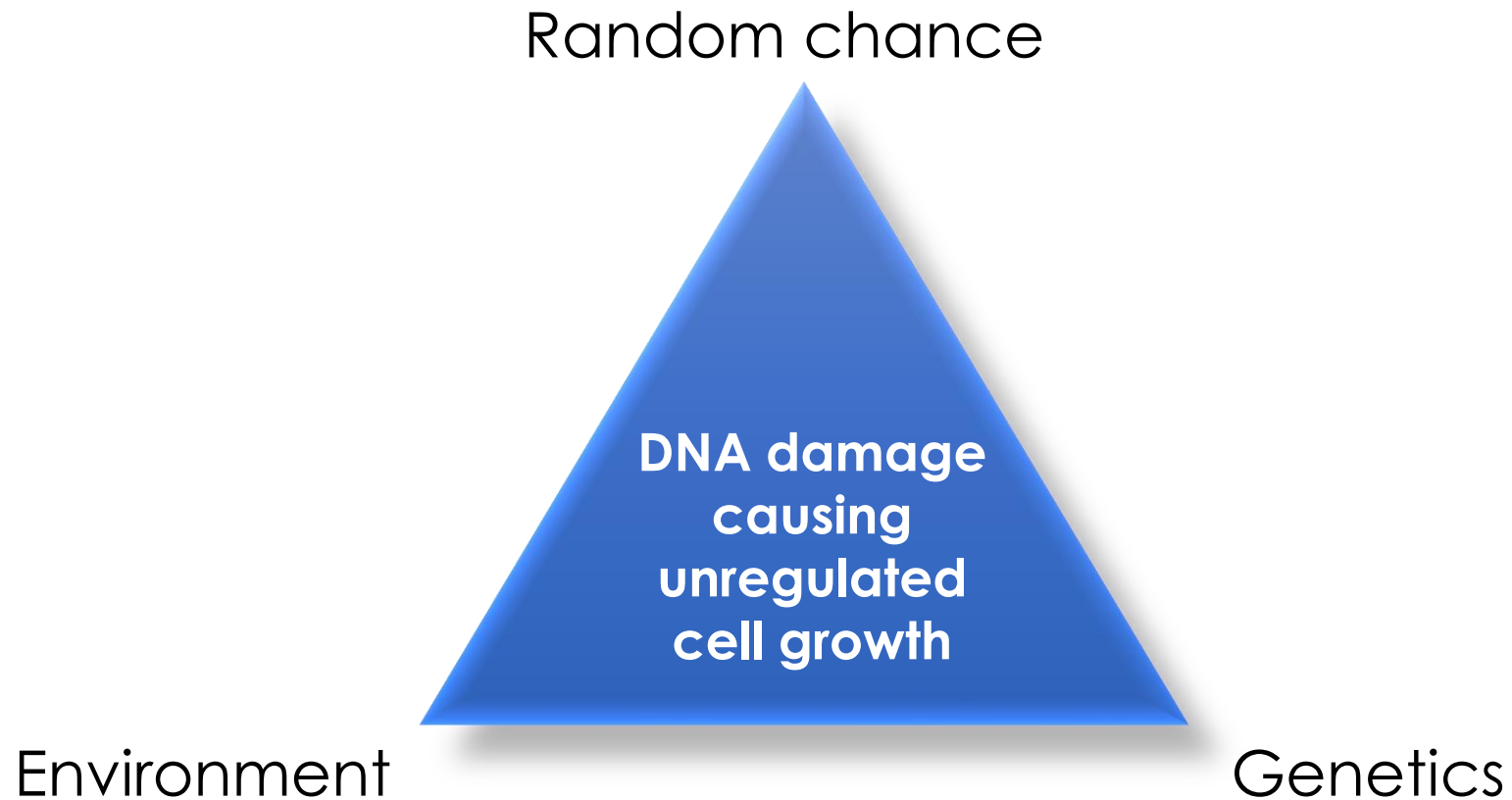


Breast Cancer: Screening, Prevention, Treatment, and Beyond

Kathleen Monahan, DO
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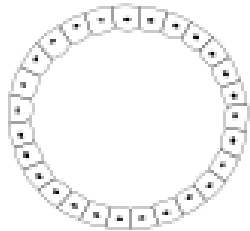
- Breast cancer biology
- Screening imaging
- Prevention and lifestyle modifications
- General treatment methods, multidisciplinary care
- New research
- Survivorship support

What Causes Cancer?

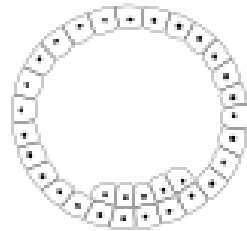


What Causes Cancer?

