POS0359

MOLECULAR PROFILING OF RADIOGRAPHIC AXIAL SPONDYLOARTHRITIS PATIENTS REVEALS AN ASSOCIATION BETWEEN INNATE AND ADAPTIVE CELL POPULATIONS AND THERAPEUTIC RESPONSE TO ADALIMUMAB

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Background: The response to treatment in spondylarthropathies is heterogeneous, due to factors yet to be better described. For that reason, it is important to find tools that might help clinicians to decide what is the best available therapeutic option for each patient.

Objectives: The goal of this study is to use comprehensive molecular profiling to characterize clinical response to therapy in a real-world setting. Specifically, to identify molecular biomarkers differentiating good responders and non-responders to TNF inhibitors (TNFi) treatment, using adalimumab, in radiographic axial spondyloarthritis (ankylosing spondylitis (r-axSpA) patients context.

Methods: Whole-blood mRNA and plasma proteins were measured in a cohort of biologic naïve r-axSpA patients (n = 35) from the Bioefficacy study (Biomarkers identification of anti-TNF alpha agent efficacy in AS patients using RNA sequencing and mass spectrometry), pre and post (14 weeks) TNFi treatment using adalimumab. Response to treatment was categorized according to ASAS20. Results of differential expression analysis were used to identify the most enriched pathways and in predictive models to distinguish responses to TNFi.

Results: A treatment-related signature, independent of the type of response, suggests a reduction in inflammatory disease activity. We found genes and proteins robustly differentially expressed between baseline and week 14 in responders, including the GWAS AS-associated genes *TNFRSF1A*, *FCGR2A*, *TYK2*, *TBKBP1*, *IL1R1*, *IL6R*, *ICOSLG*, *IL7R*, *HHA1* and *LTBR*. Moreover, CRP and HP proteins showed strong and early decrease in the plasma of AS patients, while a cluster of apolipoproteins (APO1, APO2, APO3) showed an increased expression at week 14. Good responders to TNFi treatment tend to have higher expression of innate immunity genes at baseline, and lower expression of markers associated with adaptive immunity, particularly B-cells. A logistic regression model incorporating ASDAS-CRP, gender and *Gene x*, the top differentially expressed gene at baseline between responders and non-responders, enabled an accurate prediction of response to adalimumab in our cohort (AUC=0.97).

Conclusion: Differences in disease activity and/or innate/adaptive immune cell type composition at baseline may be a major contributor to response to adalimumab in r-axSpA. Alternatively, a model including clinical and gene expression variables could be considered, particularly in patients with mild disease activity.

Disclosure of Interests: None declared

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POS0360

COMPLEX LANDSCAPE OF BIRC5/SURVIVIN GENOME BINDING IN HUMAN CD4+ T CELLS

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Background: Survivin, coded by BIRC5 gene, is a multitasking protein essential for cell renewal and homeostasis. In autoimmune conditions as rheumatoid and psoriasis arthritis, survivin was associated with inflammation severity and joint damage. Importantly, inhibition of survivin alleviated experimental arthritis in mice. We have recently shown survivin to be essential for T cell differentiation and microRNA processing. The known anti-apoptotic and proliferation facilitating functions of survivin does not explain the nuclear localization of survivin in interphase.

Objectives: We aimed to uncover nuclear functions of BIRC5/survivin in CD4 cell of RA patients and healthy.

Methods: CD4 T cells were isolated from the peripheral blood using positive selection on magnetic beads (EasySep) and activated for 48h with ConA+LPS. Chromatin immunoprecipitation (ChIP) with polyclonal anti-survivin antibodies was done in four independent samples of healthy donors (n=5), healthy smokers (n=3), rheumatoid arthritis (n=3) and breast cancer (n=2). Pooled libraries were constructed for each group and ChIP-seq was carried out (Illumina). For comparative RNA-seq analysis, activated CD4 T cells were incubated with or without survivin inhibitor (YM155) for 24h. State-of-the-art bioinformatics pipelines were applied for NGS data and the survivin-binding peaks were used for comparison with genes, chromatin state annotation and functional gene- and regulatory regions-based functional analysis. Co-localization of peaks in the whole genome and in vicinity of the differentially expressed genes (DEG) was done using ReMap integrated ChIP-seq datasets for all human cells and tissues.

