

DIMENSIONS IN ONCOLOGY: RADIATION THERAPY

Presenters:

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DISCLOSURE

- We have not conflicts of interest to disclose.

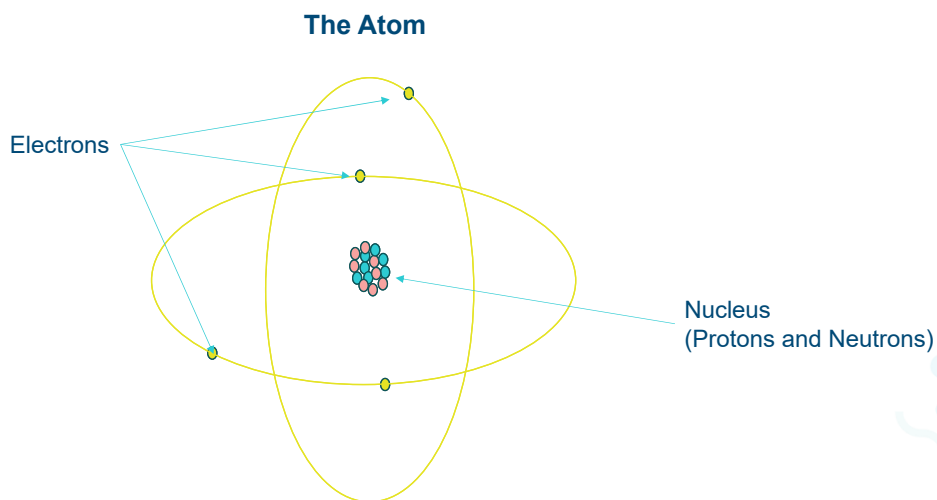


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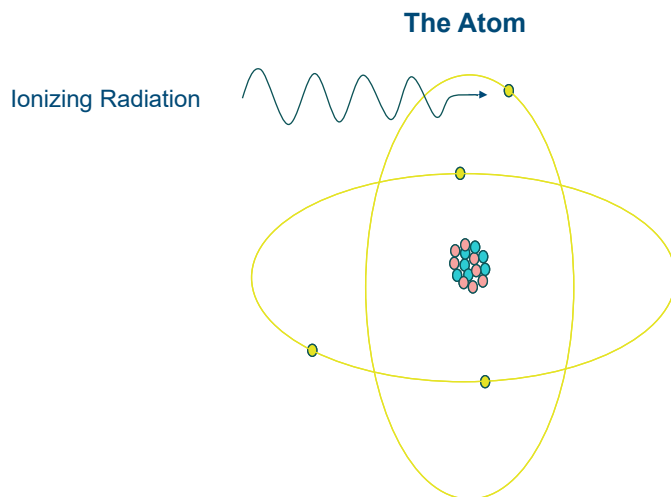
OBJECTIVES

- What is radiation and why does it work?
- How do we generate the radiation for treatment?
- Roles of the treatment team
- The general workflow for a patient's treatment
- A patient's experience

WHAT IS RADIATION?

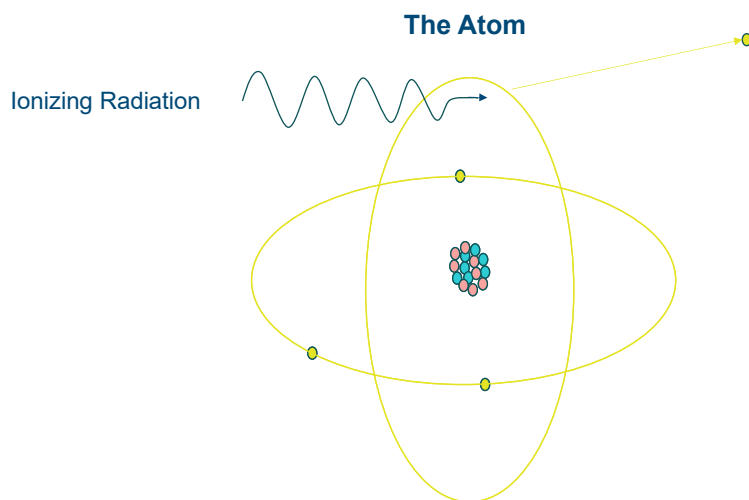


WHAT IS RADIATION?



