New insights into cause and treatments for aggressive form of breast cancer

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Potential environmental risk factors and new targets for treating an aggressive form of breast cancer have been identified, according to new data presented at the Society for Endocrinology annual conference in

Brighton. The study suggests that exposure to common chemicals in our everyday environment may increase the risk of developing a difficult to treat type of breast cancer and highlights strategies for new treatment using combination therapy.

Triple negative breast cancer (TNBC) is an aggressive form that particularly affects younger people and makes up 10-20% of all breast cancer diagnoses. Although still curable if caught early, TNBC is resistant to hormone treatments and newer "targeted" therapies, used to treat other types of breast cancer; TNBC is, therefore, treated with surgery, radiotherapy and chemotherapy. There is a need to better understand the biology of TNBC, to help develop new therapies to improve the survival and quality of life for patients with TNBC and also to identify how people might reduce their risk of developing this disease.

Current hormonal therapies used to treat women with another type of breast cancer that is "hormone receptor positive", target oestrogen and progesterone receptors, two of 48 nuclear receptors (NRs). We know that many NRs are altered in breast cancer, and are both potential drivers of breast cancer development and possible new therapeutic targets. NRs act as environmental sensors, working together to control different aspects of how breast and other tissues work. Their activity is altered by environmental factors, but how environmental chemicals change NR activity is not well understood, particularly in the context of TNBC.

Dr. Laura Matthews and Professor Chris Twelves from the University of Leeds, with Professor Valerie Speirs from the University of Aberdeen led a study funded by the charity Breast Cancer UK. They mapped the entire NR superfamily in samples from different types of breast cancer and from normal breast tissue, to identify common alterations in NR activity. They then compared their findings with those from other studies to identify NRs associated specifically with TNBC. This allows them to predict which drugs or environmental chemicals are more likely

to generate the distinct NR profiles associated with TNBC; these include disinfectants, insecticides, dietary fats and industrial pollutants.

Dr. Matthews comments, "Identifying these NR networks, and ways they might be controlled in patients with TNBC is really important. We are now investigating how the environmental chemicals change the behaviour of normal breast cells so we can understand how they might drive cancer development. We are also testing whether using drug combinations that target multiple NRs at the same time might prevent or be an effective treatment for TNBC. Our goal is to reduce the number of people that develop breast cancer, and guide new therapies, so that more people can live beyond breast cancer."

Thalie Martini, CEO at Breast Cancer UK, states "Breast Cancer UK is proud to support work carried out by Dr. Matthews, her collaborators and team members. Her research will help identify some of the many risk factors associated with developing breast cancer. We hope this will inform ways that people can reduce their risk of developing the disease".

More information: Abstract P130: Nuclear receptor profiling predicts chemical disruptors as risk factors for developing breast cancer

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