

# What's New in Breast Cancer Treatment?

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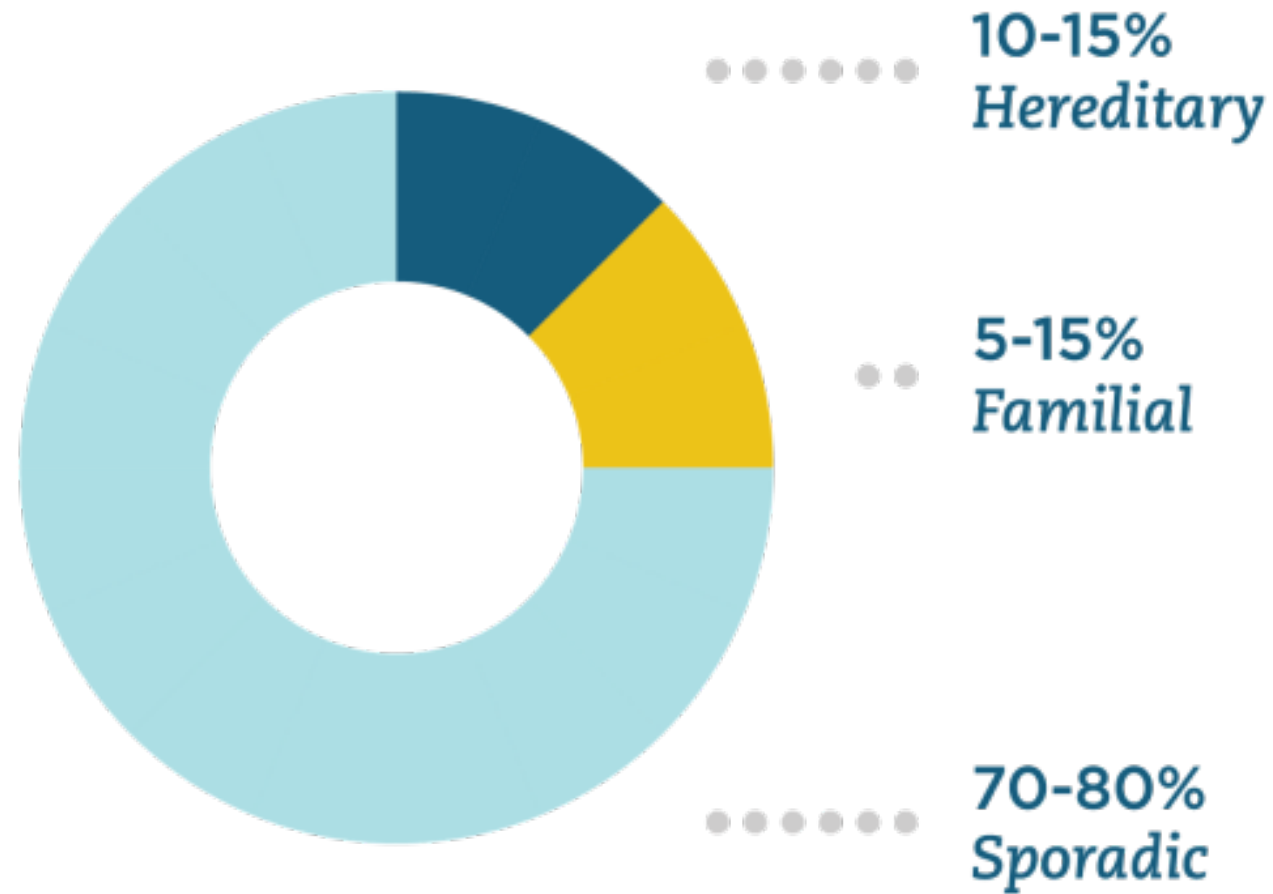


