This Week in Rheumatology - 2024-11-03

This Week in Rheumatology

Other Rheumatic Diseases

The latest research in Other Rheumatic Diseases encompasses a broad spectrum of advancements, from diagnostic tools to novel therapeutic strategies. In the realm of autoimmune haemolytic anaemias (AIHAs), recent studies have elucidated the mechanisms behind the production of autoantibodies targeting red blood cell autoantigens, leading to their accelerated destruction. This understanding is crucial for developing targeted therapies. Meanwhile, telemedicine has been shown to be a valuable tool in pediatric rheumatology, with the Turkish translation of the video pediatric gait, arms, legs, and spine (v-pGALS) examination proving to be an accurate and practical method for evaluating musculoskeletal (MSK) problems in children. In the treatment of severe Behcet's syndrome, a randomized trial demonstrated that infliximab had a superior complete response rate and fewer adverse events compared to cyclophosphamide, highlighting the potential of biologic therapies in managing this condition. For fibromyalgia, research has uncovered significant alterations in muscle oxygen saturation, which may contribute to the chronic pain and fatigue experienced by patients. These findings suggest that therapeutic strategies targeting muscle oxygenation could offer new avenues for symptom relief. Additionally, a novel CAR T cell therapy targeting myelin oligodendrocyte glycoprotein (MOG) is being developed for multiple sclerosis, representing a promising approach to treating this autoimmune disease. Imaging modalities, such as MRI and ultrasound, have also shown promise in diagnosing and managing myositis and juvenile idiopathic arthritis (JIA), providing more sensitive and detailed evaluations of disease activity and damage. Finally, the role of somatic mutations in the pathogenesis of autoinflammatory and autoimmune diseases has emerged as a significant area of research, with these mutations being linked to both early- and late-onset rheumatic monogenic diseases and complex inflammatory conditions. Together, these studies underscore the importance of multidisciplinary approaches in advancing the diagnosis and treatment of Other Rheumatic Diseases.

References

- Autoimmune haemolytic anaemias. by Michel M, Crickx E, Fattizzo B, Barcellini W. Nature reviews. Disease primers. PMID: 39487134
- Telemedicine in pediatric rheumatology: the video pediatric gait, arms, legs, and spine (v-pGALS) examination. by Balik Z, Sener S, Bayindir Y, Kasap Cuceoglu M, Aliyev E, Basaran O, Bilginer Y, Ozen S, Batu ED. Turkish journal of medical sciences. PMID: 39473760
- Infliximab versus Cyclophosphamide for Severe Behcet's Syndrome. by Saadoun D, Maalouf G, Vieira M, Trad S, Lazaro E, Sacre K, Plessier A, Sene T, Kone-Paut I, Noel N, Mekinian A, Lambert M, Ribeiro E, Mirault T, Mele N, Dellal A, Fain O, Melki I, Chiche L, Gaudric J, Redheuil A, Maillart E, Ghembaza A, Desbois AC, Mirouse A, Domont F, Leroux G, Ferfar Y, Rigolet A, Viallard JF, Vautier M, Resche-Rigon M, Cacoub P. NEJM evidence. PMID: 39437137
- Unveiling the link: exploring muscle oxygen saturation in fibromyalgia and its implications for symptomatology and therapeutic strategies. by Rubio-Zarapuz A, Parraca JA, Tornero-Aguilera JF, Clemente-Suarez VJ. Medical gas research. PMID: 39436169
- MOG-specific CAR Tregs: a novel approach to treat multiple sclerosis. by Frikeche J, David M, Mouska X, Treguer D, Cui Y, Rouquier S, Lecorgne E, Proics E, Fall PB, Lafon A, Lara G, Menardi A, Fenard D, Abel T, Gertner-Dardenne J, de la Rosa M, Dumont C. Journal of neuroinflammation. PMID: 39428507

- Imaging Modalities in Myositis: A Clinical Review. by Yoshida T, Albayda J. Rheumatic diseases clinics of North America. PMID: 39415372
- Imaging in Juvenile Idiopathic Arthritis. by Avar-Aydin PO, Ting TV, Vega-Fernandez P. Rheumatic diseases clinics of North America. PMID: 39415371
- Somatic mutations in autoinflammatory and autoimmune disease. by Torreggiani S, Castellan FS, Aksentijevich I, Beck DB. Nature reviews. Rheumatology. PMID: 39394526