Results: We identified 13 thousands non-overlapping survivin ChIP-peaks (>3000 peaks were present in at least 3 samples). Survivin-bound regions were enriched near the genes and promoters (p=e-30 and p=e-8), which implied that survivin role in transcription could be mediated by known transcription factors. Thus, we analyzed survivin peaks vs binding regions of 1135 transcription regulators (TR) available in ReMap. Potential partner proteins of survivin were selected based on the enrichment of the overlapping peaks in the whole genome and in CD4-active regulatory areas. Both, strict overlaps and location within 10 and 100kb survivin peak vicinity were analyzed. This approach allowed us to select >150 TRs enriched in all tests. The enriched TRs were involved in immunity and RA-relevant pathways including cytokine response and production, JAK-STAT signaling, etc. Among the TRs co-localized with survivin were CHD8, MAX, EP300, BRD2, CTCF and RAD21, all responsible for chromatin architecture. Several TRs were massively enriched in the vicinity of DEGs after survivin depletion including MAX, AR, CTCF, MYC and IRF1. Search for TR binding motifs in survivin peaks supported over-representation of binding sites for IRFs (p=e-5) and several proteins of the bZIP-family (p=e-5).

Conclusion: Analysis of the survivin bound DNA in CD4 cells demonstrated the nonrandom distribution with specific enrichment within the regulatory elements of the genes and co-localization with protein partners to regulate their transcription.

Disclosure of Interests: None declared

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POS0361

DNA METHYLATION SIGNATURES CHARACTERIZE PSORIASIS AND PSORIATIC ARTHRITIS IN MONOZYGOTIC TWINS DISCORDANT FOR THE DISEASE

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Background: Psoriatic disease is a chronic inflammatory disorder spanning from skin disease (psoriasis) to psoriatic arthritis (PsA). The genetic background is insufficient to explain disease onset as illustrated by not very informative Genome Wide Association Studies and monozygotic (MZ) twin studies recently performed. It is strongly assumed that epigenetics may contribute to disease susceptibility modulating gene expression. DNA methylation has been found involved in several autoimmune inflammatory rheumatic diseases. Here we have analysed the DNA methylation profile of a selected cohort of MZ twins discordant for psoriasis/PsA.

Objectives: To identify the methylome associated with psoriasis and PsA in the peripheral blood of MZ twins discordant for these conditions.

Methods: Peripheral blood from 7 couples of MZ twins discordant for psoriatic disease was collected and DNA extracted for a genome-wide evaluation of the DNA methylation profile, with the Infinium MethylationEPIC BeadChip. *Minfi* and the packages of the Bioconductor were used to analyse the data obtained. Quality control and exclusion criteria were applied to the raw data having a final number of 762.451 probes, which accounts for 88% of the total.

Results: The approach first identified 2564 differentially methylated positions (DMPs; *p<0.005) with 19 genes potentially affected (with at least two DMPs within 1 kb of distance), including SMAD3 and SMARCA4/BRG1 involved in the Interferon and TGFβ pathways. Gene Ontology (GO) analysis of DMP-associated genes showed a significant enrichment (*p<0.005) in transcription factor binding, transcription corepressor and transcription coactivator activity, SMAD binding and histone -lysine-N-methyltransferase activity. To further validate the results, 5'-methylcytosine immunoprecipitation (MedIP) followed by Real Time PCR was performed to assess the methylation level of SMAD3 and SMARCA4/BRG1 promoters in the same cohort of MZ twins. We found significantly DNA methylation enrichment in SMARCA4/BRG1 promoter in psoriatic disease twins (p<0.05). SMAD3 and SMARCA4/BRG1 mRNA expression was also assessed to evaluate any inverse correlation with promoter methylation level, on the MZ cohort used for the EPIC array (n=4) and on a cohort of PsA/Ps patients (n=8) and appropriate healthy controls (n=3). Reduced mRNA expression (p<0.05) was demonstrated for SMARCA4/BRG1 (n=4). Conversely, no changes were found for SMAD3.

Conclusion: We report the first DNA methylation approach in MZ twins discordant for psoriatic disease. We believe that the observed changes in SMAD3