team you

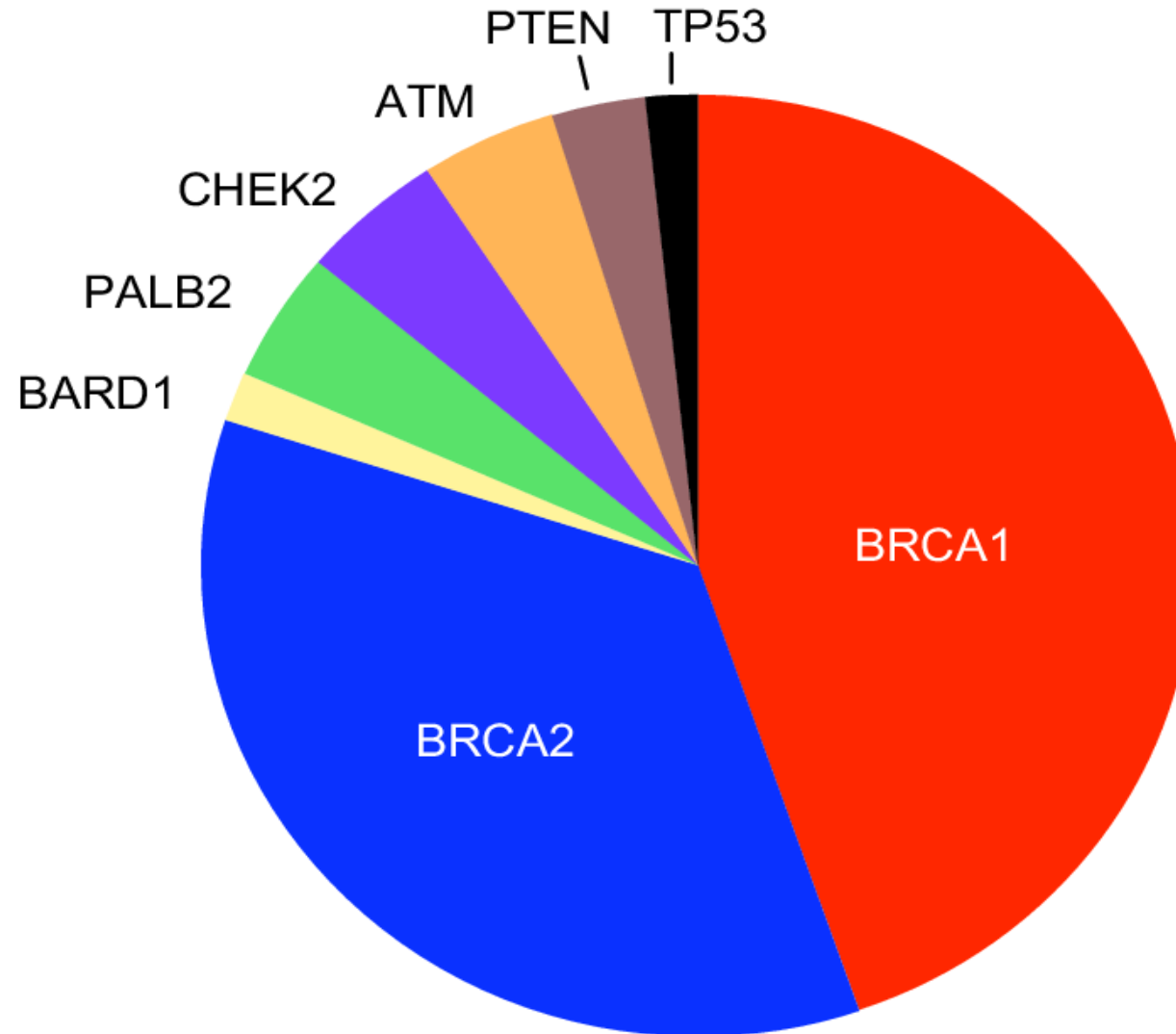
# Strongest Risk Factors for Breast Cancer