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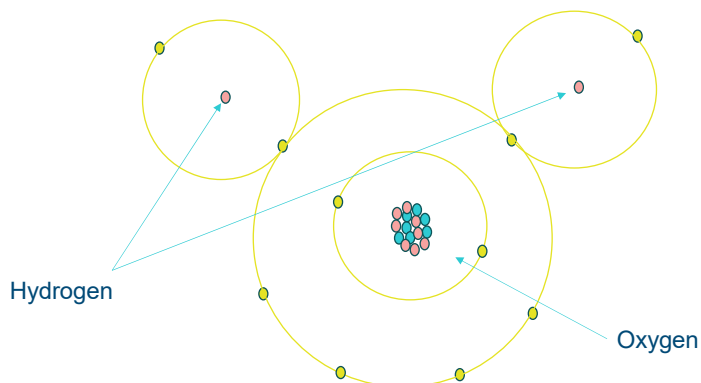
WHAT IS RADIATION?



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IONIZING RADIATION VS WATER

...or any molecule in your body



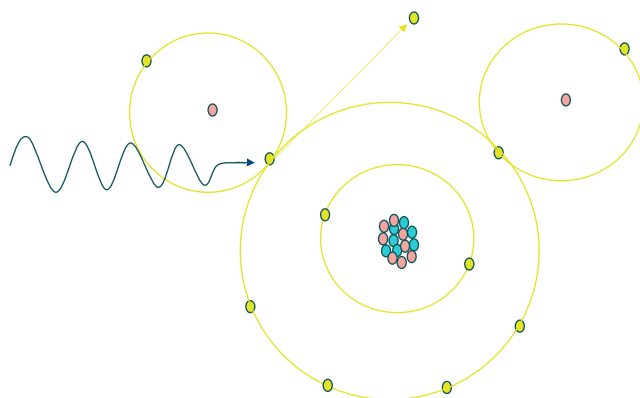
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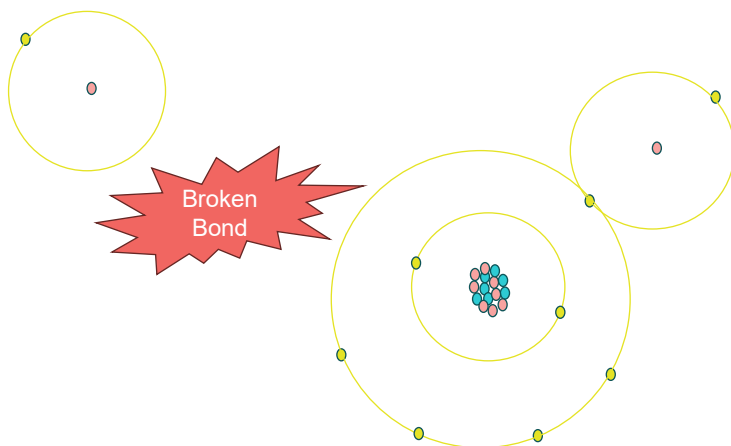
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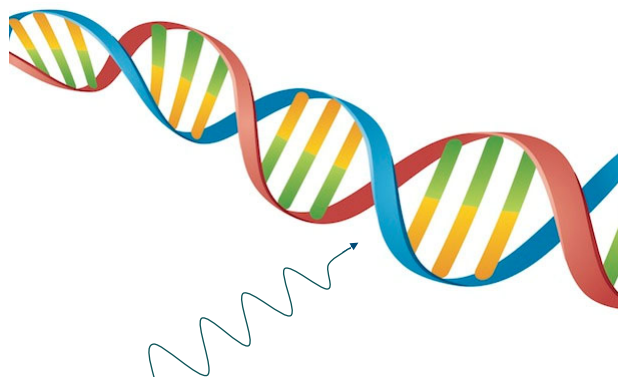


