Quantification - SUV

Quantification

The number contained in the voxel is proportional to quantities of interest

Activity concentration (Bq/ml)	SUV

Needs calibration of the imaging device

SUV standardised uptake value

- SUV expresses the uptake related to an uniform distribution of the activity in the volume of the patient.

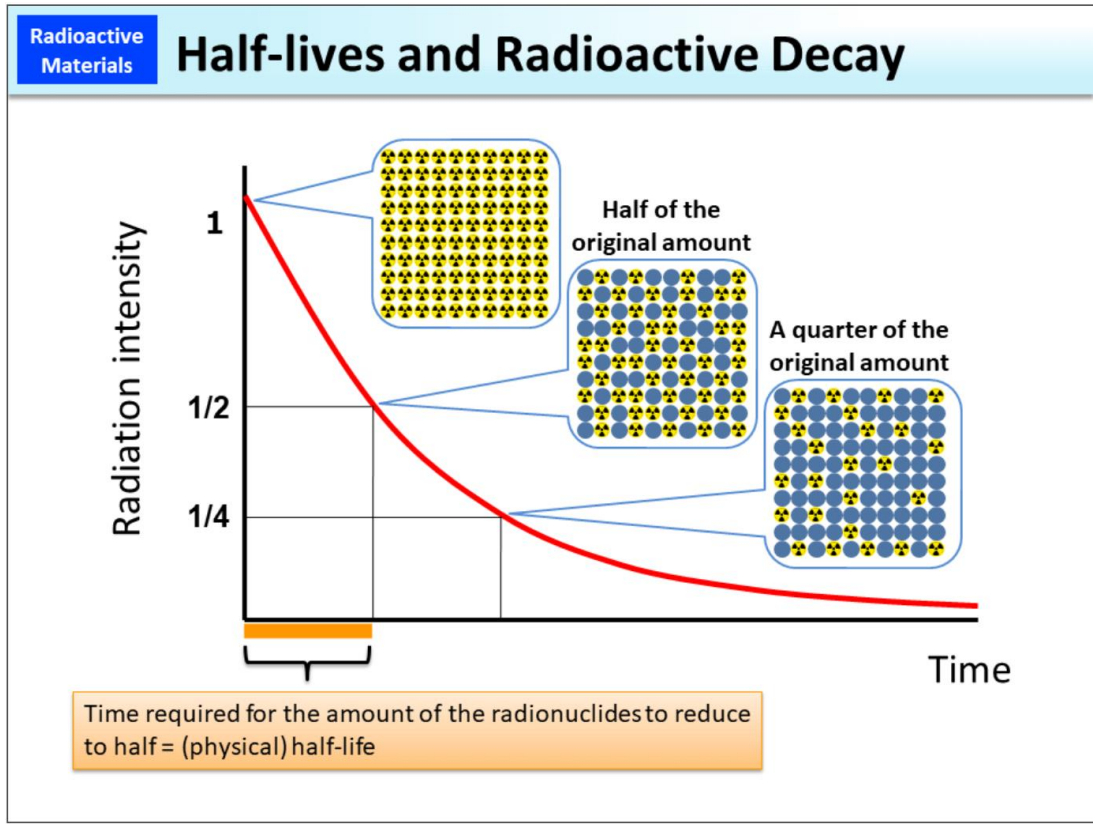
$$SUV = \frac{VOI\ concentration\ [{}^{Bq}/_{ml}]}{Injected\ activity\ [Bq] \Big/ Volume[ml]} \qquad [No\ unit]$$

Injected activity and concentration are expressed at same time.

- Volume usually estimated by the weight

$$SUV = \frac{Uptake\ [Bq/ml]}{A_{inj}[Bq]} \cdot Weight[g] \qquad [g/ml]$$

Radioactive decay



- A_0 : activity at time t_0
- A_t : activity at time t
- $\Delta t = (t - t_0)$ time delay
- T : half live of the radioisotope (T=110 min for ^{18}F)

- $A_t = A_0 \cdot e^{-0{,}693 \cdot \frac{\Delta t}{T}}$
- Times expressed is same unit!

Sources of error JNM 2009 : R. Boellaard

- Residual activity in the syringe : 5 %
- Clock synchronisation : 10 %
- Paravenous injection : 50 %
- Uptake period : 15 %
- Patient movement : 30 %
- Blood sugar : 15 %
- …

Thank you!

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