- Female
- Older than 50 years
- = 1 in 8 women

# Genetic Mutations



# Genetic Mutations



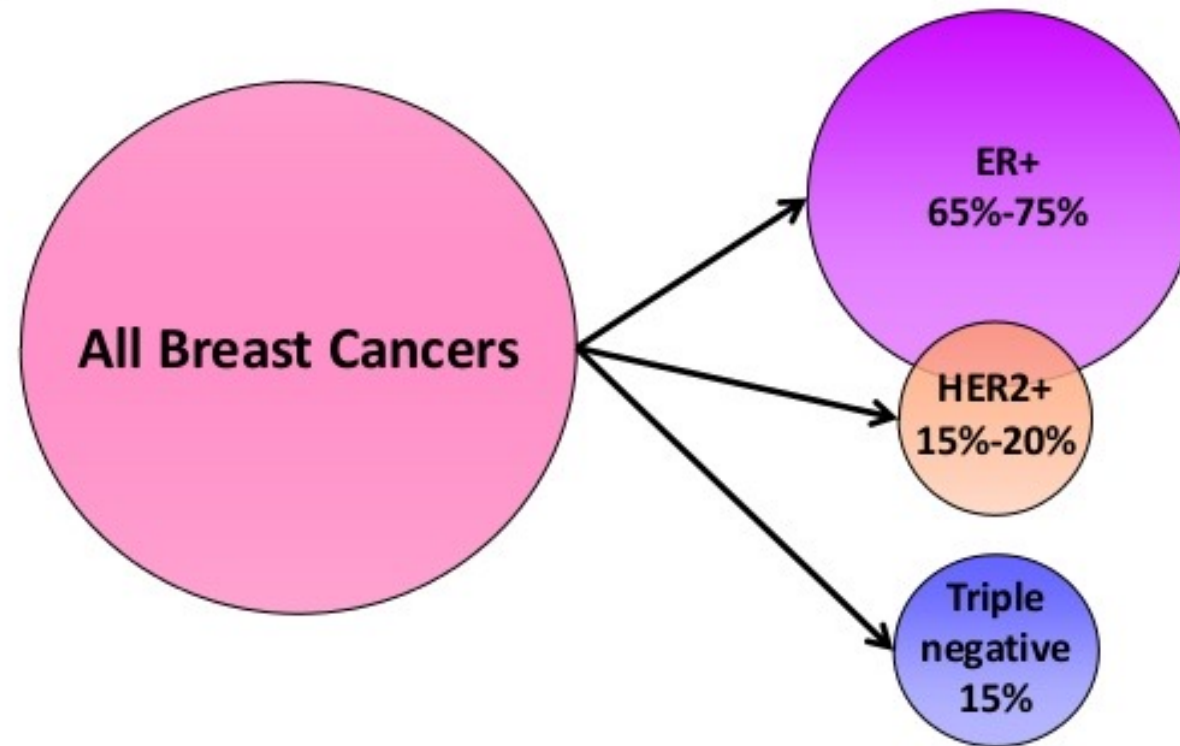
- **Hormone Receptor**
  - Estrogen receptor 'ER (+/-)
  - Progesterone receptor 'PR (+/-)
- **Her2neu**
  - Her2 'positive or negative'

- ER+/PR+, Her2 negative
- ER+/PR-, Her 2 negative
- ER+/PR+, Her 2 positive
- ER-/PR-, Her2 positive
- ER-/PR-, Her2 negative ('triple negative')



## Clinical Breast Cancer Subsets Defined by IHC

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- Staging historically defines the ‘extent of disease’
  - Stage 1- Tumors less than 2 cm with negative lymph nodes
  - Stage 2 or 3 - Larger tumors and/or positive lymph nodes
  - Stage 4 - Cancer has spread outside breast and lymph nodes (bone, lung, liver, brain)



- Takes into account the BIOLOGY of the tumor along with the extent of the tumor (i.e., ER, PR, Her2 and grade).
- Some smaller more aggressive cancers are at higher risk of recurrence than some larger, slower growing cancers.

