

Myofibroblast Density in Fasciae

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BACKGROUND: The identification of myofibroblasts (MFBs) in fascia led to new questions concerning their role in regulating passive fascial tissue stiffness [1] and regarding a potential association between density of these cells and a local history of tissue loading/injury [2,3].

METHODS: We used 8 male and 12 female rats of different age (50 days - 613 days). We dissected fascia lumbodorsalis profunda (n = 6), fascia lumbodorsalis superficialis (n = 20). We stained these fasciae for alpha smooth muscle actin (ASMA), which is the main contractile filament of MFBs. We determined the density of the stained area using light microscopy coupled with analysis software. Areal proportion of ASMA positive stress fiber bundles was used as an indicator for the local density of MFBs. We performed Wilcoxon signed rank test with a significance level of 0.05.

RESULTS: We did not find indications for gender differences of MFB density in lumbodorsal fascia. The comparison between the density of ASMA stress fiber bundles in lumbar fascia versus thoracic samples did not yield significant differences. Fascia profunda contained more ASMA positive areas than Fascia superficialis (0.006% versus 0.001 %, n=6). When we compared young (median age 85 days) versus older animals (169 days, n=7), we found that fascia from older rats contained significantly more ASMA stress fiber bundles (0.24% versus 0.02%, n=8).

CONCLUSION:

Differences in the density of ASMA stress fiber bundles indicate that the distribution of MFBs varies with age of the animals and location of the sample. While the observed density differences between tissues from different origins could be associated with their previous history of mechanical loading, this association remains speculative.

REFERENCES

- [1] Remvig L et al.. In Findley TW, Schleip R, eds. Fascia Research – Basic Research and Implications for Conventional and Complementary Health Care. Munich: Elsevier GmbH, 2007, p 87.
- [2] Schleip R, Naylor IL, Ursu D, Melzer W, Zorn A, Wilke HJ, Lehmann-Horn F, Klingler W.. Med Hypotheses 66, 66–71, 2006.
- [3] Schleip R, Vleeming A, Lehmann-Horn F, Klingler W. Letter to the Editor Eur Spine J 16, 1733–1735, 2007.