Commentary

Immunopharmacology Sessions at the 19th World Congress of Basic & Clinical Pharmacology 2023

From the International Union of Basic and Clinical Pharmacology (IUPHAR) Immunopharmacology Committee

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The aim of the Immunopharmacology Committee of the International Union of Basic and Clinical Pharmacology (IUPHAR) (https://iuphar.org/sections-subcoms/immunopharmacology/) is to promote global collaboration and stimulating research in basic and clinical immunopharmacology world-wide. The Committee organised and chaired four sessions at the 19th World Congress of Basic and Clinical Pharmacology (WCP2023), held at the Scottish Events Campus (SEC) in Glasgow, from 2-7 July 2023, with over 2,000 delegates in attendance. The sessions featured innovative and advanced research on immune-modulating drugs ranging from allergic to infection and inflammatory diseases, with contributions from renowned speakers from top universities across four continents.

The first session "Study, development and rational use of immunopharmacological agents" was co-chaired by Professor Pasquale Maffia (University of Glasgow, United Kingdom), Chair of the Immunopharmacology Committee, and Professor Francesca Levi-Schaffer (Hebrew University of Jerusalem, Israel), IUPHAR President-Elect. Professor Alberto Mantovani (Humanitas University, Italy) started the discussion by explaining how a better understanding of the role of tumour-associated macrophages has changed immunotherapy, and how macrophage-centred therapeutic approaches may contribute to further development in the field [1]. Professor Pasquale Maffia discussed the importance of immune mechanisms in atherosclerosis and the need to continuously search for novel immuno-pharmacological targets for the treatment of cardiovascular diseases [2]. Dr Lucy MacDonald (University of Glasgow) presented how macrophages play a crucial role in rheumatoid arthritis, and how the targeting of distinct synovial tissue macrophages subsets may help remission [3]. Lastly, Professor Peder Olofsson (Karolinska Institutet, Sweden) gave an insight into how neuronal regulation of the immune system could represent a promising way to target inflammation, potentially using bioelectronic medicine [4]. Overall, the session demonstrated how a better integration between all researchers and clinicians working in the fields of immunology, pharmacology, drug discovery, and device development is strongly required for accelerating the study, development and rational use of immune-specific therapies.

The second session “Immune system modulating drugs: Where are we?” was co-chaired by Professor Ekaterini (Katerina) Tiligada (National and Kapodistrian University of Athens, Greece) and Dr Hong Yong Peh (Brigham and Women’s Hospital and Harvard Medical School, USA). Professor Tiligada provided a critical overview of the interplay between histamine and different components of the immune response. A comprehensive understanding of histamine's complex role in health and disease is the key to uncovering new therapeutic approaches in histamine targeting [5]. Professor Carlo Riccardi (University of Perugia, Italy) reviewed the role of glucocorticoids (GCs) in immune regulation. GCs are the election treatment for several inflammatory-mediated diseases; however, they present several side effects. More studies are necessary for a better understanding of their epigenetic and transcriptional mechanisms and their role in inducing anti- or pro-inflammatory effects [6]. The session moved on to understanding how the modulation of lipid-based mediators can lead to the resolution of inflammation. Dr Peh demonstrated that the boost of the super-family of lipid mediators known as specialized pro-resolving mediators (SPMs) can promote the resolution of allergen-induced lung inflammation. The session concluded with a presentation by Professor Mauro Teixeira (Universidade Federal de Minas Gerais, Brazil), whose research is focusing on pro-resolving mediators such as lipids and peptides, and how these molecules may be useful for the treatment of various chronic inflammatory diseases and infections [7]. Overall, the talk highlighted the promising role of pro-resolving mediators, offering a valuable alternative or combinational therapy to conventional drugs that are immunosuppressive with a plethora of unwanted side effects.

The Session “Asthma: New therapeutic avenues” was co-chaired by Professor Stephen Holgate (University of Southampton, United Kingdom) and Professor Bruce Levy (Brigham and Women’s Hospital and Harvard Medical School, USA). Professor Holgate started the session by presenting the background of asthma dating back to 1860, and the timeline of therapies including inhaled bronchodilators, inhaled corticosteroids, oral leukotriene modulating agents, and recently discovered type 2 biologics targeting IL-4, IL-5, and IL-13. Asthma starts in early childhood and understanding how trained immunity or innate immunity

could be harnessed for therapeutic utility could be transformative in terms of future therapies [8]. Dr Emily Swindle (University of Southampton) shared how structural epithelial cells form a protective barrier against inhaled particulates and pathogens to maintain homeostasis. The epithelium and fibroblast form an epithelial mesenchymal-trophic unit (EMTU) to coordinate responses to environmental stimuli, and the dysregulation of EMTU plays a role in asthma pathogenesis. Dr Amandah Necker-Brown (University of Calgary, Canada) presented how glucocorticoids only partially repressed IκB kinase (IKK)-ε expression, resulting in a new panel of inflammatory genes potentiating inflammation in asthma. The inhibition of IKKε may represent a therapeutic target in glucocorticoid-resistant diseases. Professor Levy discussed how SPMs are agonists for the resolution of lung inflammation with specificity to receptors to transduce cell-type specific responses. SPMs displayed bronchoprotective, anti-inflammatory and pro-resolving bioactions that can target airway epithelial cells as well as innate and adaptive leukocytes [9]. Finally, Professor Levi-Schaffer's (The Hebrew University of Jerusalem) talk focused on the mast cell-eosinophil interaction that results in increased eosinophilia and mast cell survival, creating a positive feedback loop for inflammation in asthma and allergy. Targeting CD300a and Siglec-7 may have potential anti-inflammatory and pro-resolution properties, similarly for resolvin D1 in orchestrating the downregulation of mast cell and eosinophil functions [10]. Overall, a better understanding of type 2 and non-T2 inflammation can stratify patients to receive more precise medications to provide symptomatic relief, and eventually lead to complete resolution of asthma and allergy.

The last session "Spotlights on emerging immunopharmacology for controlling rheumatic and allergic diseases" was chaired by Professor Masaru Ishii (Osaka University, Japan). Professor Stefan Siebert (University of Glasgow) started the session by discussing recent advances in therapeutics for chronic inflammatory rheumatic conditions. Despite these advances, recent treatments only have a partial response with remission elusive for several patients. He concluded his talk by suggesting research areas to focus on to discover novel therapies [11]. Professor Ishii shared the background and development of intravital optical microscopy for visualising in situ the behaviour of a diversity of living cells within intact tissues and organs,

and the pharmacological actions of new drugs in arthritis [12]. Professor Adriano Rossi's (University of Edinburgh, United Kingdom) talk focused on the resolution of inflammation in acute lung injury and rheumatoid arthritis by targeting neutrophils and eosinophils with cyclin-dependent kinase inhibitors. These inhibitors decreased eosinophil longevity, induced granulocyte apoptosis, and promote clearance of apoptotic cells via efferocytosis [13]. Finally, Professor Kazuyo Moro (Osaka University) discussed the contribution of Group 2 innate lymphoid cells (ILC2s) in ulcerative colitis. In their appendectomy mouse model, type 2 cytokines were increased in an IL-25-dependent manner. The ablation of colitis in IL-25 knockout mice was reversed with IL-25 administration [14].

In summary, WCP2023 was a wonderful and data-intensive conference. Immunopharmacology was largely represented in the four sessions organised by the IUPHAR Immunopharmacology committee, as well as other sessions at the meeting and keynote lectures. We are looking forward to the next meeting in 2026 in Melbourne and any advances that may have been ignited from the topics discussed at the these sessions.

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