- **Premenopausal**

- Primary source of estrogen from the ovary

- **Perimenopausal**

- Intermittent production of estrogen from ovaries, despite not menstruating (may last years)

- **Postmenopausal**

- Primary source of estrogen is from adrenal gland which produces androgens that then get converted into estrogen within a cell

- **Adjuvant Therapy**

- Given after surgery for stage 1-3 cancers to treat the 'possibility' of microscopic cells having escaped from the breast
- Improves the cure rate (anti-estrogen therapy, chemotherapy, targeted therapy)

- **Neoadjuvant**

- Treatment given prior to surgery

- Stage of the cancer
- ER, Her 2 neu
- Age, menopausal status
- Treatment before surgery (neoadjuvant) or after surgery (adjuvant)

- Tamoxifen (estrogen blocker)
  - Pre or post menopausal women
- Aromatase inhibitors (decreases E production in cells)  
post menopausal women only
  - Anastrozole (arimidex)
  - Letrozole (femara)
  - Exemestane (aromasin)

- Premenopausal women
  - “Turning off the ovaries” (i.e., putting into menopause) along with anti-estrogen pills improves the cure rate for a subset of women
  - Done with monthly Lupron injections or removal of the ovaries
  - May have more side effects

- Premenopausal Women
  - Tamoxifen **5-10 years**
- Postmenopausal Women
  - Aromatase inhibitor or tamoxifen
  - Generally 5 years, some women benefit from longer duration... who?
  - Breast cancer index (BCI) helps to identify those who benefit from longer duration than 5 years



**Patient & Order Information**

Nodal Status:  
Lymph Node-Negative (N0)  
Tumor Size (cm): N/A Tumor Grade: N/A

Order ID: ..... BLR19-000123  
DOB (Gender): 01/01/50 Female  
Sample ID: ..... S1-001234

Date of Collection: 02/01/14  
Date Received: ..... 03/01/19  
Date Reported: ..... 03/10/19

**Extended Endocrine Benefit & Risk of Late Distant Recurrence****PREDICTIVE RESULT**

Am I likely to benefit from extended endocrine therapy?

**NO****PROGNOSTIC RESULT**

What is my risk of late distant recurrence?

**2.2%**

2.2% risk (95% CI: 0.3% - 4.1%) of late distant recurrence  
(years 5-10) for HR+, lymph node-negative patients

Data to support interpretation of the Predictive and Prognostic Results above, including assay description, applicability of results and clinical validation data, are provided on page 2.

**Additional Comments****Treating Provider**

First I. Last, M.D.  
ABC Facility  
1234 ABC Street  
Anywhere, USA 12345  
Phone: 111.222.3333  
Fax: 100.200.3000

**Submitting Pathologist**

First I. Last, M.D.  
XYZ Pathology  
456 XYZ Street  
Anywhere, USA 12345  
Phone: 444.555.6666  
Fax: 400.500.6000

- Egg and/or embryo harvesting prior to starting chemotherapy is safe (but expensive).
- Lupron injections during chemotherapy may help preserve ovarian function.
- No evidence that pregnancy increases the risk of recurrence in women who have had breast cancer.

# Who Benefits from Chemotherapy?



- Most Her2 positive cancers
- Most ER-, PR-, Her2 negative cancers (triple negative)
- Some ER+, Her2 negative cancers

- Oncotype or Mammoprint
- Used with ER+, Her2 negative cancers
- Many don't benefit from chemotherapy
- Testing the tumor helps identify the group that benefits from chemotherapy and those that don't

# Oncotype

oncotypeIQ



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PRES

## Oncotype DX Breast Recurrence Score® Report Node Negative

### PATIENT, SAMPLE

Date of Birth: 01-Jan-1950 Gender: Female Report Number: O8000123456-3021 Report Date: 04-Sep-2018  
Specimen Source/ID: Breast/SP-16\_0123456  
Ordering Physician: Dr. First Name I. Ordering Physician Last Name

Recurrence Score®  
Result (RS)

10

Distant Recurrence  
Risk at 9 Years

With AI or TAM Alone

3%

TAILORx

AI is Atomoxetine (Xenical) / TAM is Tamoxifen

Absolute  
Chemotherapy Benefit\*

RS 0-10 All Ages

<1%

NSABP B-20

\*Exploratory Subgroup Analysis for TAILORx and NSABP B-20:  
Absolute Chemotherapy (CT) Benefit by Age and RS.