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IONIZING RADIATION VS DNA

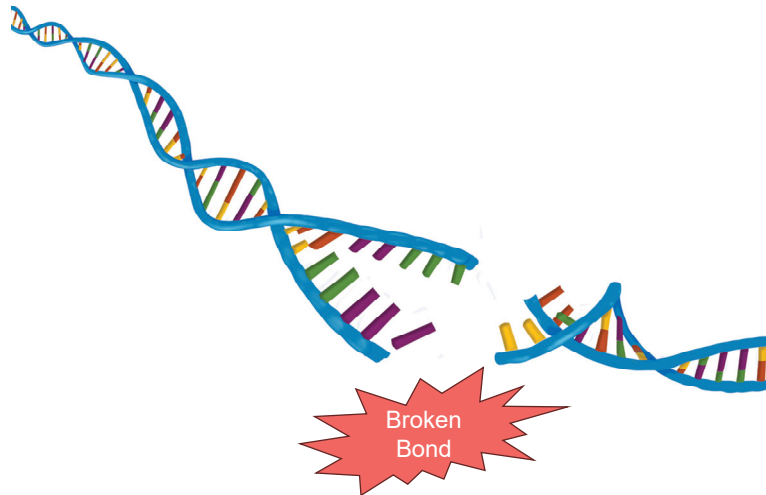


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IONIZING RADIATION VS DNA



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WHERE DOES IONIZING RADIATION COME FROM

- Naturally occurring
 - Cosmic rays
 - Radioactive materials in nature
 - Radium, radon, potassium, uranium, thorium...
- Human made
 - Radioactive materials
 - Iridium 192, Strontium 90, Yttrium 90 (Y90), Cesium 131....
 - Xray tubes
 - CT scanners used primarily for imaging (~100 keV)
 - Linear accelerators
 - Radiation therapy (1-20 MeV)

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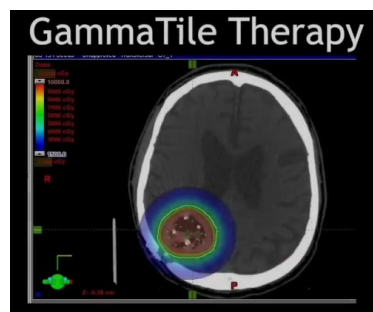
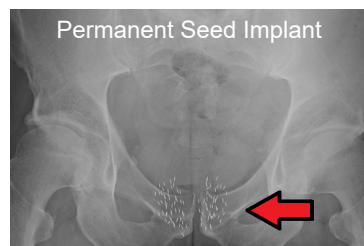
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Low Dose Rate

