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Evaluation of radiopharmaceuticals sorption to 2 and 3-pieces syringes

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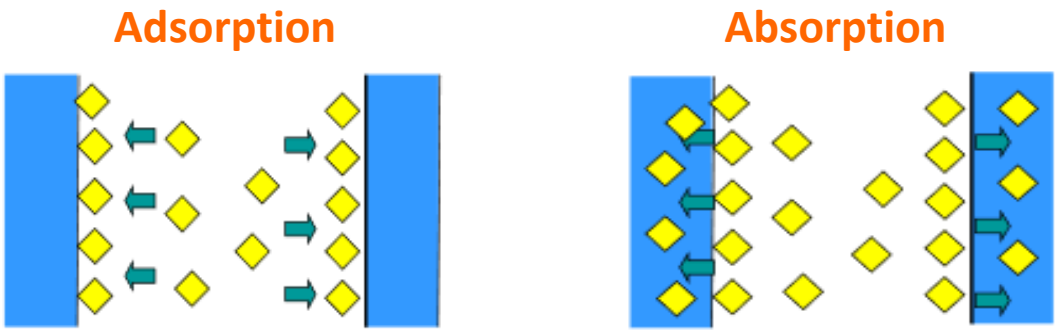
1 - Introduction

Drug sorption can impact :

→Quality
→Stability
→Quantity of the dose delivered



Courtesy of Valérie Sautou

Objectives :

Evaluate the sorption of two **radiopharmaceuticals to syringes** by a new, **non-destructive method**

2 – Materials and methods

2P syringes - *BD Discardit II BP309050* – 5 mL
Barrel = Polypropylene
Plunger = Polyethylene

3P syringes – *Medicina IVL05* – 5 mL
Barrel = Ethylene-polypropylene copolymer
Plunger = Ethylene-polypropylene copolymer + Polyisoprene
Stopper = Silicone oil

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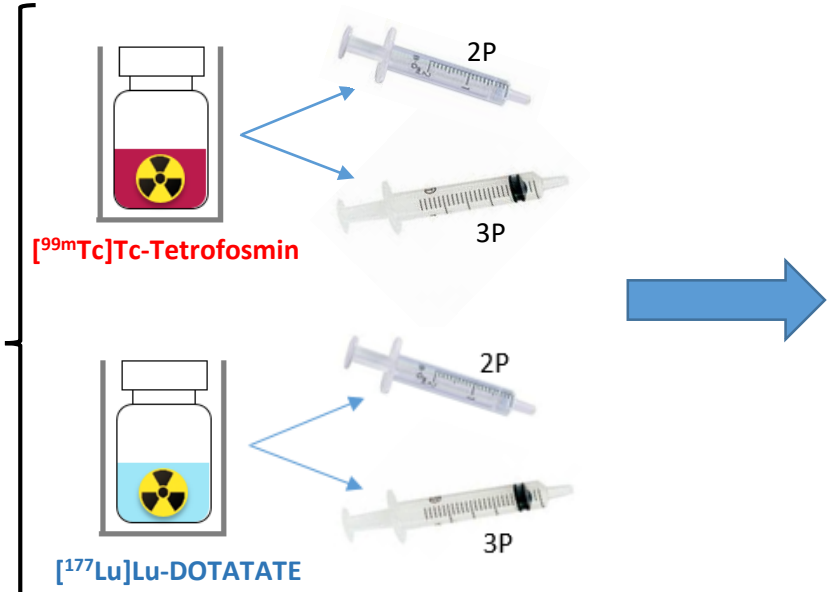
In triplicate



Both types of syringes are filled with radiopharmaceuticals and the volume adjusted to 5 mL with NaCl