Age	RS 0-10	RS 11-15	RS 16-20	RS 21-25	RS 26-100
>50 years	No CT Benefit (<1%)				>15% CT Benefit
≤50 years	No CT Benefit (<1%)	~1.6% CT Benefit	~6.5% CT Benefit		>15% CT Benefit

Quantitative Single-Gene Scores

11.4 ER Positive



8.3 PR Positive



9.0 HER2 Negative



oncotypeIQ



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PR

## Oncotype DX Breast Recurrence Score® Report Micromets & Node Positive (1-3)\*

### PATIENT, SAMPLE

Date of Birth: 01-Jan-1950 Gender: Female Report Number: O8000123456-3021 Report Date: 03-Dec-2018  
Specimen Source/ID: Breast/SP-16\_0123456  
Ordering Physician: Dr. First Name I. Ordering Physician Last Name

Recurrence Score®  
Result (RS)

10

Distant Recurrence  
Risk at 9 Years

With AI or TAM Alone

12%

TransATAC

AI is Atomoxetine (Xenical) / TAM is Tamoxifen

Absolute  
Chemotherapy Benefit

RS 0-17

No  
Apparent  
Benefit

SWOG 8814

Real World Evidence of SEER Registry Outcomes in Patients Treated Without Chemotherapy  
Based on RS Results

	RS 0-10	RS 11-15	RS 16-20	RS 21-25	RS 26-100
# of Patients	1808	2196	1754	692	364
BCSS at 9 Years	98.2%	99.0%	96.7%	93.1%	84.2%

