Radiation Safety Office

Module 3
Biological Effects of Ionizing Radiation

Radiation Safety Office

TOPICS

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Exposure Limits

Regulatory Limits

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Biological Effects

Terminology

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Acute Vs. Chronic Exposure

Acute Exposure

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Chronic Exposure

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Direct Vs. Indirect Action

Direct Action

Chain of Events for Indirect Action:

- $H_2O \rightarrow H_2O^+ + e^-$ Radiation ionizes water molecule.
- $OH + OH \rightarrow H_2O_2$ Hydrogen peroxide interacts with DNA.

Prompt Vs. Delayed Effects

Prompt Effects

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Thresholds for Prompt Effects

Effect	Dose

Delayed Effects

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Stochastic (Random) Effects

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Linear No Threshold Model

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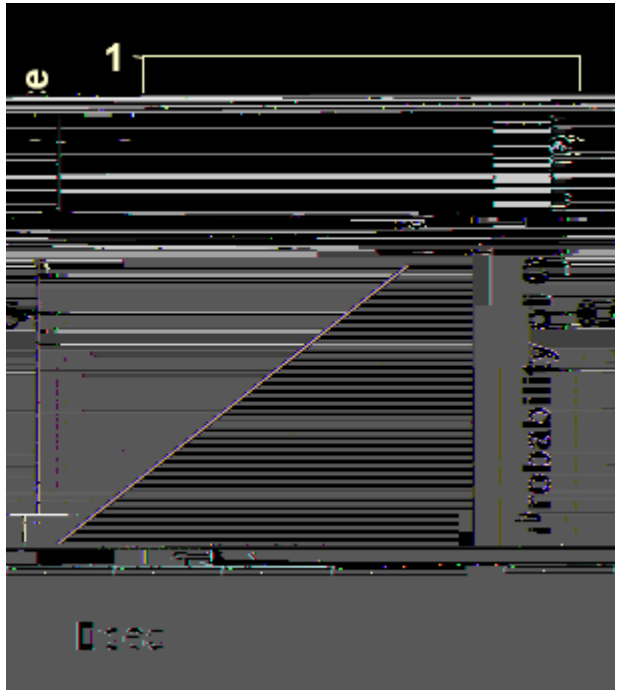

Examples of Stochastic Effects

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Cancer (Cont.)

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Mental Retardation

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Non-Stochastic (Deterministic) Effects

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Nonlinear Threshold Response

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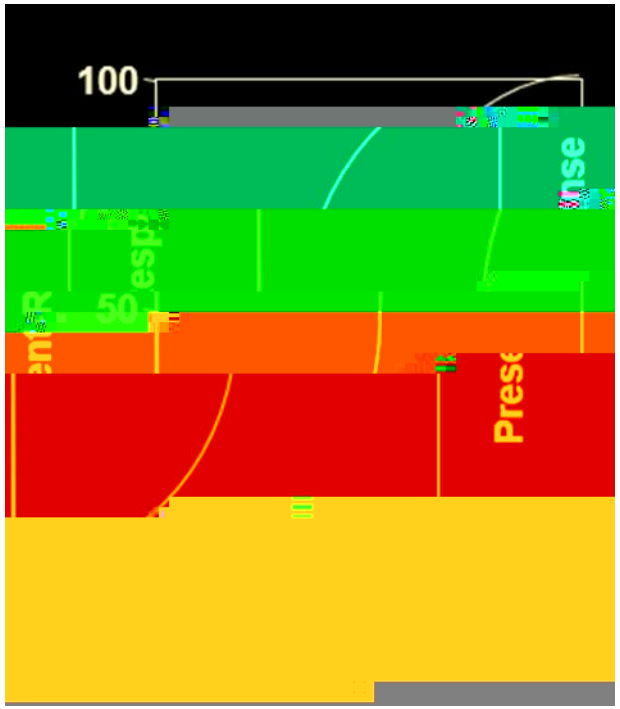

Examples of Non-Stochastic Effects

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Sterility

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Cataracts

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Erythema & Other Skin Effects

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Hemopoietic Syndrome

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Gastrointestinal Syndrome

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Central Nervous System Syndrome

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Summary

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