Osteoarthritis

Recent research in osteoarthritis (OA) has uncovered several promising therapeutic approaches and mechanisms that could lead to improved treatments. One study demonstrated that mitochondrial transfer from mesenchymal stem cells (MSCs) can reverse metabolic dysfunction in OA chondrocytes, restoring energy status and mitochondrial dynamics, and conferring resistance to oxidative stress and apoptosis. This treatment was effective in a collagenase-induced OA mouse model, suggesting a potential new approach for OA therapy. Another study compared total hip replacement (THR) to resistance training in patients with severe hip OA, finding that THR resulted in a clinically significant reduction in hip pain and improved hip function. Additionally, a clinical trial of once-weekly injectable semaglutide in patients with obesity and knee OA showed significant reductions in body weight and knee pain compared to placebo, highlighting the potential of this treatment for managing OA in obese individuals. On the mechanistic front, researchers have identified that PARP12 inhibits mitophagy and promotes OA progression, while IGF1, driven by Wnt signaling, is a major contributor to joint damage. These findings suggest that targeting these pathways could be beneficial in OA treatment. Furthermore, a double-blind randomized controlled trial found that the presence of leukocytes in platelet-rich plasma (PRP) injections did not affect their safety or efficacy in treating knee OA, providing clarity on the optimal composition of PRP for OA therapy. Another study highlighted the significant impact of severe knee pain and depression on physical function, emphasizing the need for a holistic approach to OA management. Lastly, partial excision of the infrapatellar fat pad was shown to reduce pain, improve function, and promote cartilage health in knee OA patients, offering a surgical option for symptom relief. These studies collectively advance our understanding of OA and provide a range of potential therapeutic strategies, from mitochondrial transfer and pharmacological interventions to surgical techniques.

References

- Mitochondrial transfer balances cell redox, energy and metabolic homeostasis in the osteoarthritic chondrocyte preserving cartilage integrity. by Court AC, Vega-Letter AM, Parra-Crisostomo E, Velarde F, Garcia C, Ortloff A, Vernal R, Pradenas C, Luz-Crawford P, Khoury M, Figueroa FE. Theranostics. PMID: 39479450
- Total Hip Replacement or Resistance Training for Severe Hip Osteoarthritis. by Frydendal T, Christensen R, Mechlenburg I, Mikkelsen LR, Varnum C, Graversen AE, Kjaersgaard-Andersen P, Revald PH, Hofbauer C, Bieder MJ, Qassim H, Munir MS, Jakobsen SS, Nielsen SM, Ingwersen KG, Overgaard S. The New England journal of medicine. PMID: 39476341
- Once-Weekly Semaglutide in Persons with Obesity and Knee Osteoarthritis. by Bliddal H, Bays H, Czernichow S, Udden Hemmingsson J, Hjelmesaeth J, Hoffmann Morville T, Koroleva A, Skov Neergaard J, Velez Sanchez P, Wharton S, Wizert A, Kristensen LE. The New England journal of medicine. PMID: 39476339
- IRF1-mediated upregulation of PARP12 promotes cartilage degradation by inhibiting PINK1/Parkin dependent mitophagy through ISG15 attenuating ubiquitylation and SUMOylation of MFN1/2. by Deng Z, Long D, Li C, Liu H, Li W, Zhong Y, Mo X, Li R, Yang Z, Kang Y, Mao G. Bone research. PMID: 39465252
- IGF1 drives Wnt-induced joint damage and is a potential therapeutic target for osteoarthritis. by Escribano-

Nunez A, Cornelis FMF, De Roover A, Sermon A, Cailotto F, Lories RJ, Monteagudo S. Nature communications. PMID: 39448593

