

Adverse Outcome Pathway

Applied to chronic low dose radiation

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Stakeholders:
Health Canada, CNSC

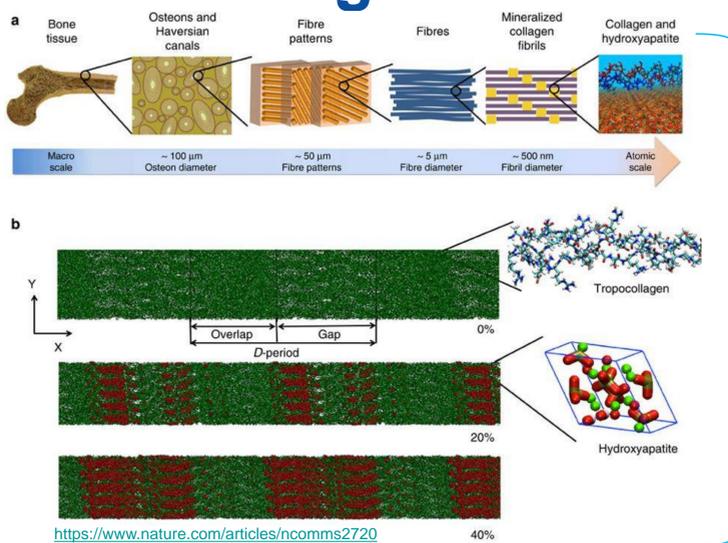
Objective:

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

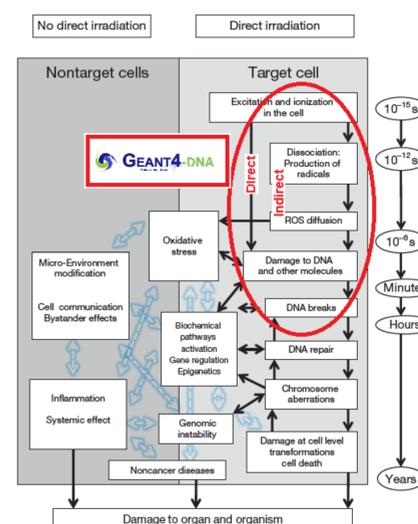
Radionuclides in bone

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

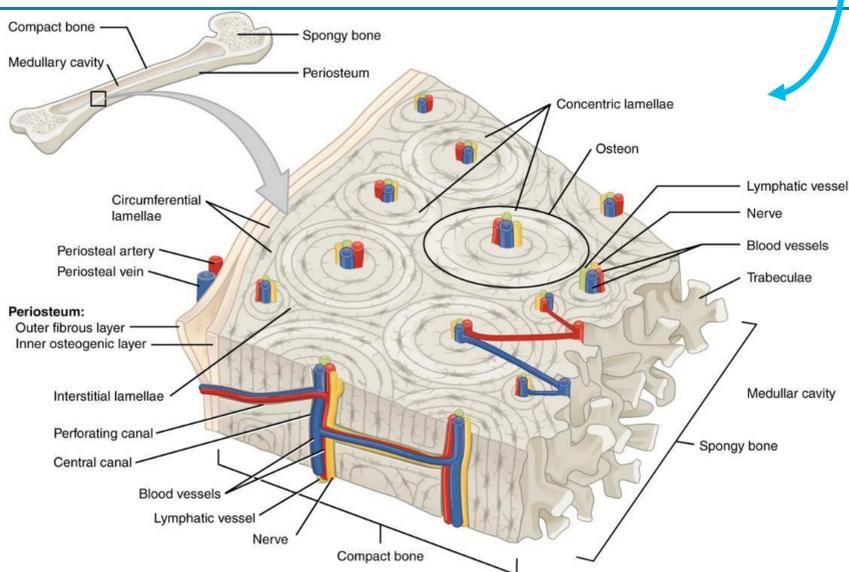
structure, physiology and remodelling



Dose and tissue response modelling is the pathway agnostic to the radiation?

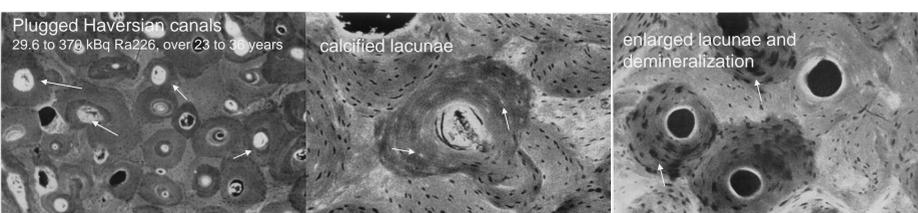


Bone model/remodel in vasculature and Haversian canals



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



Radium in Human Bone: The Microradiographic Appearance Author(s): R. E. Rowland, J. H. Marshall and J. Jowsey Source: Radiation Research, Vol. 10, No. 3 (Mar., 1959), pp. 323-334



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Ultimate goal:

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

UNRESTRICTED / ILLIMITÉ