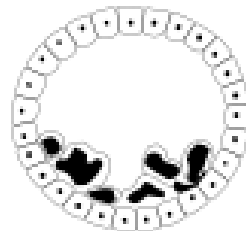
- Cell growth regulation proteins
 - “Grow” signals can get stuck in the ON position
 - “Brakes” can stop working
 - “Repair crew” can fail to fix new damage
- Two-Hit Hypothesis (Dr. Alfred Knudson, 1971)
 - Single gene mutation unlikely to cause cancer
 - Multiple factors result in cancer growth



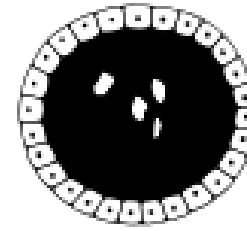
Normal duct



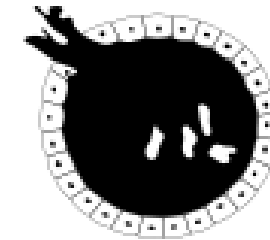
Intraductal hyperplasia



Intraductal hyperplasia with atypia



Intraductal carcinoma in situ

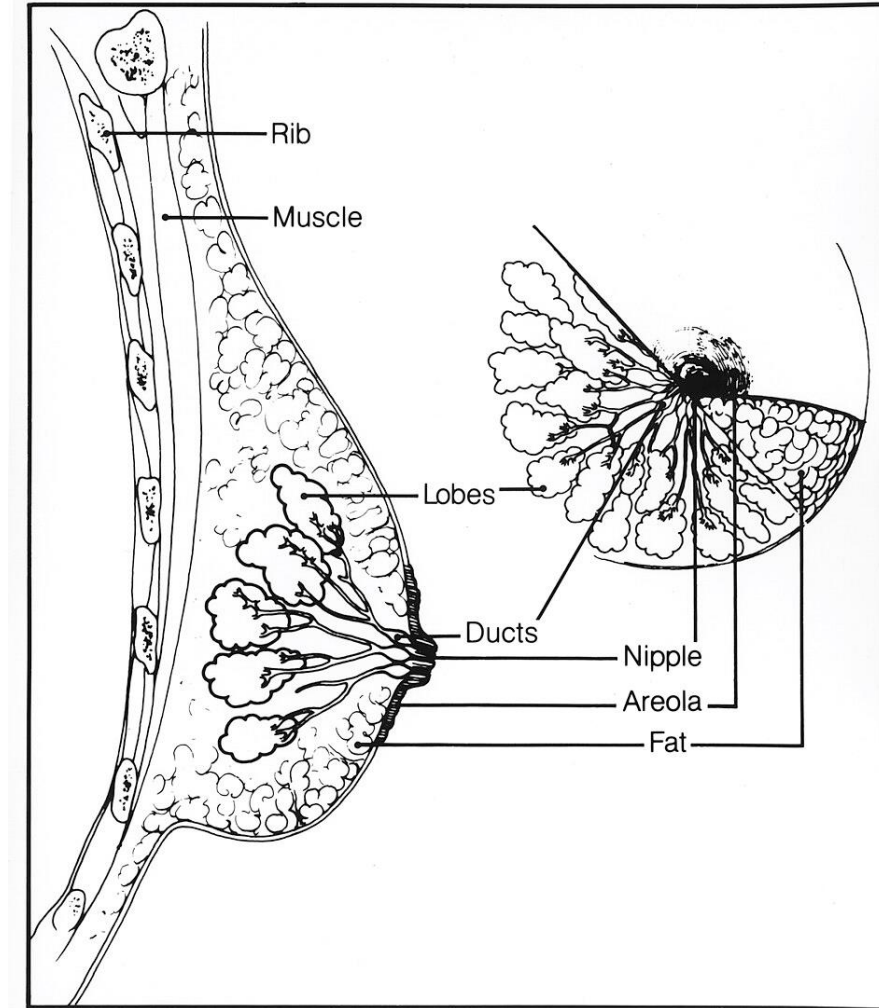


Invasive ductal carcinoma

- Atypical hyperplasia
 - Increases risk
- Carcinoma in situ
 - Cancer cells present, but stay in specific location
- Invasive carcinoma
 - Cancer can spread by accessing lymphatic or blood vessels

Breast Anatomy

- Cellular elements within the breast
 - Lobules
 - Ducts
 - Fatty support tissue
- Regional lymph nodes
 - Axillary
 - Intramammary
 - Internal mammary
 - Supraclavicular