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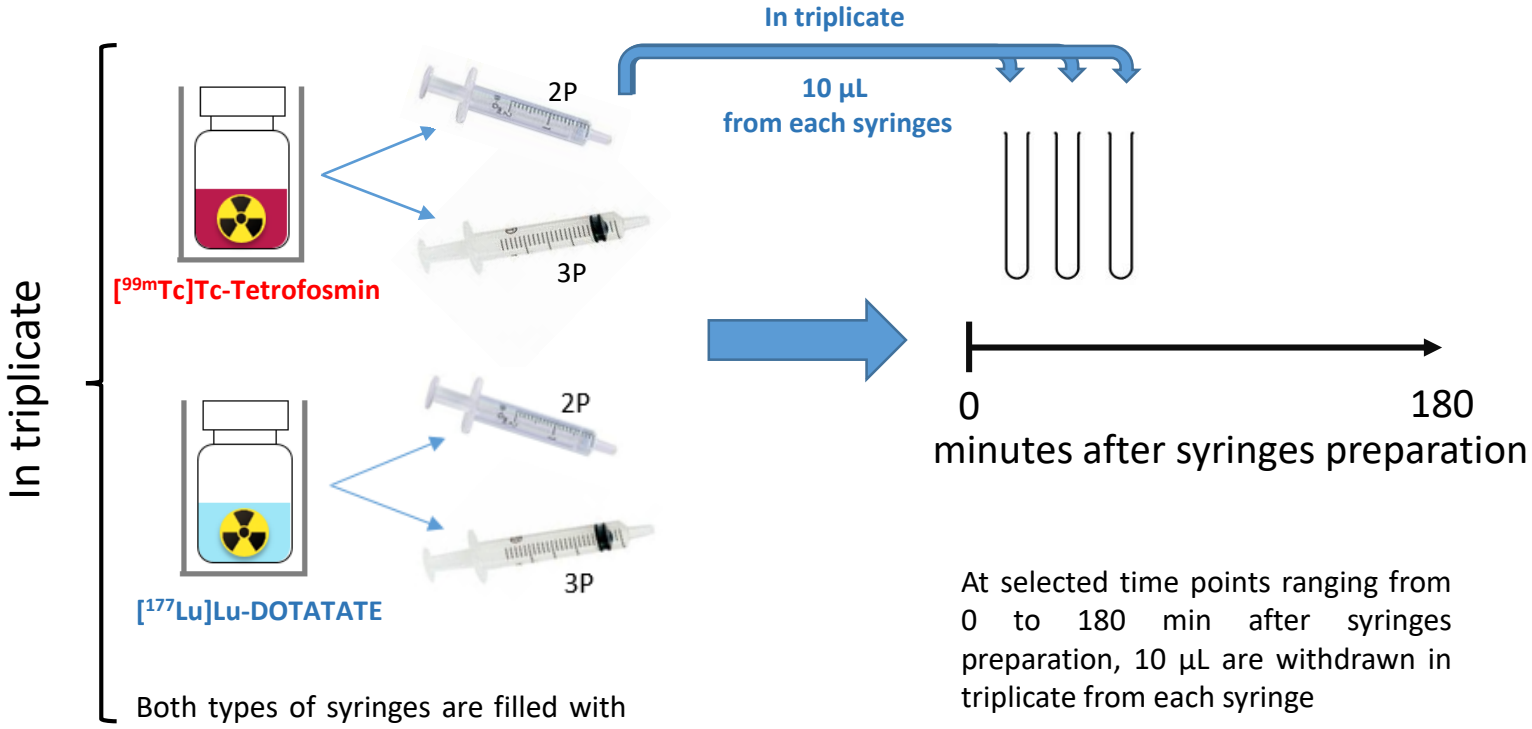

Both types of syringes are filled with radiopharmaceuticals and the volume adjusted to 5 mL with NaCl

At selected time points ranging from 0 to 180 min after syringes preparation, 10 µL are withdrawn in triplicate from each syringe