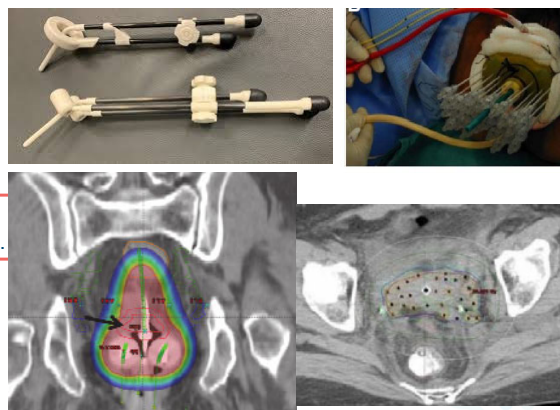


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High Dose Rate



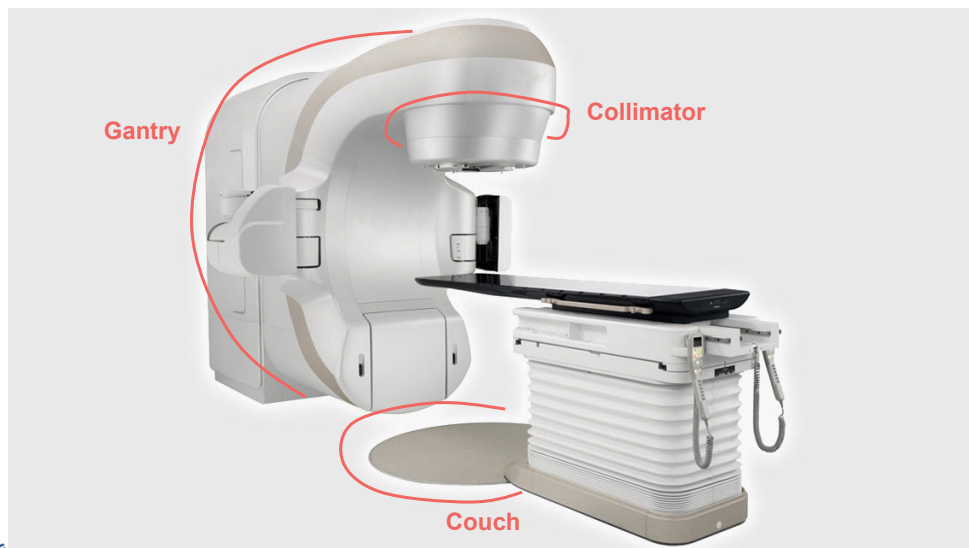
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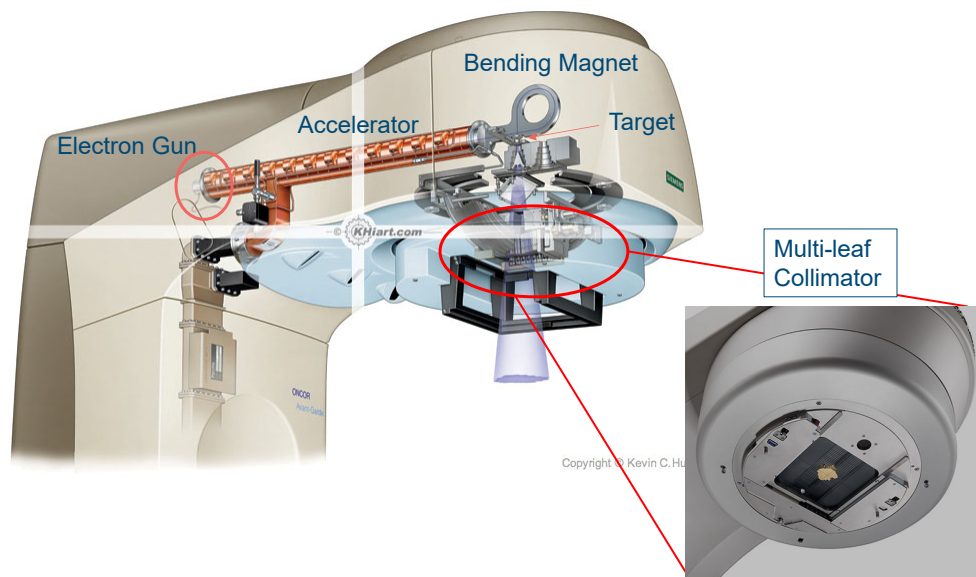
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LINEAR ACCELERATOR



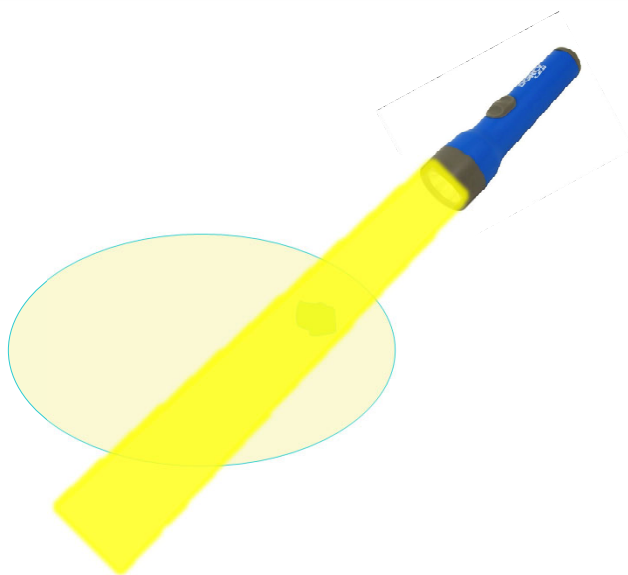
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LINEAR ACCELERATOR



