

Hormone receptor expression in human fascial tissue and modulation of the extracellular matrix according to the hormone levels

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Many clinical and experimental findings point to sex differences in myofascial pain, demonstrating that adult women tend to have different myofascial problems with respect to men [1]. It is possible that sex hormones can play a role in extracellular matrix and collagen remodeling and thus contribute to functions of myofascial tissue, causing a sensitization of fascial nociceptors. This study was approved by the Institutional Ethics Review Board according to ethical regulations regarding research conducted on human tissues. Immunohistochemical and molecular investigations of relaxin receptor 1 (RXFP1) and estrogen receptor-alpha ($ER\alpha$) were carried out on samples of human fascia collected from female volunteer patients during orthopedic surgery (age between 42 and 70 yrs, divided into pre- and post-menopausal groups), and in fibroblast cells isolated from deep fascia. Furthermore, an *in vitro* stimulation was performed with levels of beta-estradiol equal to the follicular phase or to the periovulatory phase, and the matrix was analyzed after Sirius Red staining. RXFP1 and $ER\alpha$ are expressed in all the human fascial districts examined and in fascial fibroblasts culture cells, to a lesser degree in the post-menopausal with respect to the pre-menopausal women. Furthermore, different levels of beta-estradiol modulate the collagen production, that increases when the hormone levels rise up to the periovulatory concentration (~400 pg/mL). Our results demonstrated that the fibroblasts located within different districts of the muscular fasciae express sex hormone receptors and can modulate the extracellular matrix according to the hormone levels, influencing the tissue hydration and the lubrication of sliding surfaces. These results can help to explain the link between hormonal factors and myofascial pain: estrogen and relaxin play a key role in extracellular matrix remodeling by inhibiting fibrosis and inflammatory activities, both important factors affecting fascial stiffness and sensitization of fascial nociceptors [2].

References

- [1] Rollman GB, Lautenbacher S. (2001) Sex differences in musculoskeletal pain. *Clin J Pain*, 17:20-4.
- [2] Fede C, Albertin G, Petrelli L, Sfriso MM, Biz C, De Caro R, Stecco C. (2016) Hormone receptor expression in human fascial tissue. *Eur J Histochem*, 60(4):2710.