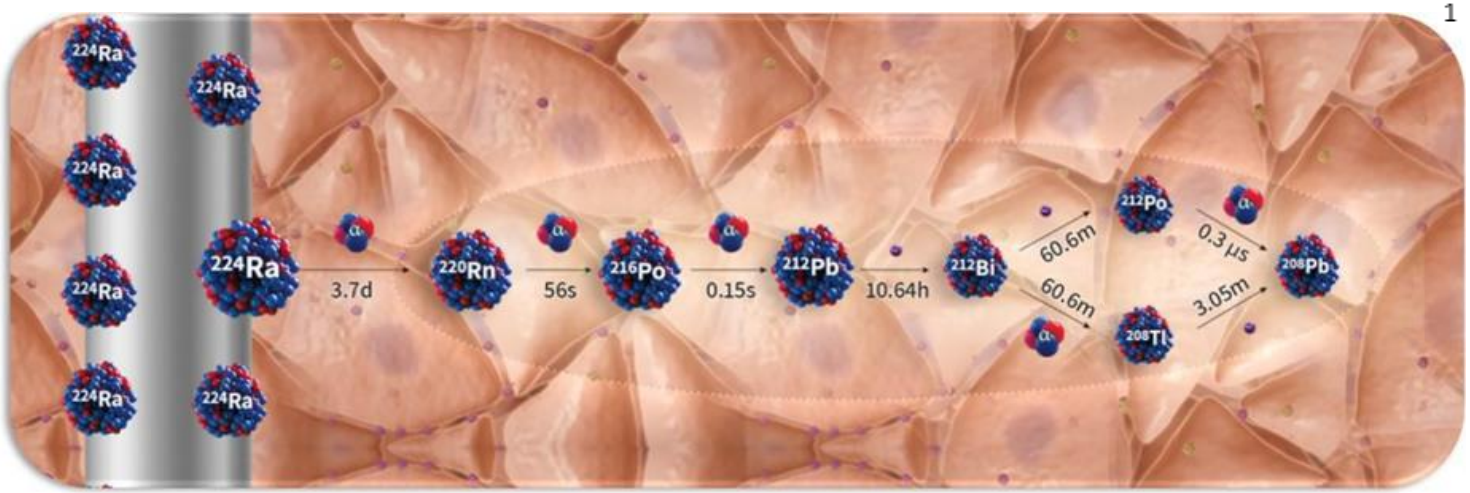
Determination of Absorbed Dose to Water for the DaRT Brachytherapy Source in Monte Carlo

- Treatment dependent on radionuclide flow
- Source strength currently activity, but absorbed dose quantity more clinically relevant
- Geometry optimization for correction factors accomplished in TOPAS for extrapolation chamber



[1]

$$\dot{D}_{water} = \frac{k_{MC,\alpha}\left[\left(\frac{\bar{W}}{e}\right)_{air} \cdot \bar{S}_{air}^{water}\right]_{\alpha} + k_{MC,\beta}\left[\left(\frac{\bar{W}}{e}\right)_{air} \cdot \bar{S}_{air}^{water}\right]_{\beta}}{\rho_0 \cdot A_{eff}} \cdot \left(\frac{\Delta I}{\Delta l}\right)_{l\to 0} \cdot (k_{meas}) \cdot (k_{MC})$$

$$k_{MC} = k_{window} k_{backscatter} k_{div} k_{vol}$$

$$k_{meas} = k_{tp} k_{elec} k_{pol} k_{recom}$$

- Optimal correction factors (magnitudes between 0.996 – 1.264) found for:

1. 2x3 mm Rectangular Collecting Electrode
2. 500 um Source to Mylar Distance
3. 3 um Aluminized Mylar Entrance Window
4. 300 – 500 um Air Gap Distance between Window and Collecting Electrode

[1] Alpha Tau Technology Brochure.