# Common genetic origins discovered behind uterine fibroids and endometriosis

December 5 2019

Credit: University of Oulu

A major international study revealed that the two most common female reproductive system diseases, uterine fibroids and endometriosis, have common genetic origins. The finding, published in the prestigious *Nature Communications* journal, drives forward basic research in the field and may open up completely new opportunities for developing drug treatment as well.

Uterine smooth muscle tumours, known as uterine leiomyomas or fibroids, are benign neoplasms causing pain and pressure, bleeding disorders and anaemia. 20-30% of women over the age of 30 years develop fibroids. As for endometriosis, it causes intense menstrual pain and reduces women's fertility. It is estimated that 10% of all women suffer from endometriosis.

It was previously known that women with endometriosis had a higher risk of developing uterine fibroids. However, the common mechanism underlying these diseases was not known.

An international group of researchers known as the FibroGENE consortium, organized by members in Cynthia Morton's laboratory at Brigham and Women's Hospital, Harvard Medical School, thoroughly investigated the whole genome of more than 35,000 women with fibroids and compared the results to those of 267,000 healthy women.

The study revealed eight novel genomic regions associated with uterine fibroids. These regions harbour well-known oncogenes and genes regulating cell growth. Furthermore, the study confirmed 21 genomic regions which had already been associated with fibroids in previous studies and most regions first reported by the FibroGENE consortium in a pre-publication.

Of the genes underlying uterine fibroids, four have been associated with endometriosis in previous studies. This is a new and surprising finding. These four genes are linked to the development of women's reproductive organs during the foetal period (WNT4), cell communication between oestrogenic and progesterone hormones (ESR1, GREB1) and stimulation of ovarian follicles (FSHB).

Another interesting finding was that the three novel genomic regions are associated with fibroids and heavy menstrual periods. "These findings

are interesting in consideration of further research because only one in four fibroid cases causes symptoms, namely heavy periods," says Outi Uimari, Clinical Lecturer from the University of Oulu, Finland who was one of the researchers responsible for the clinical part of the study.

Furthermore, researchers wanted to clarify the connection between fibroids and endometriosis in an extensive epidemiological study. Research material covering more than 400,000 women in total revealed that women with endometriosis had a two-fold risk of developing fibroids.

## The goal is to develop drug treatment

These findings confirm earlier hypotheses about a link between endometriosis and fibroids and provide much needed information on the underlying mechanism of the diseases.

"We were able to identify several genes underlying fibroids as well as gain valuable information on the shared biological mechanisms underlying both fibroids and endometriosis," Uimari says with satisfaction.

So far, fibroid treatment has served simply to alleviate symptoms, for the most part. Understanding the mechanisms underlying fibroids makes it possible to develop targeted medications for the disease mechanism.

"Even though fibroids occur frequently among women, no efficient medical treatment is available. The only essentially curative care available at the moment is a hysterectomy, which is a major, high-risk and expensive operation," Uimari points out.

The study was published in the *Nature Communications* journal in October.

**More information:** undefined undefined et al. Genome-wide association and epidemiological analyses reveal common genetic origins between uterine leiomyomata and endometriosis, *Nature Communications* (2019). DOI: 10.1038/s41467-019-12536-4