Immunology News

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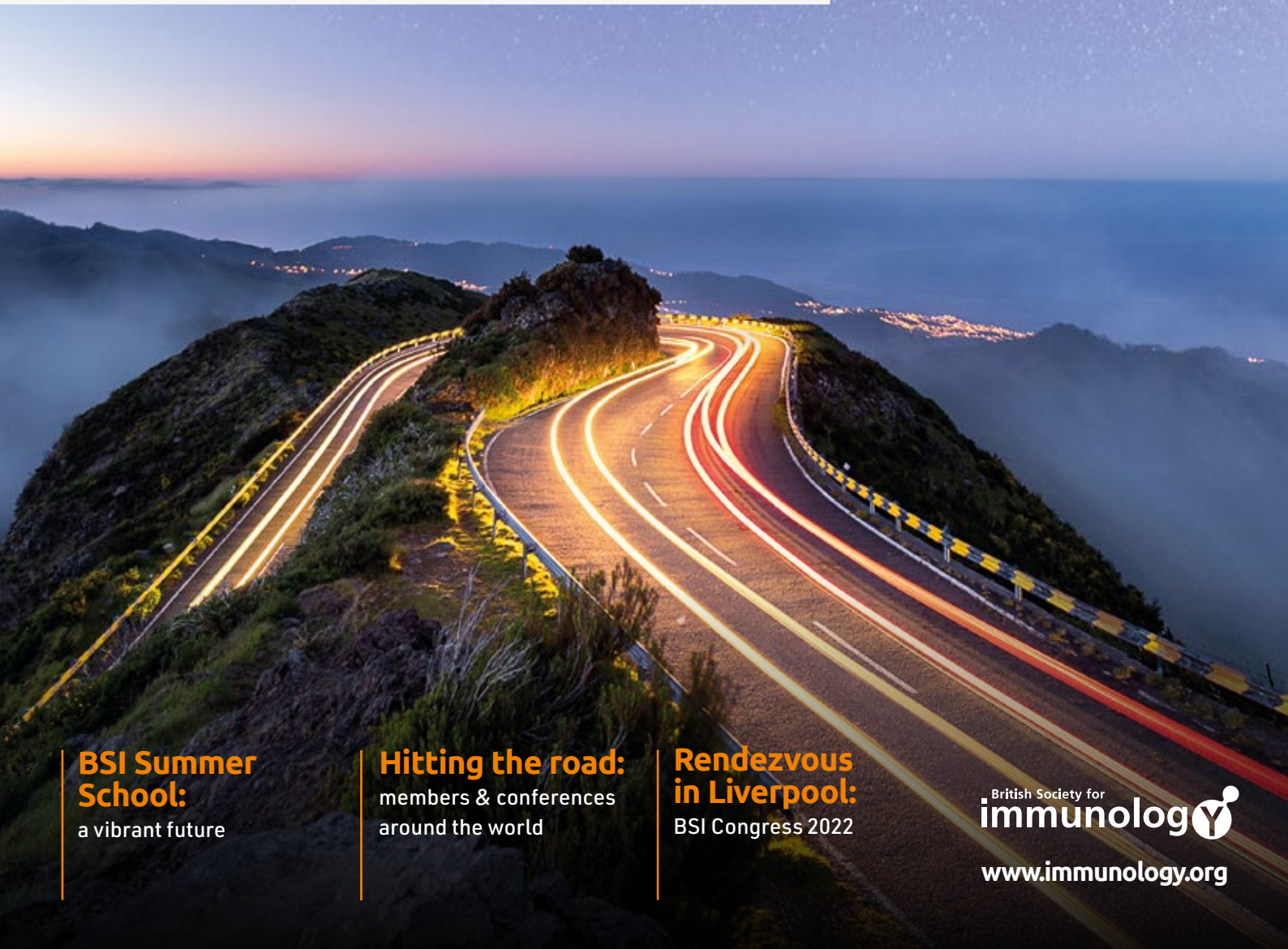
Rising stars:

the emerging generation of immunologists



BSI Summer School:
a vibrant future

Hitting the road:
members & conferences around the world

Rendezvous in Liverpool:
BSI Congress 2022

British Society for immunology
www.immunology.org

Welcome to the autumn issue of *Immunology News*. Over the past few months we have continued to work hard for and with our wonderful members. We are committed to creating and supporting our diverse immunology community, with people working in different sectors and career stages. With this in mind, we recently expanded our membership categories, striving to provide better and more relevant support to each and every one of you. Please take a look at page 5 to find out more and don't hesitate to contact our friendly membership team who'd be more than happy to tell you more about the benefits you get as part of the BSI community.

