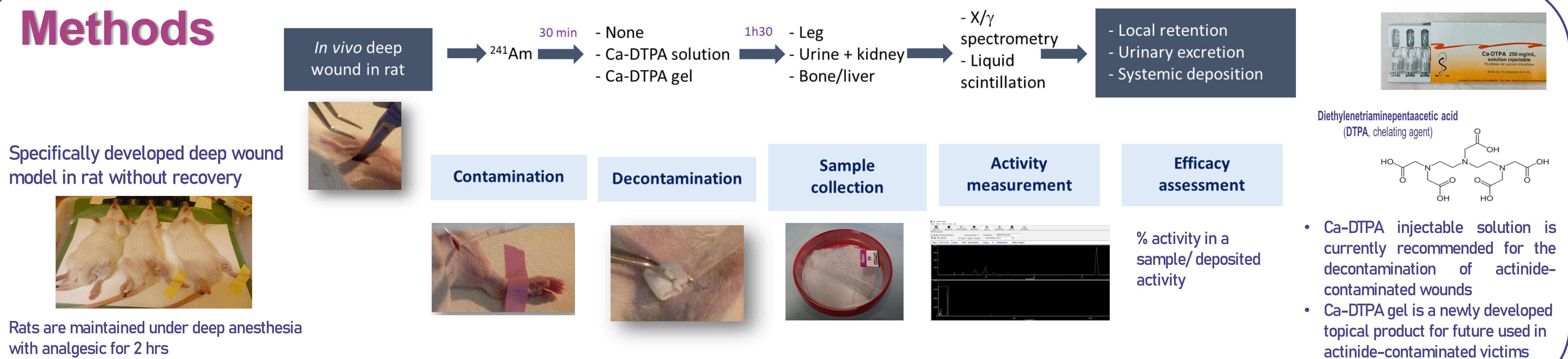


Introduction

- Wound contamination by α -emitting actinides such as plutonium (Pu) and americium (Am) is a risk for workers during nuclear fuel production and reactor decommissioning,
- To limit the proportion of actinides reaching the blood, an early decontamination of the wound site is essential,
- Current decontamination recommendations include irrigation of the wound site using the chelating agent Diethylenetriamine Pentaacetic Acid (DTPA),
- We have previously shown the high efficacy of a recently developed sterile Ca-DTPA loaded gel (25% w/w) to decontaminate injured skin exposed to Pu or Am (Van der Meeren et al, Health Physics, 2024).

Aim: Determine the efficacy of Ca-DTPA gel to decontaminate deep wounds following exposure to Am

Methods

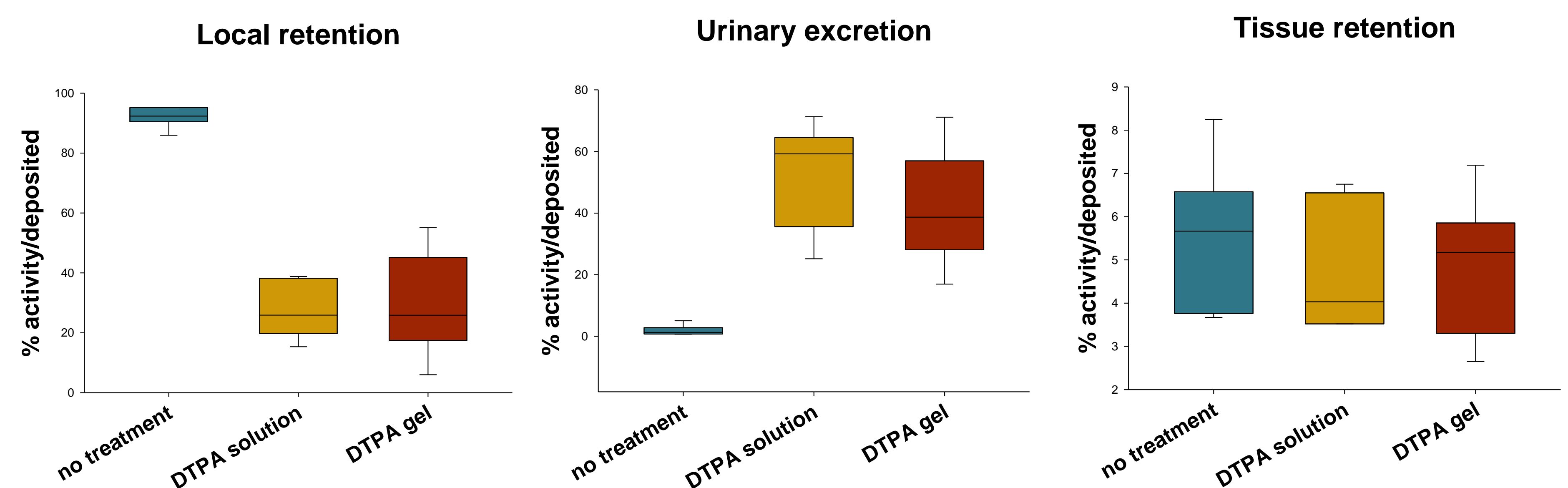


Results

Biodistribution of Am in control rats (no decontamination)

| | sample | %/ deposited |
|-------------------|--------------|--------------|
| Local retention | Leg | 92.20 ± 3.4 |
| | Urine | 1.32 ± 1.56 |
| Excretion | Kidney | 0.55 ± 0.24 |
| | Blood | 0.46 ± 0.19 |
| Systemic transfer | Liver + bone | 5.51 ± 1.69 |

Decontamination treatment efficacy



- In control rats after two hours, most of the deposited activity remains at the wound site
- The decontamination of the Am-contaminated wound with DTPA products leads to a statistically significant decrease in the local activity remaining in the leg and to a statistically significant increase in urinary excretion as compared to control rats
- No differences are observed in tissue retention (liver & bone) between the different groups. This could be explained by a level of activity in the blood of decontaminated rats quite important (2.5% of the deposited activity as compared to 0.5% in control rats), so artificially increasing the activity level in tissues
- No difference is observed between the two Ca-DTPA treated groups

Conclusions

- The efficacy of Ca-DTPA products has been demonstrated for the decontamination of a deep wound in rats contaminated with Am
- The efficacy of Ca-DTPA-loaded gel is not different than that of Ca-DTPA solution
- The gel formulation of Ca-DTPA is of practical interest in situation where reducing liquid waste is of crucial importance.