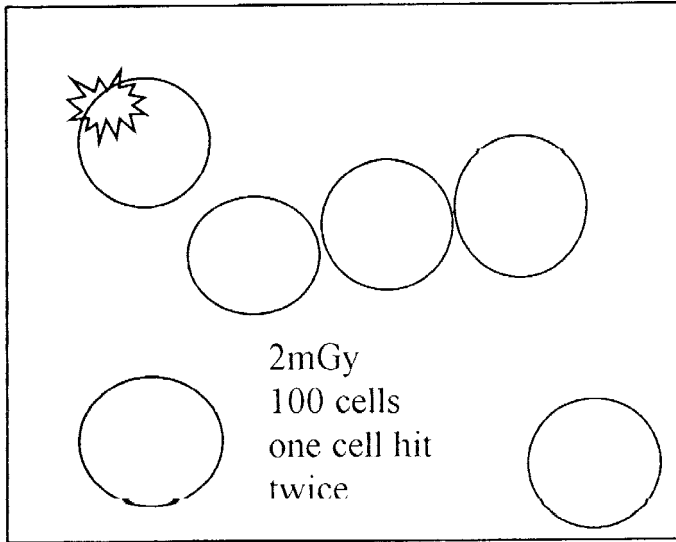


**Consequences of quadratic response to two hits inside 10 hours from intermnal isotope are that effect is 600 greater**



**1. Linear No Threshold:**

All cells get 2/100mGy-

Effect = Risk \* 2/100 = 0.02 Risk

**2. 2nd Event double hit 600 times more effective**

One cell gets double hit, others get nothing

Effect = 1/100 (2\*600\*Risk/100 + 0) = 0.12

**3. Hazard Enhancement = 0.12/0.02 = 6 times**

**Professor Goodhead's View**

Most situations of practical interest are characterised by cells receiving occasional single tracks well separated in time from any other tracks which may impinge on the same cell. From natural background, there is, on average, about one track per year through each cell nucleus. Therefore it is highly unlikely that there will be multiple tracks in short times (<1 day) over which repair of radiation induced damage within cells is usually observed to take

place. As a result, the tracks should act independently of one another for inducing single permanent damage ( e.g. mutations, chromosome aberrations) in the cells. The main exception to this might arise when larger total doses are received or the dose rate is considerably higher. A worker at the 50mGy annual limit for low LET radiation will receive 50 tracks per cell nucleus during the year (that is about one a week on average).

Available experimental and epidemiological data on radiation tumorigenesis may be considered in terms of three regions of dose response, defined by the average number of radiation tracks per cell. In the low dose region there are so few radiation tracks that a single cell nucleus is unlikely to be hit by more than one track. (Dudley Goodhead, 1988 "Spatial and Temporal Distribution of Energy." *Health Physics* 55 231-40)