Types of Breast Cancer

- Histology (cell structure)
 - Ductal carcinoma
 - 80%
 - Lobular carcinoma
 - 15%
 - Mucinous, tubular, papillary, medullary, metaplastic, micropapillary

- Molecular (receptors)
 - Hormone receptor positive
 - 72-74%
 - Hormone receptor AND HER2 positive
 - 10%
 - HER2 positive
 - 4%
 - Hormone receptor AND HER2 negative (triple negative)
 - 10-12%

Importance of Screening



Secondary prevention, finding cancers earlier

Some cancers are more difficult to detect on self exam



Increasing treatment options and flexibility

Screening Imaging

- Mammogram with tomosynthesis (3D)
- Whole breast ultrasound
- Contrast enhanced mammogram
- Breast MRI



- Clinical breast exam
- Self breast awareness
- Multi-Cancer Early Detection (Galleri, Cancerguard)
 - Not reliable for stage I breast cancer detection
 - Not covered by insurance

- Risk factors
 - Dense breasts
 - Lifetime risk $\geq 20\%$
 - 5-year risk $\geq 1.7\%$
 - Chest radiation
 - Genetic mutation carriers

Average risk

- **Yearly mammogram, starting age 40**

Increased risk

- Yearly mammogram, starting as early as age 30
- Consider annual MRI, starting as early as 25

To request a **Screening Mammogram**, click the green button above the video. You will be contacted by BCH Imaging.

DOWNLOAD LECTURE SLIDES

REQUEST A SCREENING MAMMOGRAM

REQUEST AN APPOINTMENT

To request an **appointment with Dr. Monahan**, click the blue button above the video. You will be contacted by RMCC.

- Primary prevention, reducing risk of developing breast cancer
 - Lifestyle modifications
 - Surgery
 - Pharmaceutical medications

Exercise

Weight/metabolism

Reduce alcohol use

Diet

Breastfeeding

Menopausal hormone therapy

- 150-300 minutes of moderate-intensity activity per week
 - You can talk but cannot sing
 - 50-70% maximum heart rate
- Reduce insulin resistance
 - Goal BMI <25
 - GLP-1 therapy



Alcohol Use

- 2 drinks or less per week
- Less is better



- Plant based or Mediterranean style
- 30 grams of fiber per day
- Cruciferous vegetables



Menopausal Hormone Therapy



ASSESS RISK PRIOR TO
STARTING



CAREFUL COUNSELING



LOWEST DOSE,
SHORTEST DURATION

- Bilateral mastectomy
 - Reduces risk >90-95%
- Primarily considered for:
 - High-penetrance mutations
 - Very compelling family history
 - Prior chest radiation before age 30