BCSS = Breast Cancer-Specific Survival

Quantitative Single-Gene Scores

10.8 ER Positive



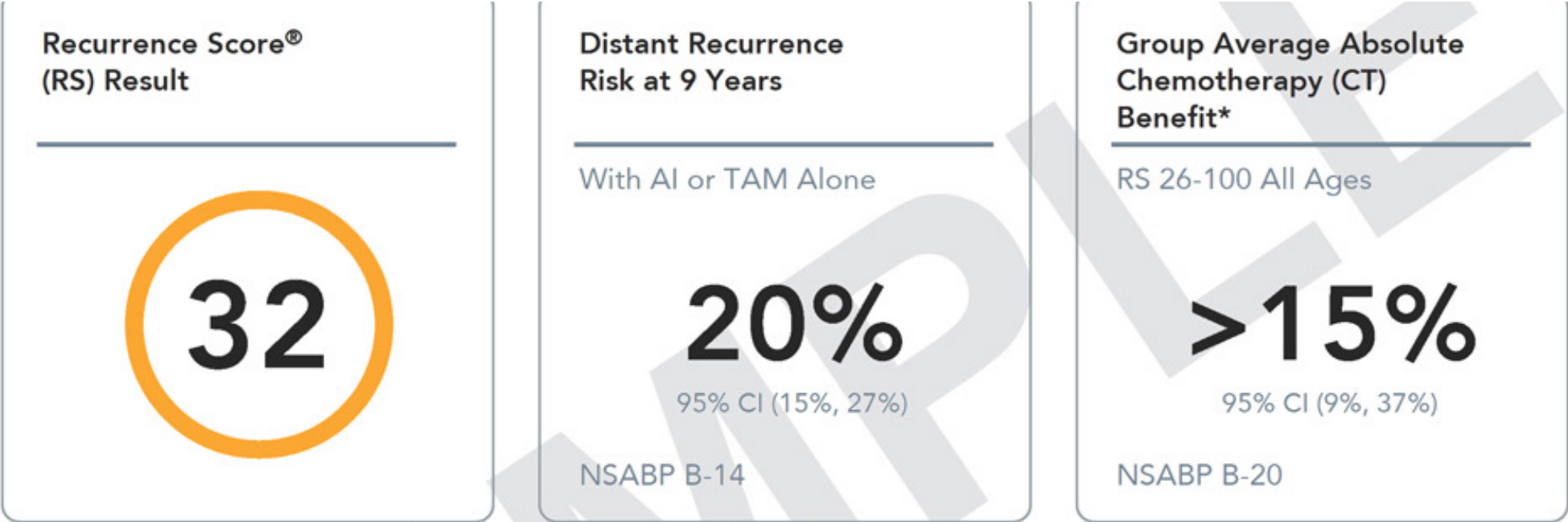
7.3 PR Positive



10.0 HER2 Negative



# Oncotype Recurrence Score



Decision on individual treatment especially around the RS 25 cutoff may consider other clinical factors.

AI = Aromatase Inhibitor / TAM = Tamoxifen  
CI = Confidence Intervals

\*For estimated CT benefit for individual RS results, see page 2.

Exploratory Subgroup Analysis for TAILORx and NSABP B-20:  
Absolute CT Benefit for Distant Recurrence by Age and RS Result

Age	RS 0-10	RS 11-15	RS 16-20	RS 21-25	RS 26-100
>50 years	No CT Benefit (<1%)				>15% CT Benefit
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# Neoadjuvant Therapy (Chemotherapy Before Surgery)

- Primarily for triple negative and Her2 + cancers.
- Timing of treatment doesn't improve cure rate.
- Can shrink tumors in breast, potentially converting initial need of mastectomy to lumpectomy.
- Potentially can reduce the need to remove more lymph nodes.



- Helps us understand how responsive the cancer is to the treatment
  - Complete response-no cancer in breast, lymph nodes
  - Partial response-some cancer remains
- Able to 'fine tune/optimize' post surgical treatment depending on the tumor response

- Drugs used to treat osteoporosis (reclast/zometa or xgeva/prolia)
- Consideration with ER+ post menopausal patients
- Modest reduction in risk of recurrence (2-3%)
- Given once every 6 months for 3 years

# Targeted Therapies



- Two Broad Categories:
  - Small Molecules (drugs ending in –ib)
    - **Enter into cancer cell** and inhibit the function of proteins that are important for cell growth
  - Monoclonal Antibodies (drugs ending in –mab)
    - Typically work by affecting proteins **on the surface** of cancer cells that are important for cell growth

