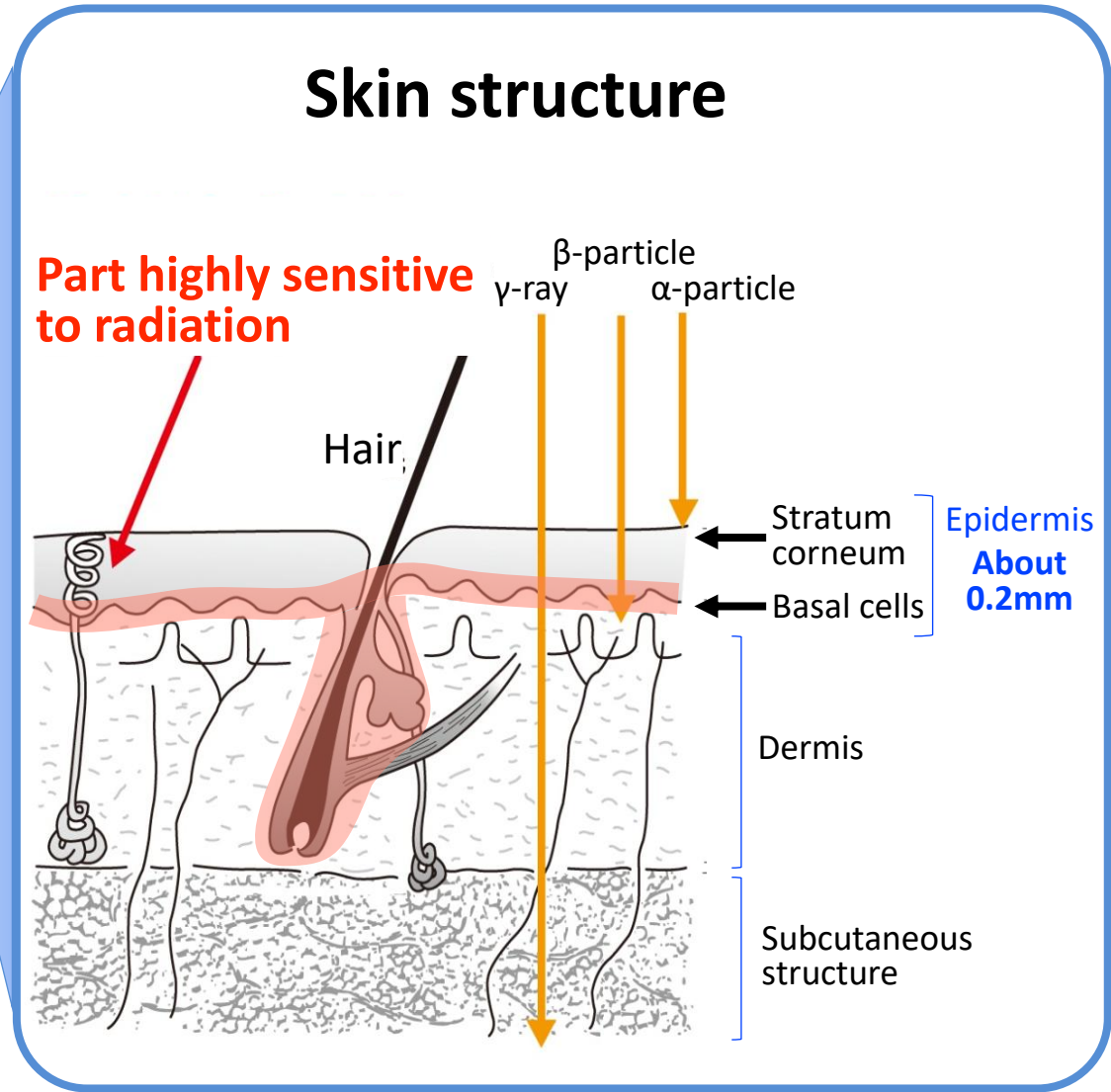
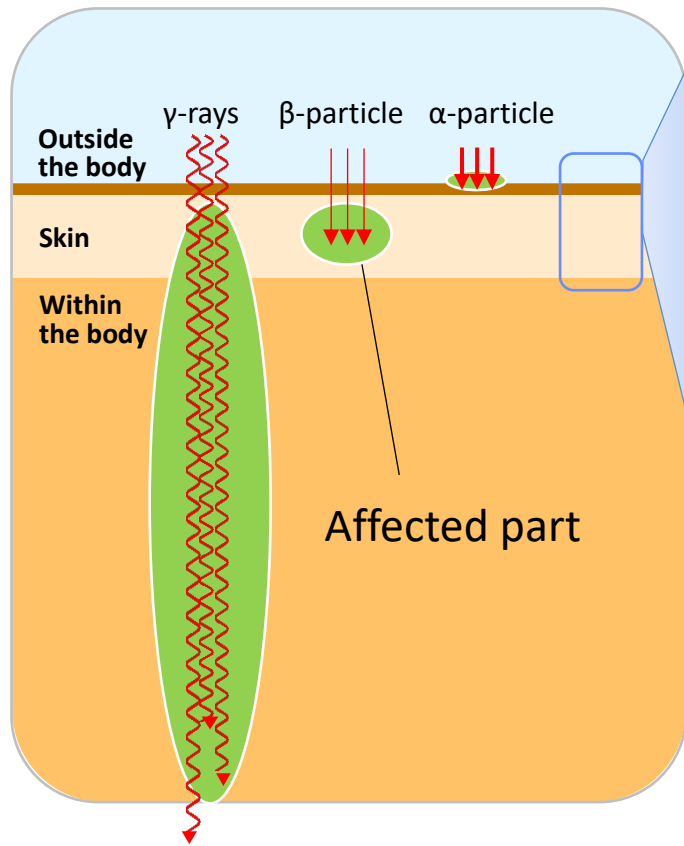
Various Forms of Exposure

