Application number/Title: 37368: Future risk of cancer and cardiovascular disease in women who experience a hypertensive disorder of pregnancy, and its modification by a common, functional, IGF1R

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Keywords provided by the Applicant PI to describe the research project:
breast-cancer, cancer, cardiovascular-disease, gestational-hypertension, hypertension, preeclampsia

Application Lay Summary:

Pregnancy has long been known to have a major impact on the developing breast and the future risk of breast cancer. Many studies have shown that hypertensive disorders of pregnancy (HDP) occur in as many as 10% of pregnancies, and are associated with lower future risk of breast cancer. HDP consists of gestational hypertension and preeclampsia, and both are characterized by the development of high blood pressure in pregnancy, usually after the 20th week of gestation. Our recent research has shown that the reduction for breast cancer can be as high as 90% in women with HDP that carry a specific common gene variant, and the initial objective of this study is to reconfirm these findings in the larger UK Biobank cohort. There is also evidence that HDP is associated with a lower risk of other cancers, and we will be examining whether this same gene variant impacts these risks as well.

Interestingly, HDP has also been shown to be associated with increased later life risk of hypertension, heart disease, and stroke, indicating that experiencing HDP can have both good and bad long-term health outcomes. Therefore, a second objective is to further explore this association and determine if this same gene variant predicts the future risk of developing cardiovascular disease in women who experience HDP.

The gene variant we will be studying is part of the insulin-like growth factor (IGF-1) system, which has a well-established role in both the development of cancer and cardiovascular disease. HDP are associated with inadequate blood flow to
the placenta, which results in alterations of many hormones and growth factors, including lower levels of IGF-1. It appears that these lower levels interact with our observed genetic variant to protect the breast tissue in pregnancy, which is known to be a very vulnerable and critical time in breast development.

Achieving the aims of this study could improve the ability to predict the future risk of developing the two most significant age-associated health outcomes that women face, and thereby lead to more effective personalized screening and open the door to novel prevention strategies.

The size and data composition of the UK Biobank make it a perfect place to study the important relation of HDP and genetics to future health, and we expect the study to be completed in 12 months.