The crucial role of semaphorins in the pelvic pain genesis of women with endometriosis

C. Arellano Estrada, M. Barcena de Arellano, S. Mechsner

Endometriosis (EM) is a chronic inflammatory disease and one of the most common causes for chronic pelvic pain. The mechanisms causing the pain emergence remain unknown, though recent studies showed reduced amounts of anti-inflammatory noradrenergic nerve fibers (NAN), which probably leads to perpetuation of the inflammation and pain genesis in EM. Specific semaphorins (semas) represent potential elicitors, due to their known role as nerve repellent factors in different chronic inflammatory diseases like rheumatoid arthritis.

The aim of the project was to define the role of semas in the pain pathogenesis of EM. Therefore the expression of a variety of semas and their receptors was analyzed in peritoneal EM lesions (pEL), healthy peritoneal biopsies (pb) and in peritoneal fluid (PF) of women with and without EM, thereby differentiating between women with and without pelvic pain. Additionally EM-associated and not EM-associated macrophages as well as activated fibroblasts in EM and not EM patients were analyzed, to determine their potential interaction with semas. Analyses were performed by means of immunohistochemical and immunofluorescence stainings and ELISA analysis.

The study revealed a significant increase of semas and their receptors in pEL and PF of EM patients, with significant differences between women with and without pain. The receptors of the semas could be identified in NAN in pEL. Macrophages and activated fibroblasts were found in higher density levels and additionally express different semas in the pEL.

The inflammatory reaction in EM leads to a release of macrophages and activation of fibroblasts, which express semas. Suggesting a potential role of semas in the reduction of the noradrenergic innervation and consequently of anti-inflammatory factors, thereby leading to the chronic inflammatory conditions in EM, potentially contributing to pain emergence.