

Roundtable Discussion on 15th November 2000

Risk Assessment Conference (12 – 15 November), Houston, Texas:

Moderator: Dr. Walter Schimmerling

Round Table Participants: Dr. Fornace, Dr. Dudley, Dr. Groer, and Dr. Cucinotta

Attendance: About 50 invited guests and participants at the conference

Selected comments (paraphrased):

Dr. Fornace:

- Sensitivity – it is dependant on several individual variations
 - At NCIH there exists about 60 med cell lines with biomarkers being developed
- Gene – cancer causation
 - Linear dose response and almost no threshold
 - Chip survey mostly monitored in serum (may not be DNA)
- High LET response is roughly proportional to RBE
- Phenomenological intervention is not clear at this time

Dr. Dudley:

- We do have very large uncertainties for low level effects
- There exists evidences that even one single electron can cause DNA break or damage to DNA
- Perhaps we may not have cancer risk for low energy particles
- High LET:
 - Evidences of its effects are much stronger
 - Effect of carcinogenesis is much stronger
 - No level can be safe
- Uncertainties are not due to the process we adopted
 - One level could be zero (no risk)
 - Other level is the natural cancer mortality
- High LET we do not have such possibilities
 - Q (quality factors) are not certain
 - RBE values have large variations between tumor types (this is expected)
 - Any study that employs the quality factor (Q) increases risk
- Very few studies can get expected high LET tracks
- Large uncertainties are the concerns to be dealt with

Dr. Groer:

“I prepared my sermon a while ago and now the parish changed”

- Part-1: How to interpolate and extrapolate when human data is available
- Part-2: How to interpret when no human data is available
- Part-1: When human data is available
 - Not to try models at cellular level. Reasons – Atomic Bomb data simply turns out to be percentages and estimations
 - There exists an Italian saying that can help us “probability to be used for uncertainties”
 - Artificial Intelligence (AI) switched to probability and probability distributions
 - “May be we are suffering from the sins of the past”
 - Do not extract data from one to other (threshold / non-threshold)
 - Ex. Leukemia / Lung Cancer: Leukemia is interlinked with other processes in the body. How can we deal with it independently

- “Statistical assessment is based on independent nature, in reality, which is not”
- Sanity check = always to check with fundamental biology
- “Modeling is the art of knowing what to neglect”

- Part – 2: When no human data is available
 - A “pivotal” data set is needed
 - A “target data” set is needed
 - A “target population” is needed
 - How best we can address the Ra to Pu extrapolation
 - From animal studies, the time-scale is totally different how can we extrapolate or interpret from this.

Dr. Cucinotta:

- Astronaut Training:
 - To inform and to educate all the crew members
 - It may not be possible to get every crewmember trained and informed as desired due to schedule conflicts and other constraints.
- ALARA:
 - Specifications of the needed radiation limits with the ALARA principle
 - Cost benefit evaluation for mission scenario and success
- Role of Individuals in Radiation Protection:
 - Risks are mostly for late effects and there can exist a temptation to underplay importance in short-term because of limitations on funds, time, resources, etc.
 - Mechanism exist for external review and prioritization, however individuals often play crucial role
 - Effectiveness of Program Managers to Argue for Research Dollars within Agencies, etc. is often crucial
 - Committee Members, for e.g. on ICRP and NCRP make critical argument to other members, boards etc. to make changes.

= Prem Saganti

With Dr. Frank Cucinotta

Space Radiation Health Project at NASA-JSC