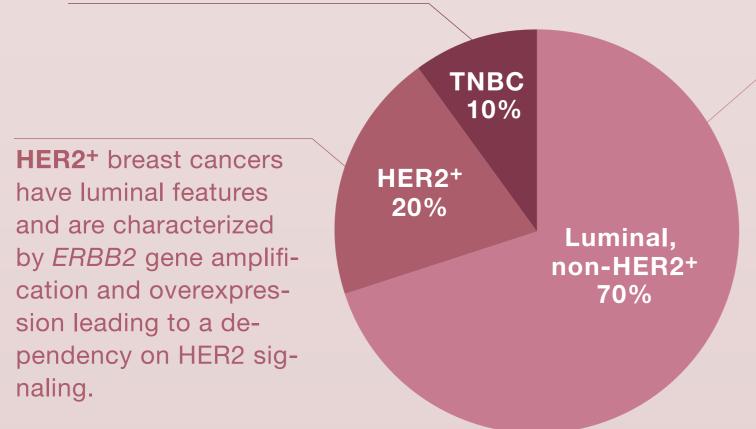
## SnapShot: Breast Cancer

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## Frequency of breast cancer subtypes

TNBC Triple-negative breast cancers are ER-PR-HER2- and show significant, but not complete, overlap with the basal-like subtype of breast cancer (which is defined by differentiation state and gene expression profile).

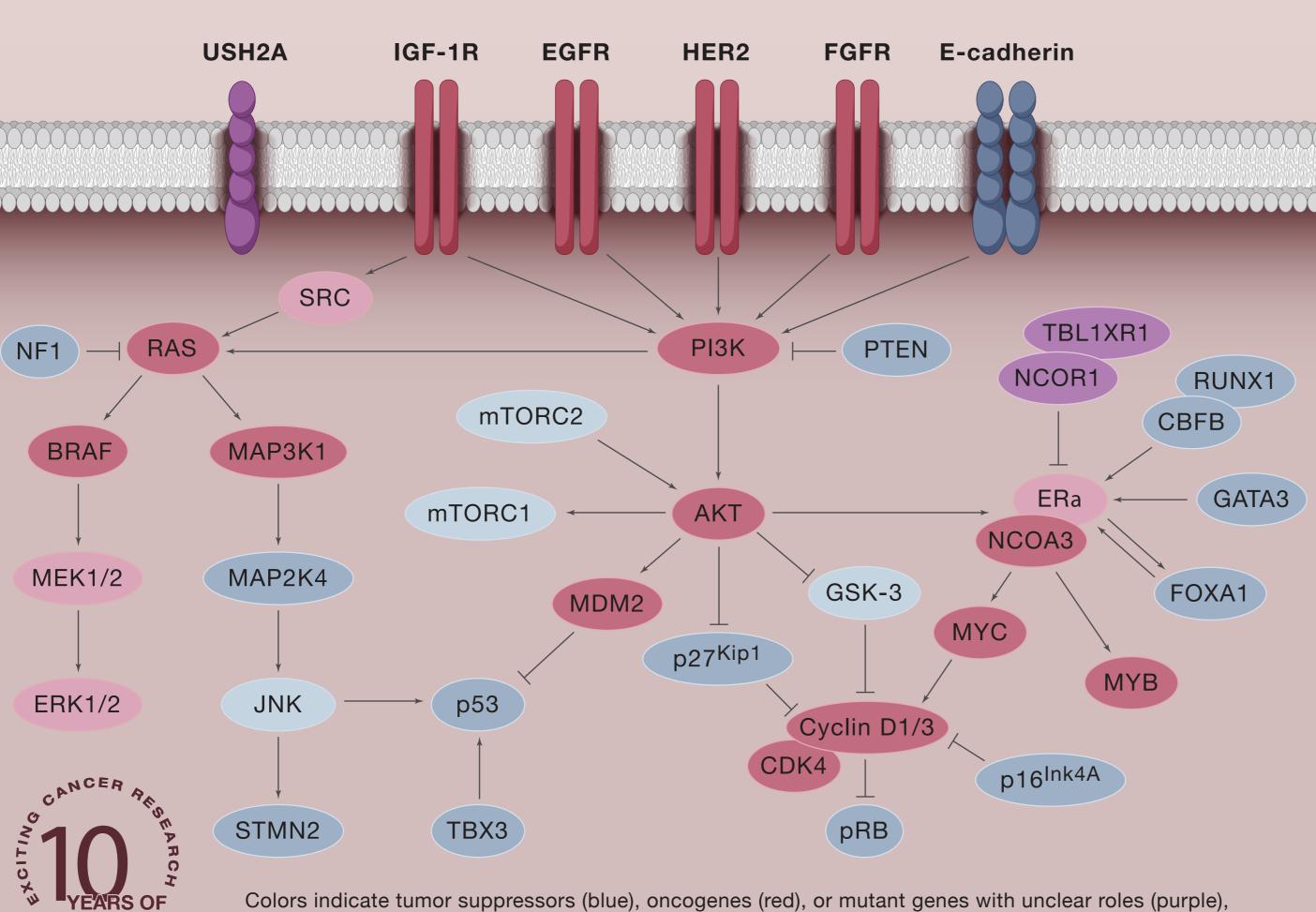


**Luminal (non-HER2+)** tumors are typically estrogen receptor positive, displaying high ERa levels. These tumors are dependent on estrogen for growth and, therefore, respond to endocrine therapy.