External exposure

- Whole-body exposure
- Local exposure (e.g. exposure by X-ray examination or local body surface contamination)



External Exposure and Skin



Internal Exposure

(i) Ingestion

From the mouth (swallowing)
Absorption through the digestive tract

(ii) Inhalation

Incorporation from the respiratory airways
Absorption from the lungs and the surface of the airways

(iii) Percutaneous absorption

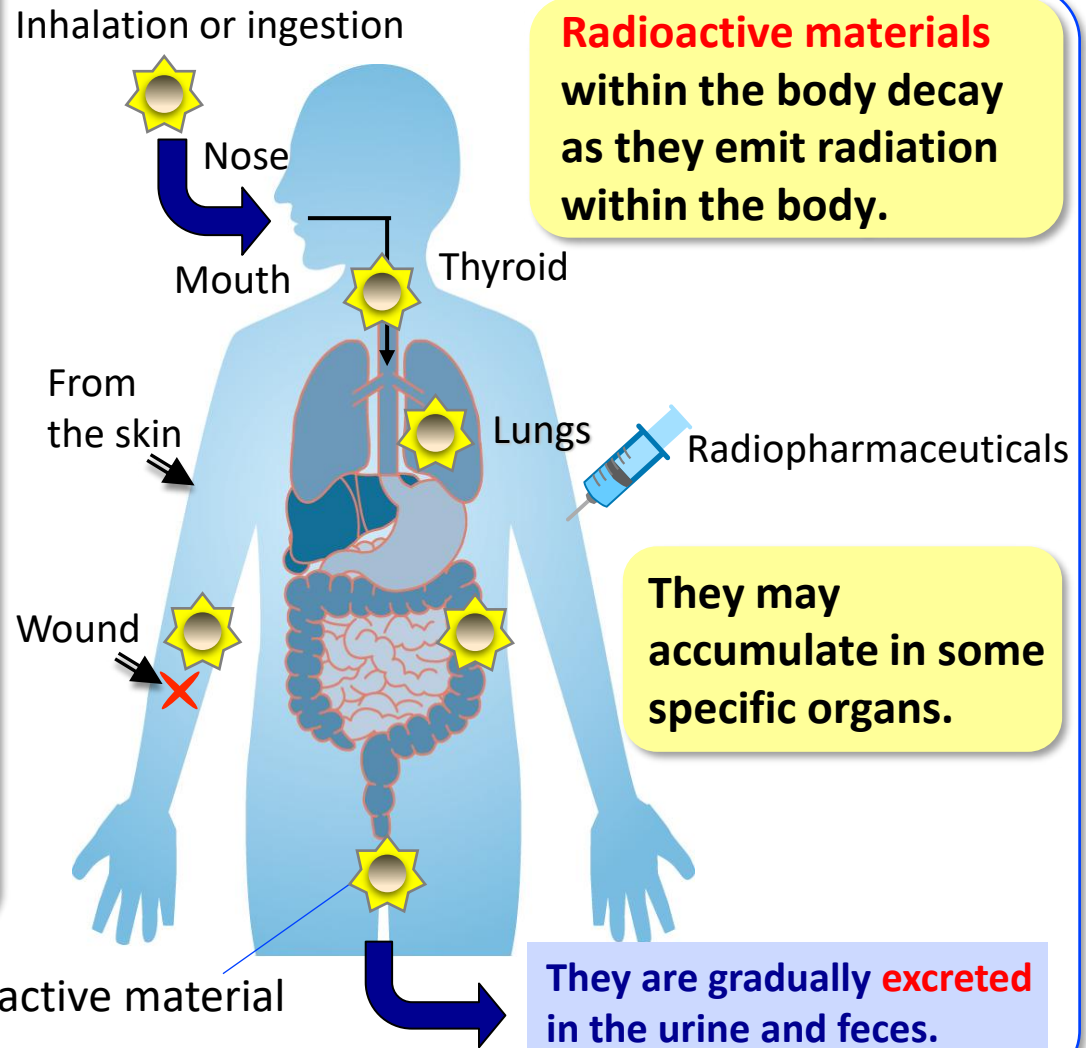
Absorption from the skin

(iv) Wound contamination

Contamination from a wound

(v) Intake of radiopharmaceuticals

Injection, oral administration (→ (i))
Inhalation of gas (→ (ii))



The characteristics of radioactive materials that especially cause problems in internal exposure

- (i) α -emitters $>$ β -emitters or γ -emitters
- (ii) Materials that enter easily but are difficult to excrete
- (iii) Materials that are likely to accumulate in specific organs

Radioactive materials

