D.PHARM • SECOND YEAR

अस्पताल एवं नैदानिक फार्मेसी

अध्याय 6

रेडियोफार्मास्यूटिकल्स



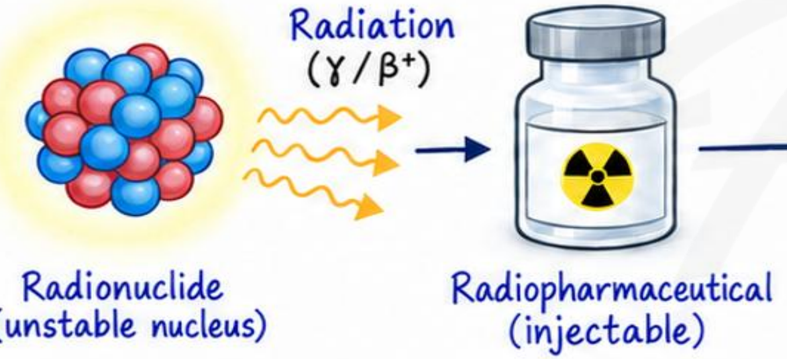
हिंदी अध्याय नोट्स

DIPLOMA IN PHARMACY

RADIOPHARMACEUTICALS AND ALARA

RADIOPHARMACEUTICAL

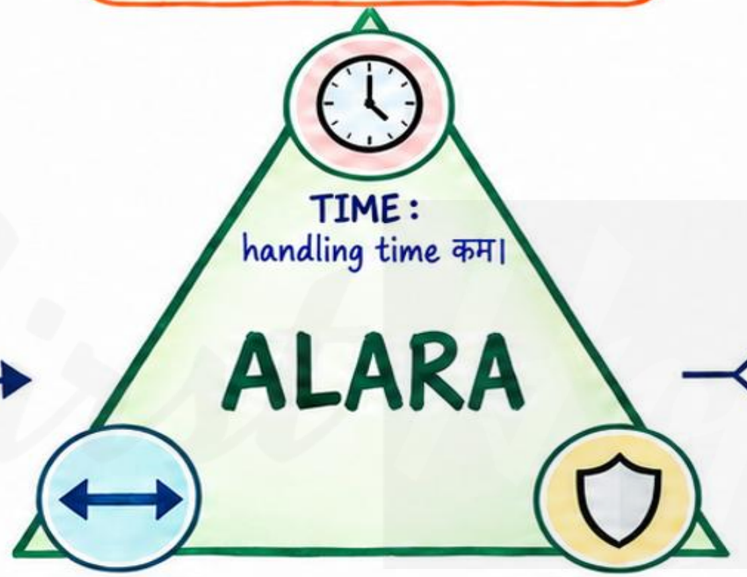
Radionuclide वाली medicinal preparation, जिसका use nuclear medicine में diagnosis या therapy के लिए होता है।



MAIN RISKS

- External exposure
- contamination
- wrong activity या patient
- injectable product में sterility loss
- security failure।

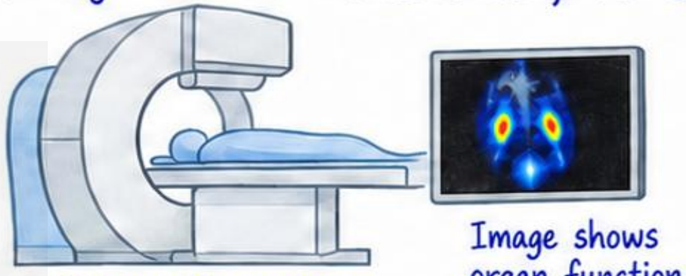
ALARA — AS LOW AS REASONABLY ACHIEVABLE



DIAGNOSTIC EXAMPLES

- Technetium-**99m** compounds
- Fluorine-**18** fluorodeoxyglucose (^{18}F-FDG)।

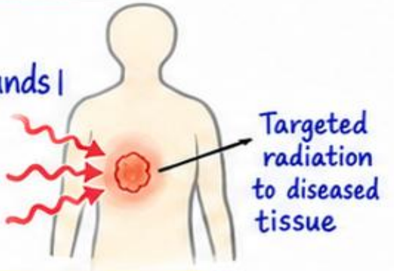
इनकी radiation imaging equipment से detect होकर organ function या disease study करती है।



THERAPEUTIC EXAMPLES

- Iodine-**131**
- Lutetium-**177** compounds।

ये selected tissue या molecular target को radiation देती हैं।



India में nuclear-medicine facility और practice को AERB authorization, approved procedures और Radiation Safety Officer oversight follow करना चाहिए।

