Effects of Low and Very Low Doses of Ionizing Radiation on Health

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Resolving the controversy over beneficial effects of ionizing radiation

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Recognize the public fear of nuclear radiation

- ~25% of Canadians die of cancer (one in four)
- people want cures for cancer
- people want to know the causes
- people want to avoid the causes
- people know almost nothing about nuclear radiation
- people believe radiation in any amount causes cancer
- a result of our continued use of linear no-threshold (LNT) model
Keys to golden age of nuclear technology

- wide awareness of the real effects of radiation on health
- controversy between scientists over beneficial effects resolved
- medical community acceptance of radiation hormesis
- recognition that LNT hypothesis is not based on science
- public acceptance of low-level radiation
- removal of radiation scare issue from anti-nuclear movements
Intense disagreement continues among scientists and analysts regarding:

- validity of the LNT model
- reality of beneficial effects of radiation

Controversy due to political, social, economic issues

- cloud objective research and thinking
- increase resistance to change of established paradigms

Extensive research already done over past century

- disagreement not easily resolved by more scientific data
- scientists often do not look for beneficial effects
- they do not design experiments to find beneficial effects
Scientific societies now challenge LNT scare

- 1995 French Academy of Sciences - report
- 1996 Health Physics Society - position paper
- 1997 Council of Scientific Societies at Wingspread
- 1998 International Nuclear Societies Council
- 1998 US Dept of Energy funds new research on low-dose radiation
- 1999 American Nuclear Society - position paper
Japanese research - health effects of radiation

- Central Research Institute Electric Power Industry:
- organized Hormesis Research Steering Committee
- involved 14 universities and two research institutes
- found extraordinary bio-positive effects:
  - cell rejuvenation
  - psychological stress moderation - enzyme stimulation
  - suppression and therapy of adult diseases (diabetes and hypertension)
  - cancer suppression by immune system enhancement
  - cancer suppression - activation DNA repair, cell killing
- having difficulty communicating discoveries to the world
Cooperation between Japan and Canada

- Central Research Institute of Electric Power Industry of Japan urged University of Ottawa to review, duplicate and extend the Japanese studies, in Canada.

- International Centre for Low Dose Radiation Research at University of Ottawa, Canada, is organizing:
  - attachment of scientists from Japan in Canada
  - participation of AECL’s Chalk River Lab
  - hospitals in Ottawa
  - hospitals in Toronto
Cancer patients, other life-limiting diseases

- have a life-or-death interest in the controversy over beneficial effects

- low-dose radiation therapy to stimulate defense mechanisms would:
  - cure certain types of cancer, e.g. non-Hodgkin’s lymphoma
  - treat diabetes and other adult diseases

- such patients would demand this therapy, if available
Nuclear workers: vital concern in this matter

- enjoy many interesting, well-paying jobs
- experience job satisfaction in providing tremendous benefits to humanity
- routinely receive low doses of radiation
- live with families near nuclear reactors
- aware that public concern about releases of radioactivity threatens their jobs
Environmentalists define a “contaminant” as:

- “any solid, liquid, gas, odour, heat, sound, vibration, radiation or combination of any of them, resulting from human activities, that may cause an adverse effect”
- We need to discredit the LNT model because it defines an adverse effect for low doses of radiation.
- A threshold model is not good enough because a “zero effect” implies uncertainties = no change from today.
- We need to validate the beneficial effects model (radiation hormesis) to address the environmental constraints on our use of nuclear technologies.
Conclusions:

- Current evolution to science-based regulation may be too slow to stop the phase-out of nuclear technologies, due to political activities.
- You have a vital concern on this subject. Learn about it!
- Nuclear workers are important and credible participants in resolving this controversy.
- Your recent public demonstrations reveal you have influence.
- Use your influence to urge scientists and regulators to use scientific methods to quantify the actual benefits and risks of radiation.