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Environmental exposures, gene polymorphisms and breast cancer risk

The incidence of breast cancer (BC) is increasing in almost all countries and is the most common cancer for women in affluent countries. The differences that still exist between different ethnic groups might be explained by differences in reproductive and hormonal factors, genetic background, lifestyle and environmental exposures. The known risk factors only explain less than a third of all cases and more than 70% of women diagnosed with BC have no inherited or sporadic cancer. Environmental exposures to persistent organic pollutants (POPs) such as polychlorinated biphenyls and organochlorine pesticides and perfluoroalkylated substances (PFAS) are among potential risk factors. These compounds are potential endocrine disruptors altering the hormone homeostasis disturbing normal development, growth and function of mammary glands. Animal studies have indicated that PFAS increase mammary fibroadenomas and our recent case-control studies in Danish and Greenlandic Inuit women showed an association between the serum levels of PFAS and BC risk. Moreover, xenoandrogenic activity of serum extracts containing the actual mixture of legacy POPs was a significant risk factor in Inuit. Environmental exposures and genetic susceptibility differ between ethnic groups. The genotype and allele frequency of genetic polymorphisms in P450 phase I and phase II genes differs between Inuit and Europeans. For Inuit women an increased BC risk was observed with high PFAS levels and carriers of at least one variant of CYP1A1(Val) and COMT(Met) or the common CYP17 A1 allele, and in Danish women, we observed polymorphisms in COMT, CYP17 and CYP19 can modulate the BC risk of PFOSA exposure.

Biography

Eva Cecilie Bonefeld-Jørgensen was an Assistant Professor in 1996, Associated Professor and Head of Unit of Cellular and Molecular Toxicology in 1999, Professor and Director of Centre for Arctic Health & Molecular Epidemiology in 2008 at University of Aarhus. She has authored more than 170 publications and collaborated with a number of national and international institutions, lecturing at graduate and post-graduate level and been Project Coordinator for several international projects currently the Fetotox birth cohort study including China, Norwegian, Denmark and Greenland. She is the President for the Danish Society of Pharmacology and designated Expert for the human health working group at Arctic Monitoring Assessment Programme.

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