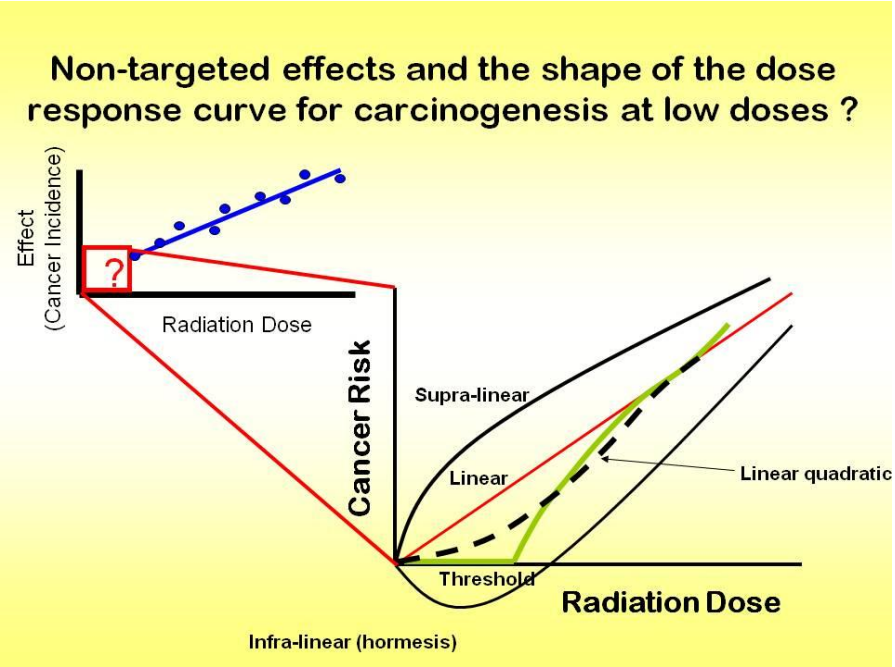
NSRSS Slide Competition

June 17, 2012
Mayu Isono



- Estimates of radiation-induced cancer risk are mainly based on LSS (Life Span Study) data of Japanese A-bomb survivors exposed to absorbed doses of 10-200 cGy. The findings clearly support a linear fit at the higher doses.
- The International Commission on Radiation Protection (ICRP) and the US National Council on Radiation Protection & measurements (NCRP) have recommended that risk at low doses be estimated by extrapolation from observations at high doses using linear no-threshold (LNT) model, because the smallest dose has the potential to cause a small increase in nuclear DNA damage, which can lead to genomic instability and possibly cancer.
- The detection of oxidative/DNA damaging effects in non-targeted cells from cultures exposed to low dose/low fluence radiation and their propagation to progeny cells suggests that the cancer risk may be underestimated by the LNT model, and the dose response curve may be supra-linear.
- In contrast, the expressions of protective (i.e adaptive) responses in low dose irradiated cells and their propagation to nearby bystander cells implies that cancer risk at low doses may be less than predicted by the LNT model.
- In deep space, exposure to densely ionizing particles may amplify stress in targeted and non-targeted cells. However, pre-exposure to low dose of sparsely ionizing protons may attenuate the stress that would be induced.
- Cancer risk at low doses/low fluences of radiation remains uncertain. Mechanistic studies of targeted or non-targeted biological responses following exposure to radiations of different quality would be informative .

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