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Appendix B

Appendix B. Probability of k-Hits in "1-Target multi-Hit" model.

In the "1-Target multi-Hit" model, probability of cells with k-Hits is shown like (A-1).

In the case of n = ∞,

$$\lim_{n\to\infty} Pk(x) = \lim_{n\to\infty}\left\{ nCk\left(1-\frac{x}{n}\right)^{n-k}\left(\frac{x}{n}\right)^{k}\right\} \quad \text{(B-1)}$$

$$= \lim_{n\to\infty}\left\{ \frac{n!}{(n-k)!*\mathrm{k}!}\left(1-\frac{x}{n}\right)^{n-k}\left(\frac{x}{n}\right)^{k}\right\}$$

$$= \lim_{n\to\infty}\left\{ \left(\frac{n}{n}\right)\left(\frac{n-1}{n}\right)\left(\frac{n-2}{n}\right)\cdots\left(\frac{n-k+1}{n}\right)*\left(\frac{x^{k}}{\mathrm{k}!}\right)*\left(1-\frac{x}{n}\right)^{n}\left(1-\frac{x}{n}\right)^{-k}\right\}$$

(a) (b) (c) (d)

When n goes to infinity, (a) converges to "1", (b) does not change, (c) converges to "e-x", (d) converges to "1".

$$\therefore \lim_{n\to\infty} Pk(x) = \frac{x^{k}.e^{-x}}{\mathrm{k}!} \quad \text{(B-2)}$$

The probability of k-Hits with a dose that induces average x-Hits per a Target is represented as (B-2)

The probability of k-Hits in the "single-Target multi-Hit" model is given by Poisson distribution [8a 15]

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