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Obesity and breast cancer: a multipartite connection

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The prevalence of overweight and obesity has dramatically increased in the last two decades in the United States and many other countries. Notably, obesity is second only to tobacco as a leading risk factor for cancer and nearly 30 percent of cancers are attributable to obesity. An additional player has been identified as a key member of the obesity-molecular network that influences several components of microenvironment as well as growth and metastatic characteristics of breast cancer cells: the adipokine, leptin. High plasma levels of leptin, a major adipocytokine produced by adipocytes, are correlated with increased fat mass in obese state.

Leptin is emerging as a key candidate molecule linking obesity with breast cancer. Acting via endocrine, paracrine, and autocrine manner, leptin impacts various stages of breast tumorigenesis from initiation and primary tumor growth to metastatic progression. Leptin also modulates the tumor microenvironment mainly through supporting migration of endothelial cells, neo-angiogenesis and sustaining recruitment of macrophage and monocytes. Various studies have shown that hyperactive leptin-signaling network leads to concurrent activation of multiple oncogenic pathways resulting in enhanced proliferation, decreased apoptosis, acquisition of mesenchymal phenotype, potentiated migration and enhanced invasion potential of tumor cells. Furthermore, the capability of leptin to interact with other molecular effectors of obese state including, estrogen, IGF-1, insulin, VEGF and inflammatory cytokines further increases its impact on breast tumor progression in obese state.

Biography

Dipali Sharma received her Bachelor's in Science (honors) from the University of Delhi followed by Master's in Science with specialization in Endocrinology and Biological Chemistry. She was awarded her Ph.D. degree in Molecular Biology/Oncology by the University of Delhi and School of Biotechnology, Jawaharlal Nehru University. She was invited to join the laboratory of Dr. Joseph Fondell in the University of Maryland as a postdoctoral fellow. Her second post-doctoral fellowship was conducted at The Johns Hopkins School of Medicine where she was mentored by Dr. Nancy Davidson. She joined Winship Cancer Institute, Emory University as an Assistant Professor and started her own research program. She is currently a Professor of Oncology at The Johns Hopkins University School of Medicine in the Department of Oncology and Sidney Kimmel Comprehensive Cancer Center, Johns Hopkins.

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