similar to those occurring in spondyloarthritis (SpA). Patients with hypermobility and suspected SpA pose a unique challenge owing to the high prevalence of back pain in the hypermobility cohort and the absence of spinal restriction on clinical examination.

Objectives: In this study, we aim to investigate the incidence of MRI SIJ lesions in patients with hypermobility.

Methods: We performed a retrospective study of all patients with a confirmed diagnosis of hypermobility related disorders (including hypermobility syndrome, hypermobility spectrum disorders and Ehlers-Danlos Syndromes) referred for an MRI lumbar spine and SIJ between 2011 and 2019 to investigate long-standing back pain. MRIs were examined by a musculoskeletal (MSK) radiologist with more than 25 years of experience, who was blinded to the clinical outcome of the patients. MRI SIJs were assessed for the presence of bone marrow oedema, subchondral sclerosis, erosion, fatty change, enthesitis, ankylosis, joint fluid and capsulitis.

Results: 51 patients with confirmed hypermobility related disorders were referred for MRI SIJ and lumbar spine between 2011 and 2019. 3 patients demonstrated clinical features in keeping with a diagnosis of SpA and were excluded from the study. 15/48 (31.3%) of patients with hypermobility and back pain (but no clinical picture of SpA) were found to have inflammatory and/or structural lesions on MRI SIJ. The most frequent lesions were small foci of bone marrow oedema (16.6%) followed by subchondral sclerosis (12.5%) and fatty change (10.4%). The incidence of erosions was 4.2%.

Conclusion: There is a relatively high incidence of inflammatory and structural lesions on MRI SIJ of patients with hypermobility. The presence of hypermobility should be taken into consideration when interpreting MRI changes in patients with suspected SpA. Further research into long-term outcomes of MRI SIJs in patients with hypermobility and back pain is required to establish the clinical significance of these findings.

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THU0493 IMPACT OF AGE, GENDER AND EDUCATION LEVEL ON THE CHOICE OF TREATMENT METHOD FOR BACK PAIN AMONG PEOPLE OVER 50 YEARS OF AGE

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Background: According to data collected by the Statistics Poland in 2014, lower back pain is the second most common complaint reported by people over the age of 60 and occurs in about 40% of them. Another 29% of respondents suffer from pain in other spine sections. Treatment of such a common condition can be a challenge due to the multitude of causes of pain, accompanying diseases and the patient's approach to his own health.

Objectives: The aim of the study was to investigate whether factors such as gender, age, level of education and pain severity affect self-chosen methods of treating back pain.

Methods: A survey was conducted on students of Pomeranian Universities Of The Third Age. There were collected socio-demographic characteristics of the participants, features of back pain and detailed information on analgesic methods, including drugs, ointments, exercises and physiotherapy treatments (laser, cryotherapy, hydromassage, ultrasound, heat treatments and other). The responses of participants over the age of 50 were included in the analysis. The answers were divided into groups by age (younger - 50–69 years and older - over 70 years), sex, level of education (lower, medium and higher) and intensity of pain assessed on the VAS scale (<6 and ≥6). The collected data were compared in these groups.

Results: 546 answers were received. 291 respondents were 50–69 years old, 255 aged 70–90 and more, 86% (471) of participants were women. 43% of respondents had secondary education and the same number had higher education. Over 90% (494) declared that they have suffered from back pain. Most of them described pain as chronic (56%), the median pain intensity assessed on the VAS scale was 6 [1–10], and the mean pain intensity was 5.89 ± 1.79. 82.6% of respondents declared doing physical exercises to relieve back pain, 75.9% were using physiotherapy, 60.7% were taking analgesic drugs and 54.3% were using ointments, gels, patches and other local analgesic methods. The higher pain severity was observed in group of females (5.74 vs. 5.61, p=0.002) and people with lower education level (6.52) than in other groups (5.89 and 5.68, p=0.005). Analgesic drugs were taken more often by younger people (66.9% vs. 53.7%, p=0.003), women (62.5% vs. 49.2%, p=0.042), people of lower education level group (80.6% vs. 62.2% secondary education group vs. 52.5% higher education group, p<0.001) and by people with pain severity ≥6 (81.5% vs. 68.9%, p<0.001). Analgesic gels, ointments, patches and other pharmaceuticals were

used more often only in group with higher pain severity (62.9% vs. 43.4%, p<0.001). Performing exercises to relieve pain was more often declared by women (84.4% vs. 70.8%, p=0.003) and people with higher education (85.1% vs. 81.3% secondary education group vs. 79.1% lower education group, p<0.001). The study showed that only in groups with varying intensity of pain there was a significant difference in the frequency of using physiotherapy treatments - 68.9% in group with pain severity <6 vs. 81.5% with pain severity ≥6 (p<0.001).