Risk-reducing Medication

- Tamoxifen
 - Low dose option
- Raloxifene
- Aromatase Inhibitors



Multidisciplinary Care



Surgery

Diagnosis and local treatment



Radiation therapy

Local treatment

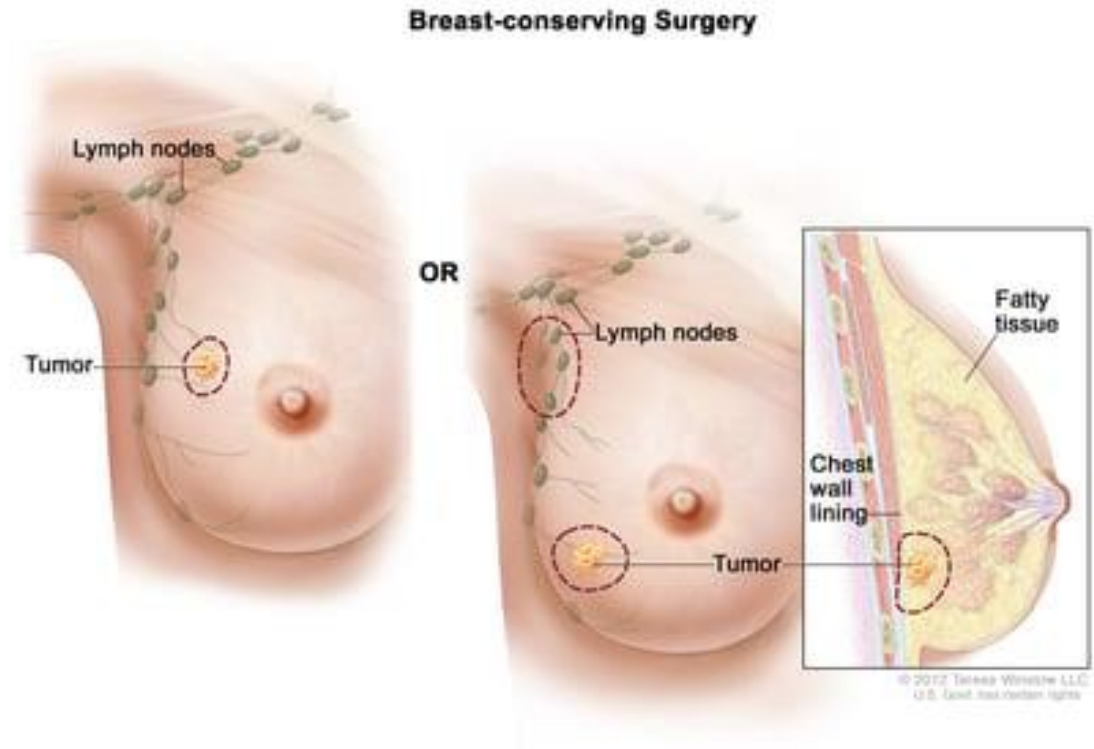


Medications

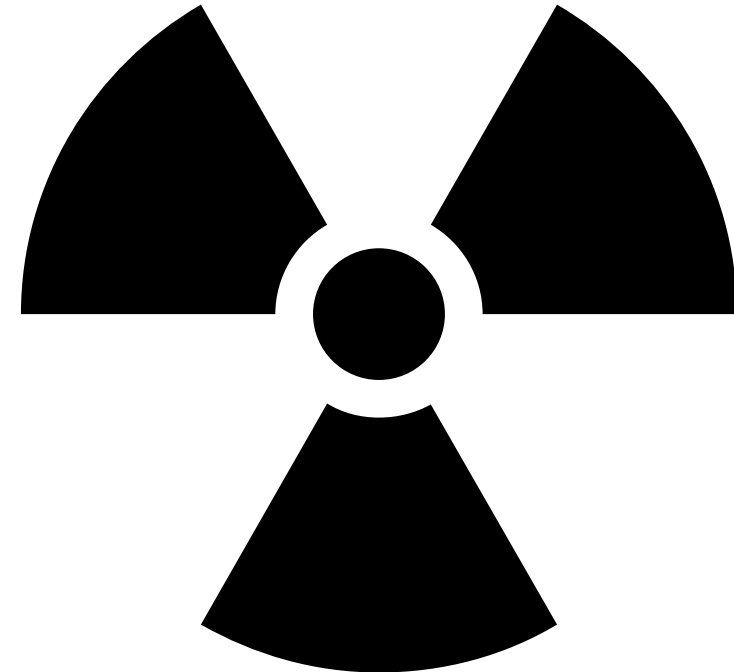
Systemic treatment

Hormone suppression, chemotherapy,
immunotherapy, targeted therapy

- Breast
 - Lumpectomy
 - Mastectomy
 - Reconstruction
- Axilla
 - Sentinel lymph node biopsy
 - Targeted dissection
 - Complete dissection



- Reduce local recurrence risk and treat cancer related symptoms
- Variable treatment plans and dosing
 - Partial breast
 - Whole breast
 - Regional lymph nodes
 - Chest wall
 - Targeted



- Around 45-50 distinct drugs approved for management of breast cancer
- Since 2020, 17 new targeted therapy approvals
- Three general categories of treatment
 - Neoadjuvant
 - Treatment before a surgery
 - Adjuvant
 - Treatment after a surgery
 - Metastatic

Hormone Directed Therapy

Selective estrogen
receptor modulators

Aromatase inhibitors

GNRH agonists

- Ovarian function suppression

Selective estrogen
receptor degraders

- Target resistance mutation ESR1

Typically utilized for HER2 positive and triple negative breast cancer



Select cases of hormone receptor positive breast cancer

- Oncotype Dx, MammaPrint, EndoPredict

Pembrolizumab (Keytruda)