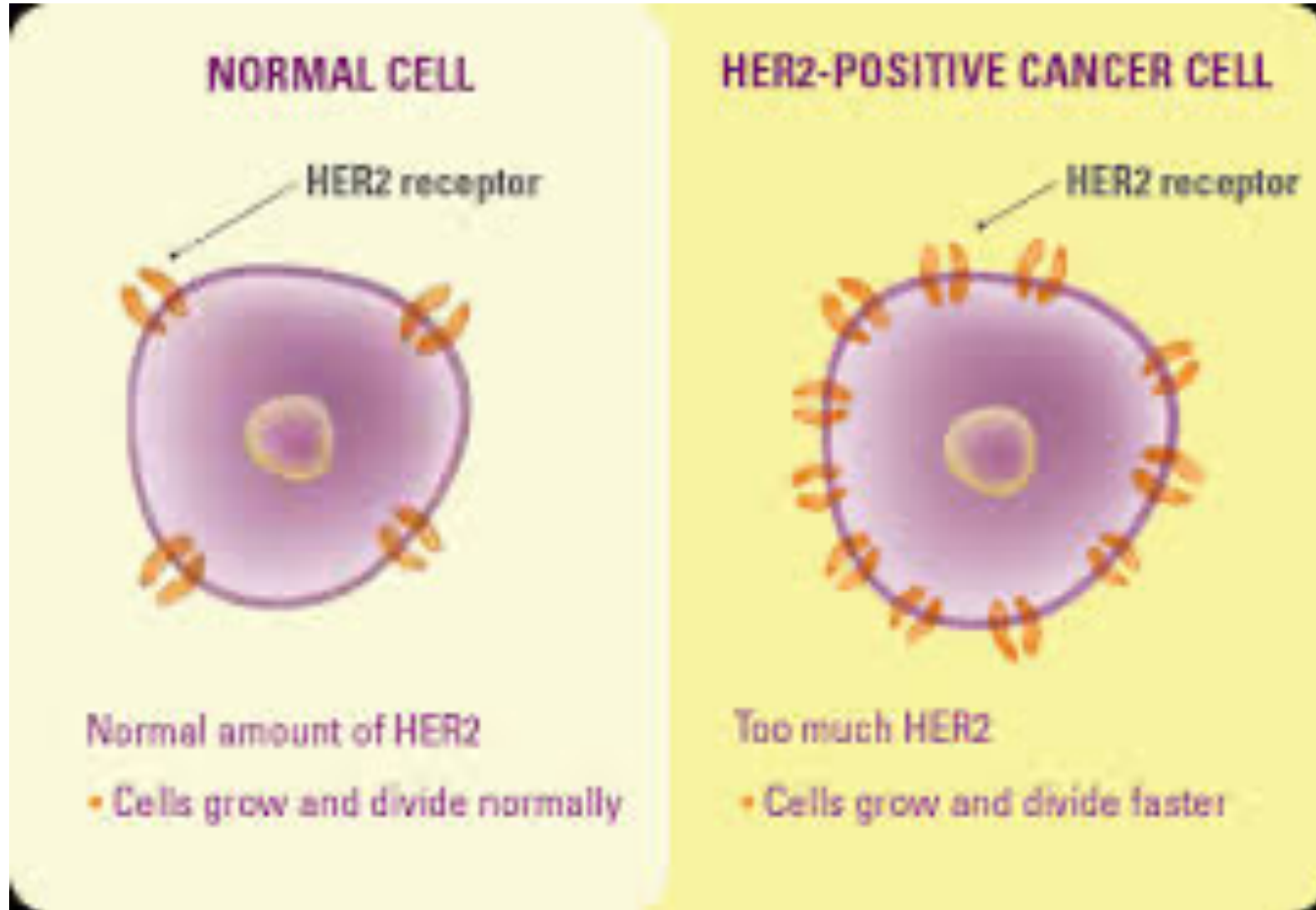
- Important new type of targeted therapy helps the anti-estrogen therapy work 'better'.
  - Palbociclib (Ibrance)
  - Ribociclib (Kisqali)
  - Abemaciclib (verzenio)

- For stage IV disease, prolongs remission by up to a year when added to anti-estrogen therapy.
- New indication (FDA approval October 2021) for one of the CDK inhibitors (abemaciclib/verzenio) with anti-estrogen therapy for stage 2 and 3 ER+ cancers to help reduce recurrence.

- Her2 is a protein present in normal cells which cause cells to grow and divide.
- Approximately 25% of breast cancers have over-expression of the Her2 gene.



# Her2 Receptor



- Protein antibodies which target Her2 on cancer cells  
Herceptin  
Perjeta
- Typically given IV, now can be given as injection