One of those key benefits is the lower rates to register for our flagship conference – BSI Congress. Congress is the high point of the year for us in the staff team – and we know for a lot of our members – so we hope to see many of you in Liverpool at the end of the year! In this issue, we showcase some of the highlights of our upcoming Congress, as well as look back with our Bright Spark in Immunology 2021 winners sharing their amazing research with us.

We also have a range of must-read articles from our members, including a perspective from an international BSI member, a piece from ECRs traveling to a conference abroad and a unique public engagement event.

We are always keen to hear from you so if there are any topics you want us to discuss, please share them with us.

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VIEW FROM …

THE CHIEF EXECUTIVE

Welcome to this issue of *Immunology News*, we do hope you enjoyed your summer and managed to fit in a well-deserved break! We have an action-packed issue for you to read with lots to update you on and some important notices too.

Firstly, our BSI Congress 2022 is fast approaching, and we are looking forward to seeing as many of you as possible in Liverpool later this year! It is great to see so many of you already registered and having submitted your abstracts, but please do not forget that time is ticking for you to benefit from early bird registration and to submit your application for a travel grant (more information on page 6). It is shaping up to be another incredible event with fantastic science and endless opportunities to network with others – you will not want to miss it!

We have also recently launched our new membership categories (page 5). We undertook the full review because our membership has been growing significantly and we want to continue to have a membership structure and offer that is fully inclusive and representative of the broad immunology sector. I hope you will agree that the changes we have made are a positive step forward and enable us to provide you all with tailored benefits that will best support you in your roles.

One area that we are currently focusing on is to get a better understanding of the career paths within immunology as well as some of the challenges out there. To this end we are embarking on developing a new careers report and, to help inform our findings and recommendations, we need your views! In the coming weeks we will be launching a careers survey and we would like you all to respond – the more respondents we have, the better our recommendations and future work on careers will be.

I also want to point out that if you want some top tips on peer review, then do turn to page 10. The new ECR editorial board members from our awesome journals are giving useful insights that you will hopefully find helpful! Finally, in response to the sad news of The Queen's passing, we offer again our heartfelt condolences to the Royal Family. The BSI recognises the incredible contributions that Her Majesty, Queen Elizabeth II made, particularly to the charity sector, during her long and tireless service. Her dedication has been an inspiration for many around the world, making a real long-lasting difference to our society.

As always, thank you for all you do and do not hesitate to get in touch with me or the team if you have any questions, comments or suggestions.

Doug Brown
Chief Executive,
British Society for Immunology
Email: d.brown@immunology.org

SOCIETY NEWS

New membership categories

To continue supporting our diverse and ever-growing community, we have recently revamped our membership categories. We have introduced five categories grouping some of the most common areas in which our members work and, for each of them, we will continue to provide tailored benefits for each career stage. Here, we showcase the sectors that form part of our immunology community, alongside some of the numerous benefits to support the ambitions and careers of our members.

Are you in the right membership category?
Our new membership categories showcase the different sectors that encompass our vibrant community. We have also recently expanded the criteria for the Early Career Membership to include anyone in the first seven years from receipt of their PhD; we have introduced a new category for those retired from full-time employment; and we offer concessionary discounts and free membership to various groups. If you have any questions, please contact our membership team at membership@immunology.org. Visit **www.immunology.org/membership** for more details.

SOCIETY NEWS

BSI Congress 2022

Monday 5 to Thursday 8 December 2022
Liverpool, UK

The UK's top immunology conference is back – bigger and better than before. Connect with the immunology community across the UK in the wonderful city of Liverpool!

Our flagship event attracts over 1,500 attendees from the UK and international immunology community. The extensive programme boasts a diverse selection of immunology topics covering cutting-edge research from leading scientists around the world. We also have a range of networking opportunities to allow you to exchange ideas and build links to aid your next career step.

Join us for an exciting and innovative mix of the highest quality basic and translational immunology research from around the world.

Keynote lecture

Dr Gitta Stockinger

Francis Crick Institute, UK

18:00, Monday 5 December

Help with your travel costs

All BSI members are eligible to apply for a BSI Congress bursary to assist with the costs of attending the meeting. The application deadline is **Friday 7 October** and you can find more information at www.immunology.org/grants-and-prizes/bsi-congress-2022-travel-bursary.

7 reasons to submit an abstract

Late-breaking abstract submission for poster presentations closes on Friday 28 October.