Subtype	Stage	5 year OS (%)	10 year OS (%)	
*DCIS	0	99	98	
Luminal (non- HER2+)	I	98	95	
	II	91	81	
	III	72	54	
	IV	33	17	
	I	98	95	
**!![50+	II	92	86	
**HER2+	III	85	75	
	IV	40	15	
	I	93	90	
TNDC	II	76	70	
TNBC	III	45	37	
	IV	15	11	

<sup>\*</sup>Preinvasive stage

## Key signaling pathways in breast cancer based on somatic mutation data



and lighter shading marks pathway components in which somatic mutations have not been identified.

Top 21 most commonly mutated genes in breast cancer								
Gene	All (%)	Luminal	TNBC					
TP53	35	26	54					
PIK3CA	34	44	8					
GATA3	9	13	0					
MAP3K1	8	11	0					
MLL3	6	8	3					
CDH1	6	8	2					
USH2A	5	4	8					
PTEN	3	3	3					
RUNX1	3	4	0					
MAP2K4	3	4	1					
NCOR1	3	3	1					
RB1	3	2	5					
TBX3	2	3	1					
PIK3R1	2	3	2					
CTCF	2	2	1					
NF1	2	2	1					
SF3B1	2	2	0					
AKT1	2	2	0					
CBFB	1	2	1					
FOXA1	1	1	1					
CDKN1B	1	1	0					

Mutation frequencies (%) in all tumors, or just within luminal (including HER2+) and TNBC subtypes.

ER	HER2	PI3K Pathway (PI3K, AKT, mTOR)		IGF, IGF-1R	Angiogenesis (VEGFR, PDGFR, KIT)		PARP	Others (Target)
Anastrozole	Afatinib	AZD8055b	INK1117	BMS-754807	Aflibercept	Olaratumab	BMN-673	Cabozantinib <sup>e</sup> , Foretinib <sup>e</sup> , Onartuzumab (MET)
Estradiol	Canertinib	BEZ235 <sup>c</sup>	INK128 <sup>b</sup>	Cixutumumab	Axitinib	Pazopanib	CEP-9722	
Exemestane	Dacomitinib	BGT226	MK2206 <sup>b</sup>	Dalotuzumab	Bevacizumab	Ponatinib	E7016	AZD4547, BGJ398, Dovitinib,
Fulvestrant	Lapatinib	BKM120	PF-04691502 <sup>c</sup>	Figitumumab	Brivanib	Sorafenib	INO-1001	E-3810 <sup>e</sup> , HGS1036 (FGFR)
Megestrol	MM-121	BYL719	PKI-587 <sup>c</sup>	Ganitumab	Lenvatinib	Sunitinib	MK4827	AUY922, Retaspimycin,
Letrozole	Neratinib	Everolimusb	PX-866	Linsitinib	MEDI-575	Semaxanib	Olaparib	Tanespimycin (HSP90)
Raloxifenea	Pertuzumab	GDC-0032	Temsirolimusb	MEDI-573	Motesanib	Vandetanib	Rucaparib	Ruxolitinib (JAK)
Tamoxifen	Trastuzumab	GDC-0068 <sup>d</sup>	XL147		Nintedanib	Vatalanib	Veliparib	Denosumab (RANKL)
Toremifene	T-DM1	GDC-0941	XL765 <sup>c</sup>	<sup>a</sup> Raloxifene is used for breast cancer prevention, not treatment, <sup>b</sup> mTOR inhibitor, <sup>c</sup> dual PI3K/mTOR inhibitor, <sup>d</sup> AKT inhibitor, <sup>e</sup> also inhibits VEGFR.				
		GDC-0980 <sup>c</sup>						

Culture and evaluate breast cancer precursor cells at various stages along the differentiation continuum using STEMCELL Technologies' defined and serum-free culture media, dissociation enzymes, antibodies, cell isolation kits and ALDEFLUOR™.

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- EpiCult™-B (Human; Catalog #05601) for the culture and evaluation of human bipotent, luminal-restricted and myoepithelial-restricted mammary epithelial progenitors in the mammary colony-forming cell assay.
- EpiCult™-C (Human; Catalog #05630) for the short-term culture of human mammary luminal epithelial and myoepithelial cells.
- ALDEFLUOR™ (Catalog #01700) for the non-immunological detection and isolation of viable normal stem and progenitor cells, as well as cancer stem cells, based on aldehyde dehydrogenase (ALDH) activity.

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<sup>\*\*</sup>Estimated overall survival (OS) using HER2-targeted therapies