Adverse Outcome Pathway: Applied to chronic low dose radiation

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Stakeholders: Health Canada, CNSC

Objective:

Explore energy deposition as the molecular initiating event in a biological pathway leading to an outcome of regulatory interest

Radionuclides in bone

Radium (natural/alpha emitting) | Strontium-90 (anthropogenic/beta emitting)

Bone serves many functions:

1. Protects soft organs.
2. Provides an environment for marrow blood formation and fat storage
3. A mineral reservoir: systemic acid/base | Ca/P homeostasis*
4. A reservoir of growth factors and cytokines: released upon bone resorption: IGF, TGF-β, BMP FGF-23, osteocalcin
5. Detoxification by metals storage, removing the metals from systemic circulation

Ultimate goal: fill a knowledge gap between energy deposition→ radiolysis yields→ biological response in a spatiotemporal context with possible computational tissue response modeling