Disclosure of Interests: Bob Stoffel Shareholder of: AbbVie, Grant/research support from: AbbVie, Employee of: AbbVie, Michael McPherson Shareholder of: AbbVie, Grant/research support from: AbbVie, Employee of: AbbVie, Axel Hernandez Shareholder of: AbbVie, Grant/research support from: AbbVie, Employee of: AbbVie, Christian Gooss Shareholder of: AbbVie, Grant/research support from: AbbVie, Employee of: AbbVie, Suzanne Mathieu Shareholder of: AbbVie, Grant/ research support from: AbbVie, Employee of: AbbVie, Wendy Waegell Shareholder of: AbbVie, Grant/research support from: AbbVie, Employee of: AbbVie, Shaughn Bryant Shareholder of: AbbVie, Grant/research support from: AbbVie, Employee of: AbbVie, Aaron Holben Shareholder of: AbbVie, Grant/research support from: AbbVie, Employee of: AbbVie, Melanie Ruzek Shareholder of: AbbVie, Grant/ research support from: AbbVie, Employee of: AbbVie, Yinuo Pang Shareholder of: AbbVie, Grant/research support from: AbbVie, Employee of: AbbVie, Hartmut Kupper Shareholder of: AbbVie, Grant/research support from: AbbVie, Employee of: AbbVie, Ronilda D’Cunha Shareholder of: AbbVie, Grant/research support from: AbbVie, Employee of: AbbVie, Julie Parmentier Shareholder of: AbbVie, Grant/ research support from: AbbVie, Employee of: AbbVie, Timothy Radstake Shareholder of: AbbVie, Grant/research support from: AbbVie, Employee of: AbbVie

DOI: 10.1136/annrheumdis-2021-eular.2213

POS0366

PRO-INFLAMMATORY EFFECTS OF HUMAN APATITE CRYSTALS EXTRACTED FROM PATIENTS SUFFERING FROM CALCIFIC TENDINOPATHY


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Background: Calcific tendinosis of the rotator cuff is due to carbonated apatite deposits in the shoulder tendons. During the evolution of the disease, an acute inflammatory episode may occur leading to the disappearance of the calcification. Although hydroxyapatite crystals-induced inflammation has been previously studied with synthetic crystals, no data are available with calcifications extracted from patients suffering from calcific tendinopathy. The objective of the study was to explore the inflammatory properties of human calcifications and the pathways involved.

Objectives: The objective of the study was to explore the inflammatory properties of human calcifications and the pathways involved.

Methods: Human calcifications were obtained from patients treated for their shoulder pain related to a calcific tendinopathy of the rotator cuff. Calcifications were extracted by ultrasound-guided lavage and aspiration as previously described [1]. Human calcifications and synthetic hydroxyapatite (sHA) were used in vitro to stimulate human monocytes and macrophages, the human myeloid cell line THP-1 and human tenocytes. The release of IL-1β, IL-6 and IL-8 by cells was quantified by ELISA. Gene expression of pro- and anti-inflammatory cytokines was evaluated by quantitative PCR. NF-κB activation and NLRP3 inflammasome were assessed by Western blot. Moreover, CD1c+ and CD141+ cDC subsets and total Mo were isolated from the synovial fluid from RA patients. Finally, silencing of expression of NLRP4 and NLRP3 on CD1c+ and CD14+ cDCs was performed with specific siRNAs.

Results: Human calcifications were able to induce a significant release of IL-1β when incubated with monocytes, macrophages and THP-1 only if they were first pre-treated with LPS (without any other reagent). Moreover, the expression levels of IL-1β and IL-6 by cells were significantly higher when human calcifications were used as compared to sHA. In addition, the expression of NF-κB was increased in THP-1 cells treated with human calcifications. In contrast, the expression of IL-1β and IL-6 by macrophages and THP-1 cells was significantly higher when treated with human calcifications compared to sHA. Moreover, the expression of NF-κB was increased in THP-1 cells treated with human calcifications.

Conclusion: As synthetic hydroxyapatite, human calcifications were able to induce an inflammatory response resulting in the production of IL-1β after NF-κB activation and through NLRP3 inflammasome. In some experiments, IL-1β induction was lower with human calcifications compared to synthetic apatite. Differences in size, shape and protein content may explain this observation.

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Acknowledgements:
Foundation Arthritis, Recherche et Rhumatismes and French Arthritis for their financial support

Disclosure of Interests: None declared

DOI: 10.1136/annrheumdis-2021-eular.2624

POS0367

NLR4 AND FC-γR CROSS-TALK ON CD1C+ DENDRITIC CELLS DIFFERENTIALLY CONTRIBUTES TO RHEUMATOID ARTHRITIS IMMUNOPATHOLOGY


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Background: Rheumatoid arthritis (RA) is an autoimmune disorder in which Th17 cells, B cells and inflammatory cytokines (1-3) contribute to joint tissue damage, however the role of specific myeloid populations to immunopathogenesis of RA remains unclear.

Objectives: To address this question, we studied transcriptional, phenotypical and functional characteristics of monocytes (Mo), CD1c+ and CD14+ conventional dendritic cells (cDC) from RA patients.

Methods: Frequencies and maturation patterns of Lin-CD14+HLADR+ plasmacytoid (CD11c-), CD1c+ and CD141+ cDC (CD11c+) subsets and CD14+ Mo from n=28 RA patients at baseline were analyzed by multicolor flow cytometry. In addition, longitudinal studies on the evolution of these populations after treatment initiation were conducted on a smaller group of RA patients. Moreover, CD1c+ and CD141+ cDC subsets and total Mo were sorted from the peripheral blood from n=4 untreated RA and healthy individuals and the synovial fluid from n=3 RA and chondrocalcinosis patients. Differential transcriptional patterns within each population were analyzed by analytic RNAseq. Functional validation of targets were performed in vitro with cDC subsets isolated from the synovial fluid of RA patients. Finally, silencing of expression of NLR4 and NLRP3 on CD1c+ and CD14+ cDCs were performed with specific siRNAs.

Results: Both CD1c+ (p=0.0091) and CD141+ (p=0.0098) cDCs were significantly depleted from the blood and enriched in the synovial fluid from untreated RA patients, but proportions of CD1c+ and CD14+ cDCs were more significantly recovered after treatment initiation and associated with improved clinical parameters. In addition, specific increased expression levels of the IgG-Fc receptor CD64 on CD1c+ cDC was associated with higher DAS28 (p=0.0002). Moreover, differential transcriptional patterns of circulating CD1c+ and CD14+ cDCs from RA patients were characterized by genes linked to toll-like receptor, Fc-receptor, inflammasome pathways and elevated CCR2 expression (p=0.016), while CD141+ cDCs transcribed interferon-related genes. Importantly, CCR2+ CD45+ CD141+ cDCs from the synovial fluid from RA patients transcribed proinflammatory cytokines such as IL-1β, CCL3 and IL-8, actively expressed the inflammasome mediator caspase 1 and were more effective activating pathogenic IFNγ/IL-17+ CD4+ T cells in vitro than CD141+ cDCs (p=0.0019). These functional profiles could be artificially induced stimulating CD1c+ and CD14+ cDCs with dsDNA in the presence of IgGs and was dependent on caspase 1 and the NLR4 inflammasome.

Conclusion: Our data provides novel insights into specific activation and functional patterns on CD1c+ cDC contributing to RA pathogenesis and identifies new sensors that could represent novel therapeutic target to treat RA.

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Disclosure of Interests: None declared

DOI: 10.1136/annrheumdis-2021-eular.3192