Conclusion: 1. The severity of pain has the greatest impact on the choice of back pain relief method, but this is not the only important factor.

2. People with lower levels of education and men less often perform physical exercises for treatment regardless of the severity of back pain.

3. In the treatment of back pain, attention should be given to recommending the patient an appropriate analgesic method, which will be easily used and more effective.

References:

Population aged 60+. Demographic structure and health. 2016. Statistics Poland.

Disclosure of Interests: : None declared

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THU0494 BACK PAIN, SPINE OSTEOARTHRITIS AND 'CANDIDATE GENES' POLYMORPHISM

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Background: Low back pain (LBP) and spine osteoarthritis are among the leading health-related causes of disability and reduction in patient quality of life. More recent work suggested that the factors that lead to disc degeneration may have important genetic components. Genetic predisposition has been confirmed by recent findings of associations between degeneration and gene polymorphisms of matrix macromolecules.

Objectives: Evaluation of genetic polymorphisms of genes collagen 1A1 (COL1A1), interleukin 1β (IL-1β), interleukin 6 (IL-6), vitamin D receptor (VDR) in patients with LBP, associated with spine osteoarthritis.

Methods: We examined 33 patients (men-17, women-16, middle age 28, 7±3.77) with LBP end onset, verified by magnetic resonance imaging (MRI) and 15 controls was carried out. Assessed the intensity of pain syndrome on visual analog scale (VAS, mm) and the nature of its current (IASP, 1994). Polymerase chain reaction and restriction fragments length polymorphism was used to detect the polymorphism of COL1A1 (rs 1800012), IL-1 (rs 1143627), IL-6 (rs 1800795), VDR (rs 1544410).

Results: The severity of the pain (VAS) average was 60 mm, all the patients revealed chronic option currents pain syndrome. In 86 % of patients detected changes disc in the form of protrusions and hernias, 17 % of patients had a characteristic reducing the height of the intervertebral disc of lower height disc and osteophytes, arthritis facet joints identified in 20 % of patients in 34% of patients diagnosed changes type Modic II. In 83% of patients with LBP identified homozygous variant allele (GG) Col1A1 gene. The absence of T-alleles in the gene IL 1β in the group of patients was associated with severity of the disease. Carriage of allele in heterozygous AG found in 54% of patients of the main group and was not observed in the control that requires further accumulation of facts. Identified association GG-genotype of IL-6 clinical and instrumental signs of the syndrome Modic-II.

Conclusion: These findings may be the reason for the patient-specific approach to diagnosing and treatment of back pain. It proves the necessity of research of genetic polymorphisms in patients with spine osteoarthritis.

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Basic and translational science in paediatric rheumatology

THU0495 NOVEL UNDERSTANDING OF THE PATHOGENESIS OF JUVENILE IDIOPATHIC ARTHRITIS: FOCUS ON MESENCHYMAL STEM CELLS IMPAIRMENT, SENESCENCE AND IMMUNOREGULATORY FUNCTION

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Background: Juvenile idiopathic arthritis (JIA) is a well-known chronic rheumatic disease of childhood characterised by progressive joint destruction and severe systemic complications.

Immune cells are known to trigger the pathophysiological cascade in JIA, but there is little information regarding the contribution made by Mesenchymal stem cells (MSCs). These cells are able to modulate the immune response and decrease the level of pro-inflammatory cytokines. With addition of regenerative property it makes MSCs potential candidates for clinical application as immunosuppressants in treatment of autoimmune diseases.

Objectives: To investigate MSCs proliferation, viability and immunomodulatory function in JIA and healthy children.

Methods: MSCs were separated from peripheral blood (PB) and synovial fluid (SF) of JIA patients and healthy controls. Cell proliferation rate was counted by Population doublings per day (PDD) during 9 days, in the last of which alamarBlue™ assays were performed to assess cell viability. Due to measure senescence MSCs were stained with SA-β-galactosidase. Immunofluorescence was used to examine the expression of p16, p21, p53. Oxidative stress was measured with DCFH-DA. Cell cycle analysis was evaluated with Propidium Iodide and analysed by Accuri® C6 Flow Cytometer.

Commercially-available bone marrow mesenchymal stem cells (BM-MSCs) were treated with graded concentrations of pro-inflammatory cytokines (0.1-100 ng/ml) with following examination of cell viability. Mixed lymphocyte reactions (MLR) were performed to measure MSC immunomodulatory ability *in vitro*.