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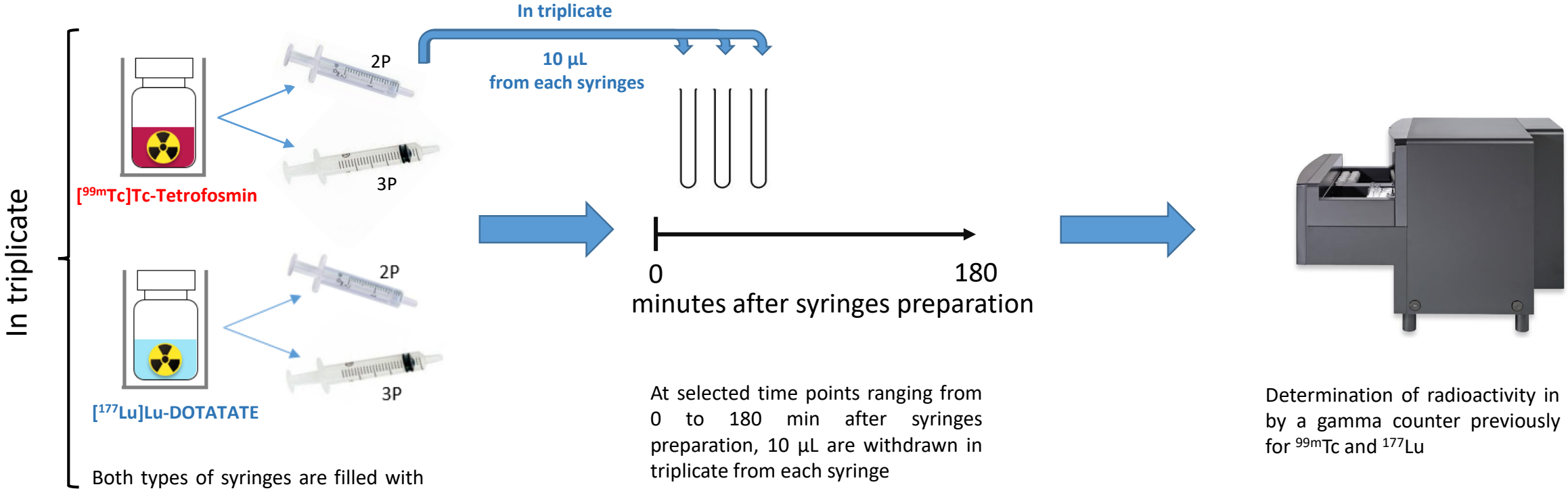