- Leukocytes Do Not Influence the Safety and Efficacy of Platelet-Rich Plasma Injections for the Treatment of Knee Osteoarthritis: A Double-Blind Randomized Controlled Trial. by Romandini I, Boffa A, Di Martino A, Andriolo L, Cenacchi A, Sangiorgi E, Orazi S, Pizzuti V, Zaffagnini S, Filardo G. The American journal of sports medicine. PMID: 39394763
- Influence of Knee Osteoarthritis Severity, Knee Pain, and Depression on Physical Function: A Cross-Sectional Study. by Sonobe T, Otani K, Sekiguchi M, Otoshi K, Nikaido T, Konno S, Matsumoto Y. Clinical interventions in aging. PMID: 39385993
- Unravelling the interplay between ER stress, UPR and the cGAS-STING pathway: Implications for osteoarthritis pathogenesis and treatment strategy. by Soh LJ, Lee SY, Roebuck MM, Wong PF. Life sciences. PMID: 39378929
- Partial excision of infrapatellar fat pad for the treatment of knee osteoarthritis. by Liu Y, Gao Q. Journal of orthopaedic surgery and research. PMID: 39375685

Rheumatoid Arthritis

Recent research in rheumatoid arthritis (RA) has explored various aspects of the disease, from treatment changes and molecular mechanisms to patient engagement and remote monitoring. A single-center retrospective observational study in Japan investigated the incidence and reasons for changes in biological and targeted synthetic disease-modifying antirheumatic drugs (b/tsDMARDs) in RA patients, identifying predictors of treatment change. Another study delved into the role of cytoplasmic DNA and the AIM2 inflammasome in RA, highlighting their origins and potential downstream effects. A stepped wedge cluster randomized trial is currently evaluating the effectiveness and cost-effectiveness of integrated symptom tracking in RA patients, along with factors for successful implementation. Additionally, a mixed-methods study found that a patient-facing electronic health record (EHR) dashboard improved patient understanding of RA, enhanced patient-clinician communication, and increased patient engagement in care. On the molecular front, research has shown that G protein-coupled receptor 40 (GPR40) deficiency in B cells leads to increased activation, proliferation, and antibody production, contributing to the pathogenesis of RA. Lastly, a review article discussed the role of cGAS-STING signaling in RA, suggesting potential therapeutic targets for future treatments.

References

- Reasons and Predictors of Treatment Change in Rheumatoid Arthritis Patients Treated with Biological and Targeted Synthetic Disease-Modifying Antirheumatic Drugs: A Single-Center Retrospective Observational Study. by Nakagawa C, Ota R, Hirata A, Yokoyama S, Uno T, Hosomi K. Biological & pharmaceutical bulletin. PMID: 39477469
- Cytoplasmic DNA and AIM2 inflammasome in RA: where they come from and where they go? by Xu C, Jing W, Liu C, Yuan B, Zhang X, Liu L, Zhang F, Chen P, Liu Q, Wang H, Du X. Frontiers in immunology. PMID: 39450183
- Remote monitoring of rheumatoid arthritis (REMORA): study protocol for a stepped wedge cluster randomized trial and process evaluation of an integrated symptom tracking intervention. by van der Veer SN, Griffiths-Jones D, Parkes M, Druce KL, Amlani-Hatcher P, Armitage CJ, Bansback N, Bower P, Dowding D, Ellis B, Firth J, Gavan S, Mackey E, Sanders C, Sharp CA, Staniland K, Dixon WG. Trials. PMID: 39407290
- Patient perceptions of an electronic-health-record-based rheumatoid arthritis outcomes dashboard: a mixed-methods study. by Nasrallah C, Wilson C, Hamblin A, Hariz C, Young C, Li J, Yazdany J, Schmajuk G. BMC medical informatics and decision making. PMID: 39395970
- Critical role of G protein-coupled receptor 40 in B cell response and the pathogenesis of rheumatoid

arthritis in mice and patients. by Li A, Wang X, Li J, Li X, Wang J, Liu Y, Wang Z, Yang X, Gao J, Wu J, Sun T, Huo L, Yi Y, Shen J, Cai J, Yao Y. Cell reports. PMID: 39392754
- The role of cGAS-STING signaling in rheumatoid arthritis: from pathogenesis to therapeutic targets. by Zhu Q, Zhou H. Frontiers in immunology. PMID: 39386207