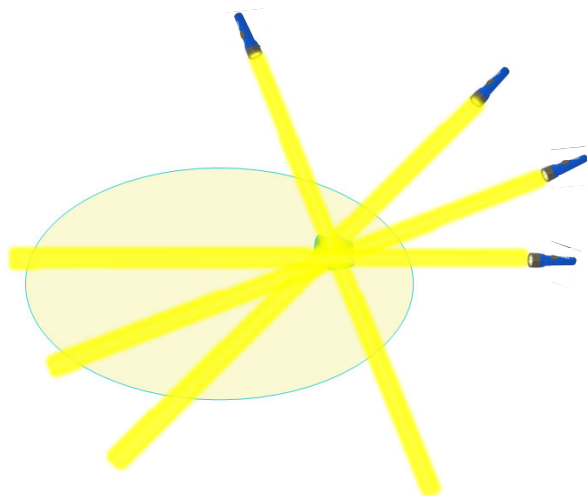
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XRAY FLASHLIGHT



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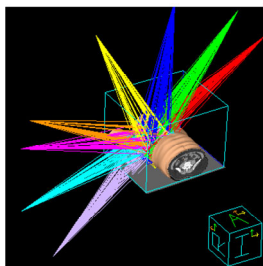
XRAY FLASHLIGHT



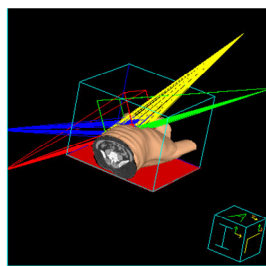
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XRAY FIELDS

Static fields

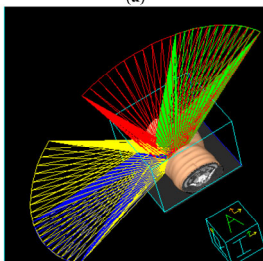


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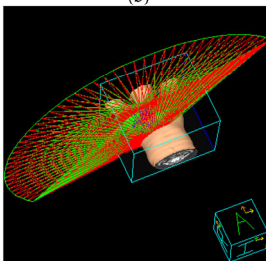


(b)

Dynamic Arcs



(c)



(d)

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RADIATION ONCOLOGY TEAM

- Radiation Oncologists
- Registered Nurses
- Nursing/Medical Assistant
- Front desk staff
- Charge Capture Specialist
- Radiation Therapists
- Radiation Dosimetrists
- Medical Physicists

JOURNEY OF THE PATIENT

- Consultation
- Simulation
- Planning
- Quality Assurance Testing
- Treatment
- Weekly On-Treatment Visits with Physician & Nurse
- Follow-Up

SIMULATION

- Create daily set up
- Use many different tools to help reproduce the same position everyday
- CT Scan in treatment position
- Takes approximately 1-2 hours
- Marks/measurements/pictures

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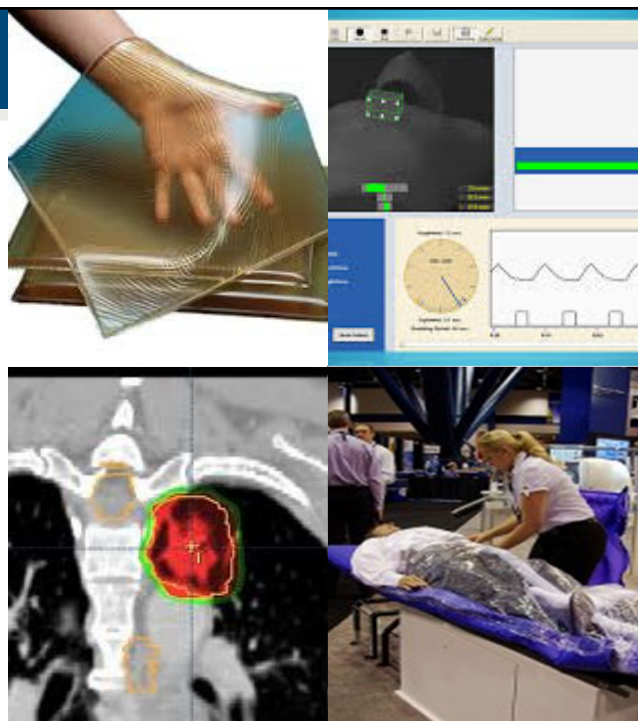


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SIMULATION

- Bolus
- Compression
- Respiratory Gating/
Deep Inspiration
Breath Hold
- 4DCT
- MRI or PET/CT
Imaging for Fusion

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