Estimation Of the distance nucleosome slide Post UV-C

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Previously, we have developed a model for the loss of nucleosome and DNA signal from a fixed ROI post UVC as a function of the UV dose. Here we shall use this model to estimate the maximal sliding distance of nucleosomes post UVC

The system of equations

$$
\begin{aligned}
T(u) &= \pi T_{max}(1-\exp(-k_t u))^2 && (1)\\
N_T(u) &= N_0\left(1-\exp(-\frac{k_p(1-k_s)+k_s}{\pi T_{max}}T(u))\right) && (2)\\
N_S(u) &= \left(\frac{k_s}{k_p(1-k_s)+k_s}\right)N_T(u) && (3)\\
N_P(u) &= \left(1-\frac{k_s}{k_p(1-k_s)+k_s}\right)N_T(u) && (4)\\
A(u) &= A_0+k_a(N_T(u)-N_0) && (5)
\end{aligned}
$$

with $N_S(u)$ the loss of nucleosome from the initial damage region (IDR) due to sliding; $N_p(u)$- the loss of nucleosome from the IDR due to chromatin opening; $A(u)$- the area of the region of interest (ROI); $T(u)$- the number of damages in the IDR.

The area of the ROI attriuted to sliding is given by

$$A_S(u) = A_0 + k_a(N_S(u) - N_0) \quad (6)$$

To reduce the number of parameters used in the function above, we will be calculating the relative expansion due to sliding given by $A(u)/A_0$