Systemic Lupus Erythematosus

Systemic Lupus Erythematosus (SLE) is a complex autoimmune disorder characterized by dysregulated immune responses and autoantibody production, affecting multiple organs with varying clinical presentations and disease severity. Recent research has shed light on several key aspects of SLE pathogenesis and potential therapeutic targets. One study highlights the role of CD44 in renal parenchymal inflammation and fibrosis in active lupus nephritis (LN), suggesting that monitoring CD44 levels could facilitate early diagnosis and management of LN flares. Another study investigates the immunometabolic mechanisms of LANCL2 in CD4+ T cells and phagocytes, demonstrating that the investigational drug NIM-1324, which targets the LANCL2 pathway, can modulate CD4+ T cell differentiation and phagocyte activation, potentially offering a new therapeutic approach for SLE. Additionally, a novel multi-miRNA detection platform using target-triggered locked hairpin DNA-functionalized Au nanoprobes has been developed for the diagnosis and classification of SLE, providing a promising tool for early and accurate detection of the disease.

References

- Systemic lupus erythematosus: pathogenesis and targeted therapy. by Su X, Yu H, Lei Q, Chen X, Tong Y, Zhang Z, Yang W, Guo Y, Lin L. Molecular biomedicine. PMID: 39472388
- Cluster of differentiation-44 as a novel biomarker of lupus nephritis and its role in kidney inflammation and fibrosis. by Wong CCY, Gao LY, Xu Y, Chau MKM, Zhang D, Yap DYH, Ying SKY, Lee CK, Yung S, Chan TM. Frontiers in immunology. PMID: 39411720
- Immunometabolic Mechanisms of LANCL2 in CD4+ T Cells and Phagocytes Provide Protection from Systemic Lupus Erythematosus. by Leber A, Hontecillas R, Tubau-Juni N, Fitch SN, Bassaganya-Riera J. Journal of immunology (Baltimore, Md. : 1950). PMID: 39365106
- Simultaneous Multi-miRNA Detection in Urinary Small Extracellular Vesicles Using Target-Triggered Locked Hairpin DNA-Functionalized Au Nanoprobes for Systemic Lupus Erythematosus Diagnosis. by Chen X, Xiang Q, Yan S, Wang Y, Su N, Yang X, Gao M, Zhang X. Analytical chemistry. PMID: 39363542

Biologics

The latest research on biologics in the treatment of rheumatoid arthritis (RA) highlights a significant association between disease response and improvements in paraoxonase-1 (PON1) activity and oxylipins. A study by Razmjou et al. (2023) examined the effects of four different biologic therapies and found that enhanced PON1 activity was consistently linked with better disease outcomes. PON1 is an enzyme known for its antioxidant and anti-inflammatory properties, and its increased activity is particularly noteworthy for its potential implications on cardiovascular safety. This finding suggests that the therapeutic benefits of biologics in RA may extend beyond reducing joint inflammation to include protective effects against cardiovascular complications, a common comorbidity in RA patients. These results underscore the importance of further research to explore the mechanisms by which biologics influence PON1 activity and to determine how these findings can be translated into improved treatment strategies and patient outcomes.

References

- Disease response in rheumatoid arthritis across four biologic therapies associates with improvement in

paraoxonase-1 activity and oxylipins. by Razmjou AA, Kremer JM, Pappas DA, Curtis JR, Wang J, Shahbazian A, Elashoff DA, Guo R, Meriwether D, Sulaiman D, O'Connor E, Reddy ST, Charles-Schoeman C. RMD open. PMID: 39461874

Vasculitis

Recent research in vasculitis has shed light on both the management of coronary artery diseases and the use of biologics in treating specific conditions. In the paper 'Management of Coronary Artery Diseases in Systemic Vasculitides: Complications and Strategies,' Shumnalieva et al. emphasize the significant risk that coronary artery disease poses to patients with systemic vasculitides, a group of disorders characterized by blood vessel inflammation. The authors discuss the complications associated with these conditions and provide strategies for their management, highlighting the need for a multidisciplinary approach to improve patient outcomes. Complementing this, Ezekwe et al. in 'Biologics in Hypereosinophilic Syndrome and Eosinophilic Granulomatosis with Polyangiitis' explore the use of biologics in treating hypereosinophilic syndrome (HES) and eosinophilic granulomatosis with polyangiitis (EGPA). Historically, systemic glucocorticoids have been the primary treatment, but the advent of biologics that target eosinophils has opened new avenues for more effective and less toxic therapies. The authors provide a comprehensive review of the evidence supporting the use of these biologics, offering a framework for their clinical application. Together, these studies underscore the importance of tailored and innovative approaches in managing vasculitis, aiming to reduce complications and improve patient quality of life.