STORAGE OF RADIOPHARMACEUTICALS

STORAGE OBJECTIVES

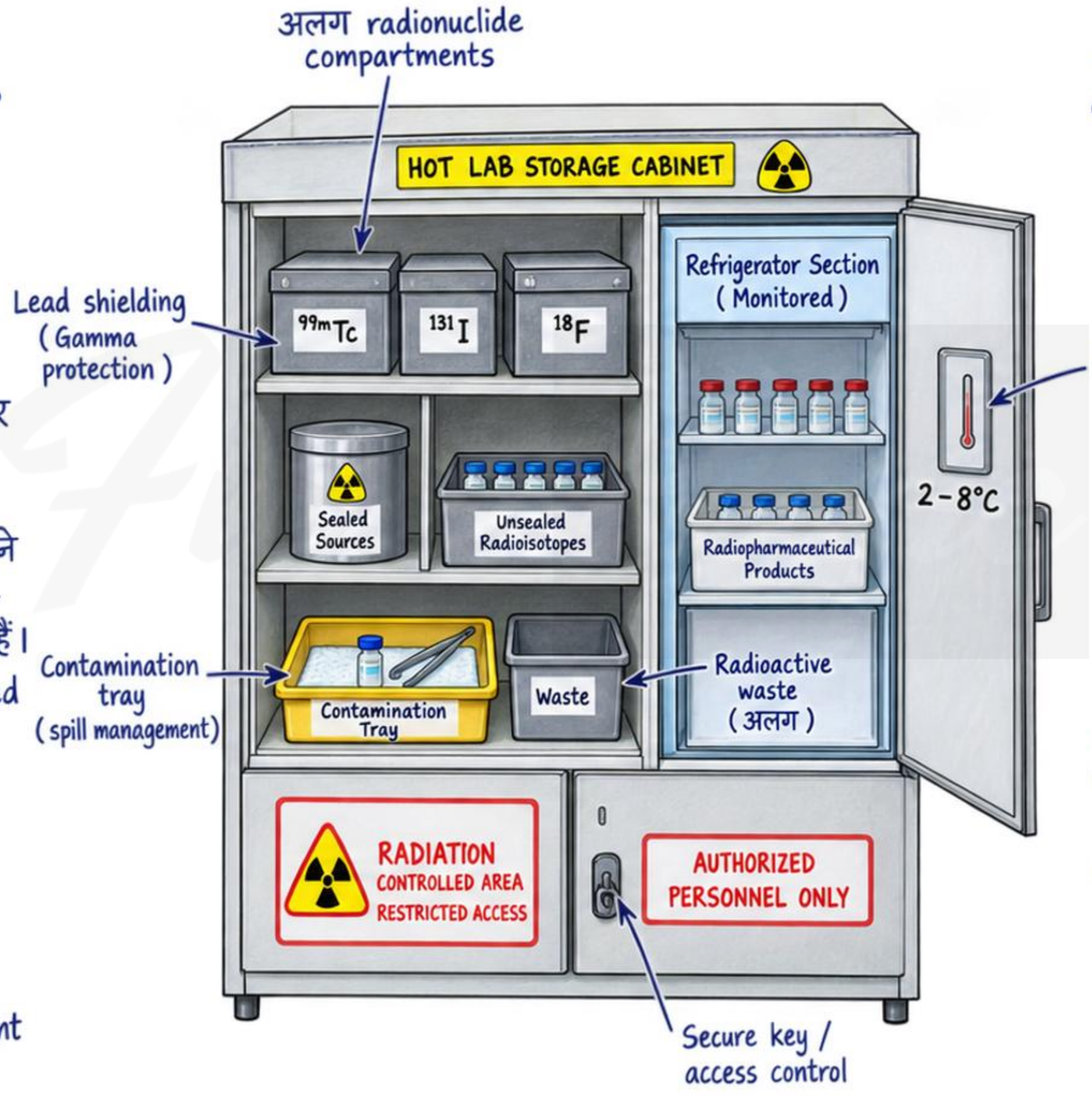
- Workers और public की protection • product quality preserve • contamination, mix-up, theft और activity loss रोकना।

SHIELDING

- Radiation type और energy के अनुसार shielding चुनें। Gamma emitters में dense shielding; high-energy beta emitters में bremsstrahlung कम करने के लिए पहले acrylic जैसे low-atomic-number material का use हो सकता हैं।
- Radiation Safety Officer के approved design follow करें।