Primarily utilized for triple negative breast cancer

Neoadjuvant

Metastatic

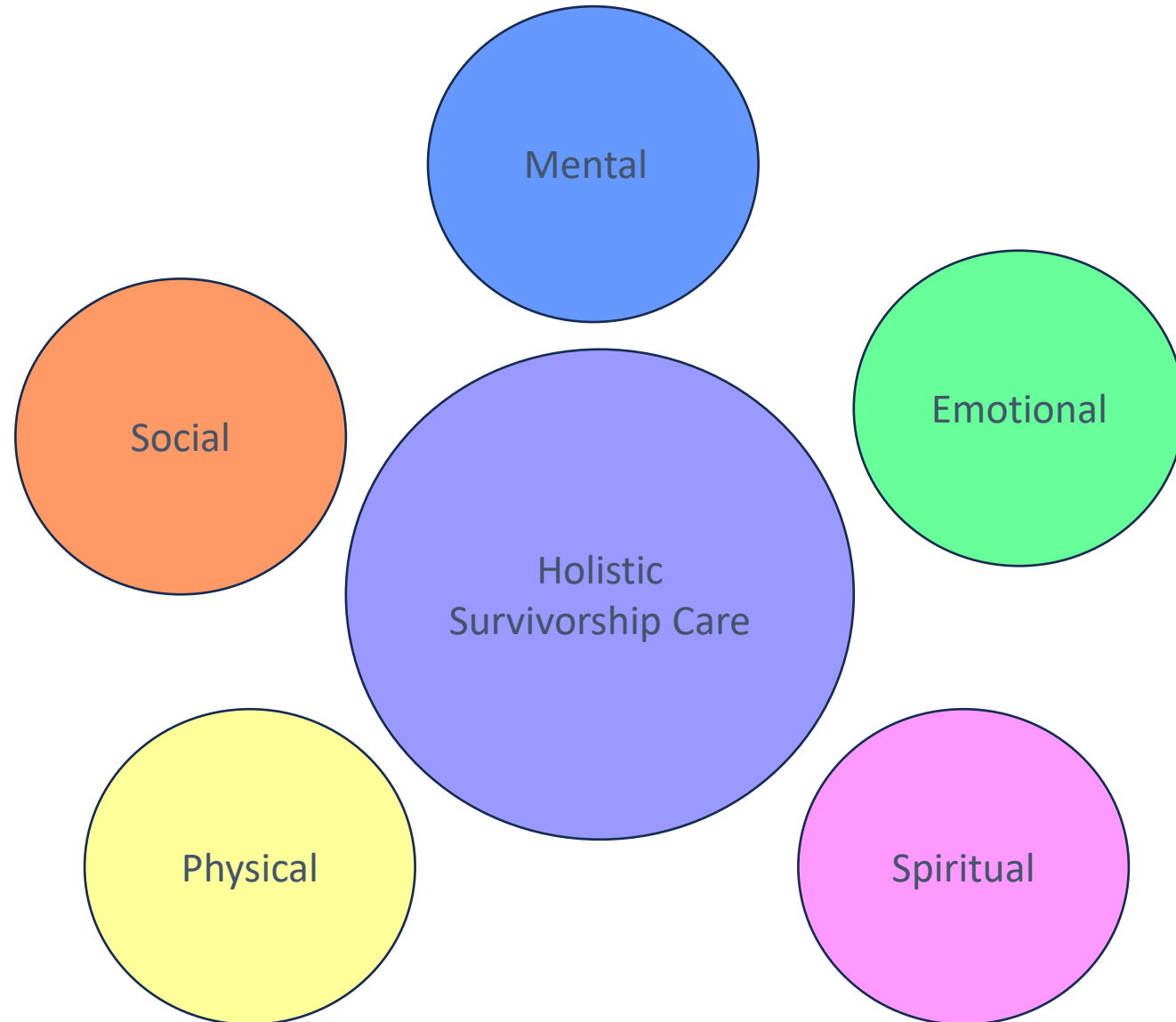
Targeted Therapy

- CDK4/6 inhibitors
- mTOR inhibitors
- PARP inhibitors
- HER2 directed antibodies
- HER2 directed tyrosine kinase inhibitors
- Anti-body drug conjugates
 - HER2 and Trop-2 targets
- PI3Kalpha inhibitors



- IV medications
 - Sacituzumab govitecan (Trodelvy) and datapotamab deruxtecan (Datroway)
 - First-line metastatic
 - Trastuzumab deruxtecan (Enhertu)
 - Neoadjuvant
 - Adjuvant
- Oral medications
 - Vepdegestrant
 - Gedatolisib
 - Camizestrant

- 889 active breast cancer trials presented registered with the National Cancer Institute
- SCARLET trial
 - De-escalating neoadjuvant treatment for triple negative breast cancer
- OFFSET trial
 - Omitting chemotherapy in young women with hormone positive breast cancer with lymph node involvement
- Novel agents
 - Unique drugs, new antibody targets, vaccines, cellular therapy



- Surveillance
 - Physical exam, symptom monitoring, imaging, blood tests
- Maintenance treatment
- Long-term side effects
 - Heart, bone, brain
 - Neuropathy
 - Lymphedema
 - Fatigue
- Psychosocial support
 - Financial toxicity
 - Recurrence anxiety
- Lifestyle modifications

Thank you!

Questions?

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Boulder Community Health