

# CYTOKINE ANALYSIS IN PLATELET RICH PLASMA OF PATIENTS WITH OSTEOARTHRITIS VS HEALTHY SUBJECTS.

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## AIM

Platelet-rich plasma (PRP) and its platelet-poor plasma (PPP) by product are rich sources of cytokines. The use of PRP in osteoarthritis (OA) is receiving increased attention. However few data are available on the cytokine presence in PRP of OA pts. The aim of our study was to investigate the biological presence of some cytokines in the PRP of patients with osteoarthritis and in the PRP of healthy subjects

## MATERIAL AND METHODS

The blood (27cc plus 3cc of trisodium citrate) is centrifuged twice with a Kit (TriCellPRP REV-MED Inc - first round 5min 3200 RPM, second round 6min 3400 RPM); 1 ml of PRP was sent for analysis. Cytokine assay was performed using the ELISA method and the absorbance reading was performed at 450nm. Cytokine panel has been the following: IL 6, VEGF, IGF-1, G-CSF, TNF- $\alpha$ , TGF $\beta$ -1, FGF-1, SDF-1 $\alpha$ .

## RESULTS

Overall, we included n=29 patients with osteoarthritis and 7 healthy subjects. Median IGF1 levels in the PRP of patients with OA were significantly lower (30.5 pg/ml, IQR: 9.9 -57.9 pg/ml) compared to healthy subjects (median 443.0 pg/ml, IQR 214-481.5 pg/ml; p=0.0001). Similarly, TNF $\alpha$  levels in the PRP in patients with OA were significantly lower (median 173.5 pg/ml, IQR 130.3 -276.5 pg/ml) compared to healthy subjects (median 436.0 pg/ml, IQR 354.5 -1037.8 pg/ml; p=0.0012). In patients with osteoarthritis compared to healthy patients there is a marked down-regulation for TNF alpha and IGF-1 (Table 1).

Table 1. Patients with OA compared to Healthy subjects

<i>Parameters</i>	<i>Patients OA (n=29)</i>	<i>Healthy subjects (n=7)</i>	<i>p value</i>
<i>VEFGA, median (IQR)</i>	<i>554.5 (394.0 to 701.0)</i>	<i>522.0 (299.5 to 640.5)</i>	<b>0.6894</b>
<i>IL6, median (IQR)</i>	<i>313.5 (258.1 to 440.4)</i>	<i>381.0 (365.3 to 620.8)</i>	<b>0.0893</b>
<i>IGF1, median (IQR)</i>	<i>30.5 (9.9 to 57.9)</i>	<i>443.0 (214.0 to 481.5)</i>	<b>0.0001</b>
<i>GCSF, median (IQR)</i>	<i>175.0 (141.5 to 239.8)</i>	<i>213.0 (104.0 to 462.0)</i>	<b>0.7190</b>
<i>TNF <math>\alpha</math>, median (IQR)</i>	<i>173.5 (130.3 to 276.5)</i>	<i>436.0 (354.5 to 1037.8)</i>	<b>0.0012</b>

## DISCUSSION AND CONCLUSION

Cytokines, released from activated platelet are essential for paracrine action of platelets. Few data are present in literature that analyze cytokines present in the PRP of patients with OA versus healthy subjects. Different balance between cytokines could impact clinical outcome of patients. IGF-1 induces stem cell differentiation toward chondrogenic lineage and cartilage extracellular matrix deposition and stabilizes chondrocyte phenotype in pathological conditions where homeostasis is perturbed. Presence of IGF-1, even if down-regulated, is important in environment of the OA cartilage. IL-6 and TNF-alpha are a proinflammatory cytokines and their reduced presence in the PRP of OA pts is of benefit.

VEGF expression levels correlate with the pathogenesis of osteoarthritis. The increased level of VEGF in the PRP represents the blood value. This preliminary data show that the cytokines, in the PRP of patients before platelets activation, correlate with their blood level and could be used to assess the severity of OA and influence the PRP protocol for number of injections during the follow up.