

Introduction: Endometriosis is a condition where tissue similar to the lining of the womb starts to grow in other places, such as the ovaries and fallopian tubes. The etiology of endometriosis is not well understood. It is recognized that endometriosis is multifactorial involving hormonal, estrogenic, genetic, epigenetic and environmental factors. Central to the disease pathogenesis is estrogen, which regulates the key pathological processes in endometriosis. Given that estrogen is the most important factor for the occurrence of disease it has been hypothesized that potential contribution of endocrine disrupting chemicals (EDCs), which interfere with the hormonal system, in the risk of endometriosis.

Project aims: The aim of the proposed project is to evaluate the association between exposure to endocrine disrupting chemicals in everyday use products and genetic, epigenetic factors and oxidative stress in the occurrence of disease.

Materials and Methods: The study population will consist of 800 females (400 endometriosis cases and 400 controls (without endometriosis)) aged 20-48 years enrolled at one of 4 participating Medical Centers/Hospitals in different regions of Poland (Łódź, Wrocław, Gdańsk, Białystok). **Cases** will be recruited in Medical Centers/Hospitals at Surgical, Endoscopic and Gynecology clinics. Women who undergo a diagnostic and/or therapeutic laparoscopy or laparotomy irrespective of clinical indication and who first diagnosed with surgically confirmed endometriosis will be recruited. **Controls** will be recruited in the same Medical Centers/Hospitals randomly selected from a list of women attending to these Medical Centers/Hospitals with the same age 20-48 years during the same time period from different diagnostic Departments.

All women who willing to participate in the study and signed the informed consent will complete a questionnaire that includes questions about socio-economic factors, stress, medical history, lifestyle factors and others exposures. All women will provide blood and urine samples.

The assessment of exposure to endocrine disrupting chemicals such as benzophenones, parabens, triclosan, bisphenols A, AF,B, BP, C, F, G, S, synthetic pyrethroids metabolites will be performed in urine using a validated gas chromatography. Whereas assessment of perfluorinated alkyl substances and synthetic musks will be analyzed based on liquid-liquid extraction followed by SPE cleanup and GC-MS/MS in serum samples.

Assessment of oxidative stress parameters, malondialdehyde in serum, 8-hydroxydeoxyguanosine and isoprostanes in urine will be performed.

To assess genetic and epigenetic factors absolute telomere length (TL) will be measured in blood genomic DNA using qRT-PCR (real time PCR) method and global DNA methylation and methylation of selected genes will be analyzed.

Additionally, concentration of hormones: Anti-Müllerian Hormone, follicle stimulating hormone, estradiol, luteinizing hormone and inhibin B will be performed.

Expected results and recommendation: The proposed project creates the possibility of a reliable assessment of exposure to environmental endocrine disruptors and the mixture of chemicals on endometriosis risk. The proposed project will be the first which assess the leukocyte telomere length among large number of women and will assess the possible interaction between telomere length and environmental factors in the risk of endometriosis. A better understanding of how TL influences endometriosis risk could elucidate novel disease pathophysiology.

The proposed project is important because diagnosis of endometriosis is difficult and treatment mainly symptomatic it is necessary to establish preventive measures to avoid as far as possible the origin of disease. The results of this study will be published in scientific journals, presented at conferences. Additionally the scientific description and the recommendations of the exposure to endocrine disrupting chemicals from everyday use products which may have potential impact on endometriosis will be prepared.