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Molecular pathways in breast cancers: From clinical-pathologic presentation to personalized therapy

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Breast cancer remains one of the most common cancers diagnosed in women. Its treatment is currently determined by expression of predictive and prognostic markers estrogen receptor (ER), progesterone receptor (PR) and HER2 growth factor. Recently molecular studies, using unsupervised gene clusters classified breast cancers in five groups: luminal A, luminal B, HER2 positive, triple negative and breast like. Each of these breast cancer subtypes proliferate and survive through more than one mechanism. ER alpha is a nuclear protein functioning as hormone activated transcription factor that regulates genes promoting cancer cell proliferation and survival. Additional mechanisms include modulation though other transcription factors which interact with gene enhancers/promoters, or it can transduce rapid signaling via non-nuclear/non-genomic pathways. HER2 activates multiple cellular signaling pathways, including the phosphatidylinositol 3-kinase and mitogen activated protein cascades. The triple negative breast cancer develops under different pathways translated in different phenotypes as well. The basal-like cancers, from a clinical point of view tend to appear at younger age and predominate in certain ethnic groups; histopathologically show high mitotic rate, tumor necrosis, prominent lymphocytic response and, at molecular level, show a high rate of p53 mutation. Another subgroup of triple negative breast cancer are claudin low cancer which overexpress a set of gene linked to mesenchymal differentiation and acquisition of stem cell phenotypes. Important pathways involved in triple negative breast carcinogenesis include Wnt, EGFR, IGFR and vascular proliferation. The study of molecular pathway offers understanding of breast carcinogenesis and provides for targeted therapy and personalized patient management.

Biography

Gabriela Oprea-Ilies has a medical degree from The Institute of Medicine and Pharmacy, Bucharest, Romania. She completed pathology residency at the University of Minnesota, Twin Cities and Cytology fellowship at Emory University, Atlanta, GA. She studied breast cancer with Dr. Schnitt, Collins and Mallory, in Boston. Currently she is a Pathologist, Assistant Professor and Principal Investigator of the breast tissue bank at Emory University, Director of the Immunolab at Grady Memorial Hospital and Adjunct Professor at Georgia State University. She has published in reputed journals, has been reviewing papers and serving in the editorial board member of repute.

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