SEGREGATION

- Radionuclides, sealed / unsealed sources, usable stock, waste और returned material अलग।
- Liquids के लिए secondary containment और clearly labelled work zones।



SECURITY AND RECORDS

- Restricted access • radiation warning symbol • radionuclide, activity, batch, receipt, use और balance inventory • secure key / access control।

Designated monitored refrigerator (2–8°C)

Domestic food refrigerator नहीं।

ENVIRONMENT

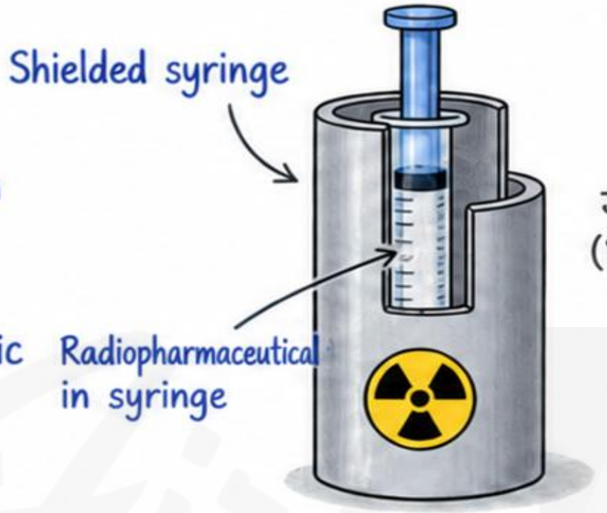
- Manufacturer-labelled temperature, light और storage conditions follow।
- Required होने पर designated monitored refrigerator; domestic food refrigerator नहीं।

Short-lived products को authorized hot lab में use के पास रखें; survey instruments और spill supplies उपलब्ध हों।

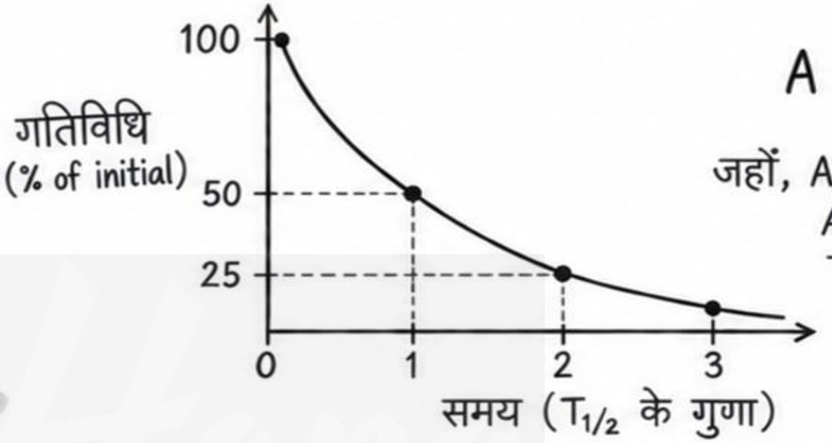
DISPENSING OF RADIOPHARMACEUTICALS

AUTHORIZED WORK

- केवल trained और authorized personnel, facility licence, Radiation Safety Officer program और written SOPs के अंतर्गत काम करें। Personal dosimetry, gloves, protective clothing और task-specific shielding risk के अनुसार — एक universal PPE list नहीं।



भौतिक क्षय (Physical decay)



$$A = A_0 \left(\frac{1}{2}\right)^{\frac{t}{T_{1/2}}}$$

जहाँ, A = समय t पर activity
A_0 = प्रारंभिक activity
$T_{1/2}$ = physical half-life
t = समय

DISPENSING STEPS

1. Patient, prescription, radionuclide, product, route और scheduled administration time verify।
2. Patient-specific activity calculate और physical decay account।
3. Injectable products को required controlled system में aseptically prepare।
4. Calibrated dose calibrator से activity measure।
5. Vial / syringe को suitable shielding और leak-resistant transport container में रखें।
6. Final identity, activity और label check; handover document।

LABEL

Patient ID : _____
Radiopharmaceutical : _____
Activity : _____ Bq / MBq
Calibration date और time : _____
Expiry time : _____
Required route : _____

Ci / mCi भी मिल सकते हैं।

CONTAMINATION CONTROL

- Absorbent work surface • tray • routine surveys • SOP के अनुसार immediate spill containment, monitoring और decontamination।



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