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Novel therapeutic targets for breast cancer

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Breast cancer ranks first in the world in terms of new cases and deaths among all types of cancer, along with this, it is the second most common cause of cancer death among women, but survival can be improved via early diagnosis. When the tumor spreads through the lymphatic and hematological pathways, it gives a poor prognosis and leads to distant metastases. For this reason, early screening for initiation of treatment is preferable. In general, based on the absence or presence of ER (estrogen) or PR (progesterone) receptor and human epidermal growth factor 2 (ERBB2 or HER2) molecular markers, breast cancer (BC) can be classified into three main subtypes: 1) positive for both hormone receptors (ER and PR) and negative for ERBB2 - this group makes up 70% of all patients with breast cancer, 2) positive for the presence of ERBB2, makes up about 20% of patients, and 3) triple negative - these are tumors that lack all three standard receptors, and such patients account for 15% of all patients with BC. Among all BC types, the triple negative is the worst, as it lacks estrogen, progesterone, and human epidermal growth factor 2 receptors. The classification of TNBC into different subtypes opens up opportunities for targeted selection of potentially new treatment options. Nowadays, as therapeutic targets for TNBC are selected: involved in the synthesis of tumor gene, namely the poly(ADP-ribose) polymerase (PARP) enzyme, as well as various receptors that target the delivery of the drug to the lesion foci, namely: the receptors for vascular endothelial growth factor (VEGF/VEGFR), epidermal growth factor receptor (EGF/EGFR), androgen receptor (AR), fibroblast growth factor receptor (FGF/FGFR), gamma-amino butyric acid receptor π-subunit (GABRP). Programmed cell death (PD-1) receptor and PD-L1 (programmed death ligand 1), antigens for antibody-drug conjugate (ADC), and seven in absentia homologue-centered targets are considered as immunotherapeutic targets. Heat shock proteins 90 (HSP90), cell cycle regulators are also being considered as possible entry points for the treatment of TNBC. So, HSP90 is a chaperon that assists with post-translational stabilization and alternation of oncoprotiens. Amid medicinal plants, licorice has proven itself with the help for elimination of adverse effects arising under chemotherapy and radiotherapy. The social status of the population also influences the outcome of treatment. Thus, the lowest 5-year survival rate was found for black women for each subtype and phase/stage of cancer.