THERANOSTICS INSIGHTS
Breast Cancer Awareness Month

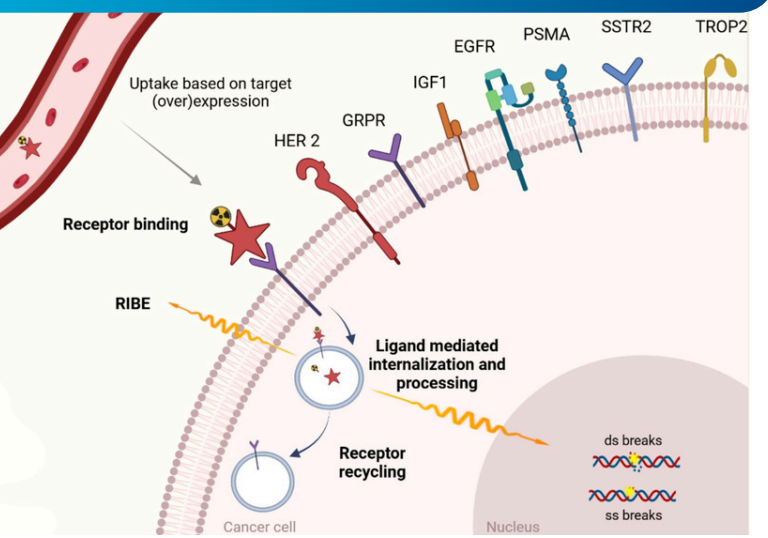
Oncidium foundation

Metastatic breast cancer

Metastatic (stage IV) breast cancer occurs when cancer spreads beyond the breast and nearby lymph nodes. Though currently not curable it is treatable to manage the disease and maintain quality of life.

Radiotheranostics in development may benefit patients with triple-negative disease (not displaying ER+, PR+ or HER2+), or rapid progression on standard therapies.

Targets



The main targeted receptors are shown above. The mechanism of action is similar to all: the ligand binds to the receptor, the complex is internalized, and radiation is delivered to the nucleus, damaging the cancer cell DNA.

Molecules studied in clinical trials

Diagnostic:

HER2- (with HER2+ metastasis): ^{89}Zr-trastuzumab

HER2+ refractory to standard treatment: ^{99m}Tc anti-HER2 sdAb

HR+ expressing SSTR2 ^{68}Ga-DOTATOC

Triple negative: ^{111}In-FPI-1547

Therapeutic:

HER2+ refractory to standard treatment
^{188}Re anti-HER2 sdAb

HR+ expressing SSTR2 (somatostatin receptor) ^{225}Ac-DOTATATE; ^{90}Y-DOTATOC

HR+ expressing GRPR (gastrin receptor)
^{177}Lu-NeoB +capecitabine; ^{77}Lu-NeoB +ribociclib +fulvestrant

Triple negative expressing
IGF-1R: ^{225}Ac-FPI-1434
SSTR2: ^{177}Lu-DOTATATE; ^{90}Y-DOTATOC
PSMA: ^{177}Lu-J591
Others: ^{90}Y-mAb-MN-14; ^{90}Y-mAb-B3; ^{90}Y-mAb BrE-3

Cancer-associated fibroblasts ^{177}Lu FAP 2286

Content and images adapted from reference article: F. Giugliano et al. Cancer Treatment Reviews 136 (2025)