

## Elements of the Second Event theory Pt I

### Temporal Averaging

1. Low dose region in ICRP methodology (linear dose response region). This assumes averaging of external gamma rays. Each cell has same dose and is traversed by one track. High dose region is characterised by two or more tracks and response is assumed to be quadratic.

2. At natural background external annual doses of 1mGy each cell receives one track per year. Any non-fatal damage is repaired before the cell replicates in a sequence which takes about 10 hours and is irreversible.

3. For certain types of internal exposure the ICRP assumptions at low dose do not hold since there is a high probability of two or more decays occurring over ten hours.

These are:

- internal sequentially decaying isotopes. e.g. Sr-90/Y90, Ba-140/La-140, Te-130/I-131
- immobilised radioactive particles e.g. PuO<sub>2</sub>, U3O<sub>8</sub>, Chernobyl fuel particles
- weak emitters which have a large number of decays per Sievert, e.g. Tritium.

There is no question that the ICRP assumptions do not hold for such Second Event processes. The question is what are the possible consequences of this for radiation protection?