# Oral Agents for Her2+ Disease

- Tucatinib – just approved this year
- Lapatinib
- Neratinib

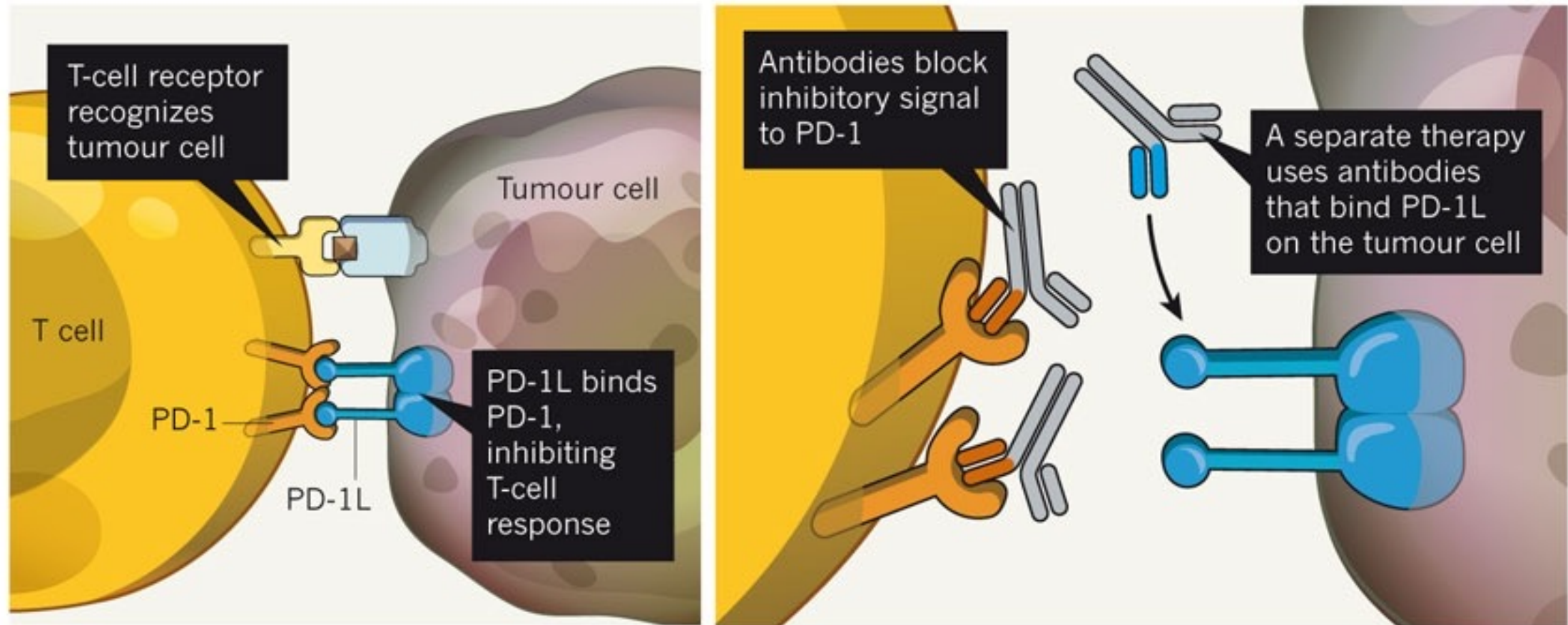
- Olaparib
  - New indication for stage 2 and stage 3 BRCA positive patients
  - Used in metastatic cancers with BRCA mutation

- Using the bodies own immune system to fight the cancer
- Most active in triple negative cancers

# Immunotherapy - PD1 Antibody Therapies

## WAKING UP THE BODY'S DEFENCES

Tumour cells can inhibit the body's immune response by binding to proteins, such as PD-1, on the surface of T cells. Antibody therapies that block this binding reactivate the immune response.





- Given with chemotherapy prior to surgery for stage 2 and 3 triple negative breast cancers.
- Improves cure rate
- New FDA approval as of July 2021
- Side effects stem from 'overactive' immune system



# Multidisciplinary Approach

- Radiology
- Surgery
- Medical oncology
- Radiation oncology
- Plastic surgery
- Genetics
- Physical therapy
- Navigation
- Integrative therapies
- Research

BCH Mammography scheduling: 303-415-5170

BCH Center for Integrative Care: 303-415-7292

BCH Rehabilitation: 303-415-4400

BCH Oncology nurse navigator: 303-415-7057

-Nanna Bo Christensen, RN, OCN, CBCN

RMCC Boulder: 303-385-2000



**NATIONAL ACCREDITATION PROGRAM  
FOR BREAST CENTERS**  
ACCREDITED BREAST CENTER

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A **QUALITY PROGRAM**  
*of the* AMERICAN COLLEGE  
OF SURGEONS

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