Results: The growth kinetics of JIA-MSCs were different from healthy controls. JIA-MSCs divided slowly and appeared disorganised with large cytoplasm and loads of outgrowth. They demonstrated a decrease in cell proliferation (negative PDD) and metabolic activity. Difference in growth kinetics and metabolic activity were found inside the JIA PB group with some evidence of response following biological treatment. Thus, PB-MSCs from patients treated with TNF α and anti-IL6 medications had notably higher cell proliferation and metabolic activity against JIA patients received other therapy. Considering this difference, it was hypothesised that cytokines obtained in a high amount in PB and SF of JIA patients may influence MSCs viability. To prove this BM-MSCs were treated with cytokines and demonstrated a dose-dependent decrease in metabolic activity significantly after TNF α and IL1, no significantly after treatment with IL6. Both BM-MSCs treated with cytokines and JIA-MSCs displayed high level of reactive oxygen species.

Cell cycle analysis revealed that JIA-MSCs were arrested in G0/G1 phase with low number of mitotic cells. In addition, the number of senescence-associated SA-β-gal-positive cells was notably higher in JIA-MSCs. Furthermore, JIA-MSCs expressed high level of immunofluorescence for p16, p21 and p53 which played an important role in regulating the senescence progress of MSCs.

Results of MLR showed the ability of BM-MSCs to decrease the percentage of activated T-helpers, T-suppressors, B-cells and natural killers proliferation, while JIA-MSCs lost this property.

Conclusion: Taken together current research has demonstrated that under the influence of proinflammatory cytokines JIA-MSCs suffered from oxidative stress and disruption of metabolic activity acquire senescent morphology, shorten of telomere length, arrest in G0 phase of cell cycle and finally loss of immune regulation. We are continuing our research to determine the mechanisms that are responsible for the impaired phenotype with the aim of identifying new therapeutic strategies for the treatment of JIA.

Disclosure of Interests: : None declared

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THU0496 APPLICATION OF SYSTEMS BIOLOGY-BASED IN SILICO TOOLS TO OPTIMIZE TREATMENT STRATEGY IN STILL'S DISEASE

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Background: Systemic Juvenile Idiopathic Arthritis (sJIA) and Adult Onset Still's Disease (AOSD) are manifestations of an autoinflammatory disorder with complex pathophysiology and significant morbidity, together also termed Still's disease.

Objectives: To investigate the optimal treat-to-target strategy for Still's disease by *in silico* models based on systems biology.

Methods: Molecular characteristics of Still's disease and data on biological inhibitors of interleukin (IL)-1 (anakinra, canakinumab), IL-6 (tocilizumab, sarilumab), glucocorticoids as well as conventional disease-modifying anti-rheumatic drugs (DMARDs, methotrexate) were used to construct *in silico*

mechanisms of action (MoA) models by means of Therapeutic Performance Mapping System technology (TPMS). TPMS combines artificial neuronal networks (ANN), sampling-based methods and artificial intelligence. The models were validated with publicly available expression data from sJIA patients (Fig.1).

Figure 1. Schematic TPMS approach used to evaluate the Still's disease treatments efficacy and their MoA

Results: Biologicals demonstrated more pathophysiology-directed efficiency than non-biological drugs. IL-1 blockade mainly acts on the innate immune system, while IL-6 signaling blockade has a weaker activity on the innate immunity and rather affects the adaptive immunity (Table 1). The MoA models showed that the IL-1 β inhibitor canakinumab is more efficient than the IL-6 receptor inhibiting antibody tocilizumab in the autoinflammatory/systemic phases of Still's disease. MoA models reproduced 67% of the information obtained from expression data (Fig.2).

Figure 2. Systems biology-based MoA models of canakinumab and tocilizumab focused on innate immune system modulation. Canakinumab preferably modulates NF- κ B, IL-8 (CXCL8), MyD88, S100A9 and ATG5, which are involved in processes of general innate immune inflammation, neutrophil recruitment, activation and autophagy, whereas tocilizumab preferably modulates FCGR1, which is involved in neutrophil activation

Conclusion: Systems biology-based modelling supported the preferred use of biologics as immunomodulatory treatment strategy for Still's disease. This further encourages early IL-1 β blockade in initial autoinflammatory/systemic phases of Still's Disease to prevent the development of disease or drug-related complications. Further studies are needed to determine the optimal timeframe of the window of opportunity for canakinumab treatment.