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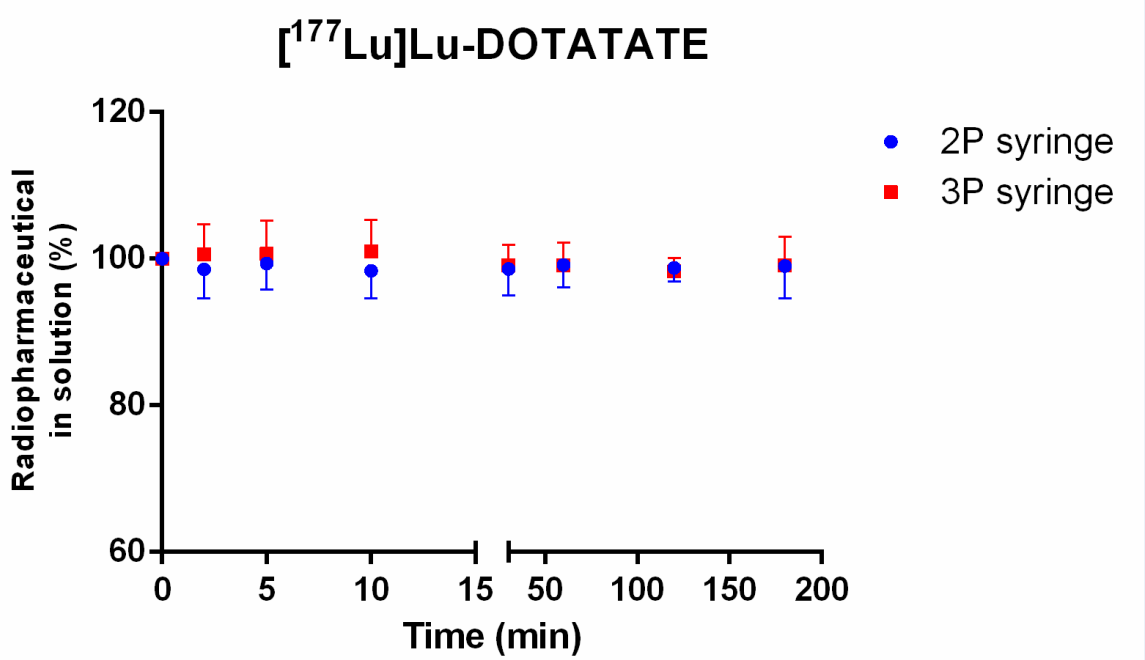
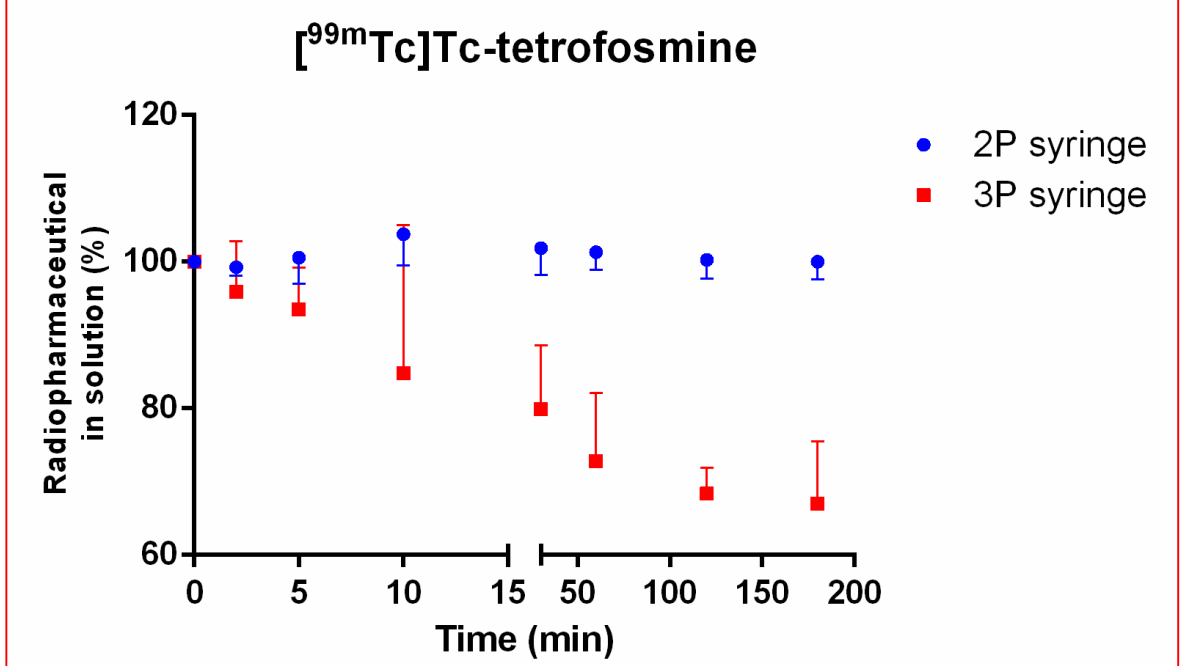
Determination of radioactivity in each tube by a gamma counter previously calibrated for ^{99m}Tc and ^{177}Lu

2 – Materials and methods

- Syringes immobile and capped throughout the study in between measures
- Radioactivity (RA) values decay-corrected
- **% radiopharmaceutical in solution calculation** :
  - T_0 activity = reference value = initial RA (100%)
  - At each time :
  - % of radiopharmaceutical in solution = $\frac{RA\ in\ solution}{Initial\ RA}$ x 100

3 – Results / Discussion





[177Lu]Lu-DOTATATE :

- No significant loss by sorption with 2P and 3P syringes
- No significant difference between 2P and 3P syringes

[99mTc]Tc-Tetrofosmin :

- No significant loss by sorption with 2P syringes
- Significant loss by sorption with 3P syringes ($p < 0.01$ starting at T10)
- Significant kinetic difference between 2P and 3P syringes

→ **Specific components of 3P syringes : polyisoprene and silicone oil could be the cause of this interaction**

4 – Conclusion

- Adapted and innovative quantification method due to the specific nature of radiopharmaceuticals

- 3P Syringes = risk of generating radiopharmaceutical loss by sorption phenomena

- These results can help to :
  - Determine the type of syringe to be used with radiopharmaceutical (3P syringe should not be used with tetrofosmin)
  - Determine the time between syringe preparation and patient administration
  - Need to measure the residual activity to know the real injected dose

- Ongoing study with other radiopharmaceuticals

Thank you for your attention