References

- Management of Coronary Artery Diseases in Systemic Vasculitides: Complications and Strategies. by Shumnalieva R, Mileva N, Padjen I, Siliogkas P, Chervenkov L, Bakopoulou K, Kaouri IE, Vasilska A, Miteva D, Vassilev D, Velikova T. Medicina (Kaunas, Lithuania). PMID: 39459361
- Biologics in Hypereosinophilic Syndrome and Eosinophilic Granulomatosis with Polyangiitis. by Ezekwe E, Weskamp AL, Pittman LM, Klion AD. Immunology and allergy clinics of North America. PMID: 39389714

Scleroderma

The latest research on Scleroderma, particularly focusing on calcinosis in systemic sclerosis (SSc), provides valuable molecular and clinical insights. Dystrophic calcinosis, characterized by the accumulation of insoluble calcified crystalline materials within tissues despite normal circulating calcium and phosphorus levels, is a frequent and burdensome finding in SSc patients. The study by Avanoglu Guler et al. delves into the pathogenesis of this condition, revealing that it involves complex molecular mechanisms. These mechanisms include alterations in calcium and phosphate metabolism, inflammation, and fibrosis, which collectively contribute to the formation of calcified deposits. Understanding these processes is crucial for developing targeted therapies to alleviate the symptoms and improve the quality of life for SSc patients. The findings also highlight the need for further research to explore the interplay between these molecular pathways and the broader pathogenesis of Scleroderma.

References

- Unraveling the Pathogenesis of Calcinosis in Systemic Sclerosis: A Molecular and Clinical Insight. by Avanoglu Guler A, De Luca G, Dagna L, Matucci-Cerinic M, Campochiaro C. International journal of molecular sciences. PMID: 39457038

Sjogren's Disease

Recent research has shed light on the role of CD45RB(+) naive mature B cells (NA RB+ B cells) in Sjogren's disease. A study by Boudigou et al. identified these cells as a distinct subset of mature naive B cells that can differentiate into plasmablasts and secrete IgM, contributing to local immune responses. This finding is significant because it provides new insights into the immune mechanisms underlying Sjogren's disease, particularly the involvement of specific B cell subsets in the pathogenesis of the disease. Understanding these mechanisms could lead to the development of more targeted therapeutic strategies for managing Sjogren's disease.

References

- Phenotypic, transcriptomic, and spatial characterization of CD45RB(+) naive mature B cells: Implications in Sjogren's disease. by Boudigou M, Frutoso M, Hemon P, Le Dantec C, Chatzis L, Devauchelle V, Jamin C, Cornec D, Pers JO, Le Pottier L, Hillion S. Clinical immunology (Orlando, Fla.). PMID: 39393568

Immunology

Recent research in Immunology has shed light on the critical role of Th17 cells in the thymus and their migration to the skin, a process mediated by the S1PR1 receptor. Engesser et al. (2023) demonstrated that S1PR1 is essential for the trafficking of Th17 cells from the thymus to the skin, both in healthy individuals and in those with autoimmune diseases. This finding underscores the significance of S1PR1 in the pathogenesis of skin-related autoimmune conditions, suggesting that targeting this receptor could be a potential therapeutic strategy. The study highlights the intricate relationship between the thymus and the skin in the context of immune regulation and autoimmune disease, providing new insights into the mechanisms underlying these conditions.

References

- S1PR1 mediates Th17 cell migration from the thymus to the skin in health and disease. by Engesser J, Wang H, Kapffer S, Kaffke A, Peters A, Paust HJ, Geissen M, Krebs CF, Panzer U, Asada N. Frontiers in immunology. PMID: 39380990