Nowadays, we observe significant growth of infertility among population, despite of improved medical care. Female fertility has been affected by multiple factors. One of them is uterine fibroid, the most common benign tumor affecting 80% of women in their reproductive age. Two main processes always dominate in the pathogenesis of leiomyomata: fibrosis and angiogenesis. Despite numerous explanations of the etiopathogenesis, there is no comprehensive one, describing all known features of this clinical entity.

Interstitial Cajal-like cells (ICLC) are relatively recently discovered cells, phenotypically similar to archetypal interstitial cells of Cajal (ICC) present in the gastrointestinal tract, but with wider range of distribution and unique multifunctions. Newly named as telocytes (TCs) they instantly focused attention of the scientific world. No doubt, ICLC were described in many organs during the last twelve years. They form homo- and heterocellular contacts with a variety of surrounding cells i.e. smooth muscle cells, nerves, immunocytes (macrophages, mast cells and lymphocytes), stem cells, melanocytes, erythrocytes and also with Schwann cells. The high sensitivity to ischemia and consequent reaction to oxidative stress, allow us to predict involvement of TCs (ICLC) in the processes of angiogenesis and fibrosis. Similar disturbances of ICLC were observed in several diseases such as systemic sclerosis, Crohn's disease, myocardial infraction, gallstone disease, psoriasis, acute salpingitis, liver fibrosis and primary Sjögren's syndrome. Until now, there are very limited data on the possible involvement of TCs (ICLC) in pathogenesis of uterine fibroids as well as detailed description of their functions in myometrial tissue.

The main goal of our project is to observe telocyte involvement in pathogenesis of uterine fibroids as a potential infertility factor in women of reproductive age. We will determine localization of TCs (ICLC) in normal myometrium and uterine fibroids, examining the potential role of these cells in the pathogenesis of uterine fibroid. Furthermore, we will observe a tendency of TC density alterations in fibroid tumors and its possible correlation with angiogenesis processes. Moreover, we will try to correlate our findings with the fertility status of our patients.

In patients with uterine fibroids as well as in controls undergoing hysterectomy we will identify TCs (ICLC), nerves and mast cells in tissue biopsies after surgery using histological and immunohistochemical methods. Ultrastructural analysis of TCs under transmission electron microscopy will be provided and supported by modern Fourier transform infrared spectroscopy analysis. Additional assessments of the markers of hypoxia in the uterus muscle and the levels of sex-related hormones and soluble vascular endothelial growth factor receptors in blood will be performed.

All planned procedures give us the opportunity to answer the fundamental question: "How uterine telocytes (interstitial Cajal-like cells) influence the pathogenesis of uterine fibroid, potentially leading to infertility?"