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**Background** RNA is required for protein biosynthesis. However, extracellular RNA (exRNA) is also present within tissues and actively secreted by cells. Examples for the exRNA-activity are a pro-coagulative effect and an enhanced permeability of the blood-brain-barrier by exRNA. Furthermore, specific exRNAs are accumulated in the serum in cancer and these exRNA have actually been identified as tumour-markers. A pro-inflammatory effect of extracellular DNA due to tissue damage has been described in rheumatoid arthritis (RA). Therefore, the authors analysed the presence and the expression pattern of exRNA in the joint as well as the activity of RNase in the synovial fluid of RA patients.
**Methods** Synovium from RA and OA patients (n=3 each) were stained with 4′,6-diamidin-2-phenylindole (DAPI) to locate DNA and SYTO RNASelect Green Fluorescent Stain to locate RNA in the tissue. A serial tissue section was stained with H&E to identify the lining layer and sublining. The expression pattern of RNA was analyed by comparing the RNA and DNA staining with the HE-staining on serial sections. In addition, the RNase activity of the synovium of different patient groups (RA: n=4; OA: n=3 and psoriatic arthritis (PsA): n=5) was measured using the Quant-iT RNA Assay Kit.
**Results** RNA and DNA signals were detectable in all areas of the synovium. Merging the RNA and DNA signals showed a co-localisation of the signals within the nucleus of the cell. Interestingly, an intensive cytoplasmatic and exRNA signal could be observed in the lining layer of RA and OA patients with stronger signal intensity in the RA lining. Due to the increased thickness of the lining layer in RA patients, an increased amount of exRNA in RA patients when compared to OA was detectable. This signal was not co-localised with the DNA. A reduced RNase activity was measured in the synovial fluid of patients with RA (20.1±3.61) and PsA (21.3±2.5) in comparison to OA patients (35.8±4.5), reaching statistical significance when comparing PsA to OA patients (p=0,033). In addition, RNase activity was inversely correlated to CRP serum level (r=−0.43).
**Conclusion** In OA and especially RA patients, exRNA is present in the synovial lining layer. RNase activity in the synovial fluid seems to be reduced in patients with chronic inflammation (RA and PSA) in contrast to OA. The increased amounts of exRNA could demonstrate a new pro-inflammatory mechanism active in chronic inflamed tissue that could be important for the perpetuation and chronification of inflammation.

## 10 EXPRESSION OF EXTRACELLULAR RNA IN SYNOVIAL TISSUE AND RNASE ACTIVITY IN SYNOVIAL FLUID OF RHEUMATOID ARTHRITIS PATIENTS

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