1. Disseminate your latest research ideas and ensure your work is accessible to other researchers in your field
2. Gain recognition in the immunology community
3. Debate immunology in a friendly atmosphere and receive valuable feedback
4. Showcase your innovative education, public engagement or equality, diversity and inclusion work in our dedicated poster category
5. Start discussions that can lead to future collaborations and further your career
6. Compete for a £250 poster prize
7. Keep up to date with cutting-edge research

BSI AGM – have your say!

17:30–18:00, Tuesday 6 December

We would like to encourage all BSI members to join us at our 2022 Annual General Meeting.

This is your opportunity to find out more about the work of your Society, what activities we have carried out in the past year and what we are doing to support our members and represent immunology in the UK.

Dates for your diary

Bursary applications:
Friday 7 October

Early bird registration:
Friday 28 October

Late-breaking abstract submission:
Friday 28 October

BSI Congress for all

Ensuring that the BSI Congress is as inclusive as possible is extremely important to us.

We introduced a number of initiatives at our last Congress which we are pleased to offer again this year.

The BSI Congress Carers' Grant has been established for those who have caring responsibilities at home, whether this is looking after children or older members of the family, or those that need carers themselves. This grant scheme is intended to go towards the cost of the attendee's care arrangements during the time they are attending BSI Congress.

The application deadline is **Friday 7 October** and you can find more information at www.immunology.org/grants-and-prizes/bsi-congress-2022-carers-grant.

We will also have an **onsite crèche** to provide subsidised childcare for delegates' children. You will need to register for this service in advance to secure a place for your child/ren.

These initiatives are in addition to other provisions already in place, such as breastfeeding facilities, prayer and quiet rooms, and access for parents and carers.

Programme highlights

PLENARY SESSIONS

- **Tropical diseases**
  Immunological investigations and vaccine developments
- **Innate inborn immunodeficiencies**
  New insights into innate immune sensory and regulatory molecules and pathways
- **Beyond blood**
  Direct sampling from tissues to discover more about the human immune response
- **Systems immunology**
  New opportunities to understand the mechanisms of human immunity in health and disease
- **Immunotherapies come of age**
  Learnings from two decades of immunotherapy for autoinflammatory diseases
- **The brainy immune system**
  Understanding interactions between the neuronal and immune systems

Plus parallel sessions covering 25 exciting themes!

Exhibitors and sponsors

The generous contributions of our corporate sponsors enable us to offer our community another Congress to remember.

We're immensely grateful for their invaluable support and we'd like to encourage all our delegates to explore the exhibition hall and tap into the expertise of our wonderful exhibitors who can answer questions and provide hands-on demonstrations of the latest technologies and products.

Bright Sparks in Immunology

12:30–16:00, Monday 5 December

Our showcase of work from early career researchers in immunology.

Bright Sparks in Immunology provides PhD students and early career postdocs with experience of presenting their work to a large audience and debating immunology in a friendly atmosphere. This exciting event combines competition with excellent science and networking.

Supporting sessions and industry satellite symposia

There will be many opportunities to learn about the important work being carried out in industry and the research, technologies and products that could help your own work. Keep an eye out on the programme for exciting sessions offering delegates a chance to familiarise themselves with the latest advances in research and technology.

Can't make it to Liverpool? Join us online!

To make our Congress more accessible to a wider audience, we're providing an online option for delegates unable to attend in-person. Online-only registration includes online access to all the scientific sessions and an online poster gallery, as well as online networking opportunities with participants, exhibitors and sponsors.

BSI CONGRESS 2022

Get the latest info

www.bsicongress.com

Twitter: @bsicongress
Follow #BSI22

If you have any questions, please email congress@immunology.org.

SOCIETY NEWS

New BSI Early Career Trustee

Our Board of Trustees is crucial to our work, ensuring the Society is well run, financially sound and that it meets its charitable aims and objectives. We're delighted to welcome a new Early Career Trustee, Dr Matthew Siggins, who joined the Board in July 2022.

MATTHEW SIGGINS
BSI Early Career Trustee
Research Fellow, Imperial College London

"I am passionate about immunology and, as a postdoctoral Research Fellow at Imperial College London, am intimately familiar with the many challenges that Early Career Researchers (ECRs) face. I have years of experience as a Postdoc and as a Fellows Development Centre representative and a departmental representative at Imperial College, and in these roles, I have helped to deliver improvements for researchers.

"As a new BSI Trustee, I will work with the wealth of experience on the Board to boost opportunities for ECRs. The BSI has already delivered excellent initiatives to help ECRs, such as the BSI career enhancing grant scheme. I hope to voice members' perspectives and put ideas forward to help maintain innovation and further enhance existing support.

"During the pandemic, my scientific work has focused on analysing and modelling immune responses in COVID-19 patients to better understand the immunology of disease, consequences of infection and potential therapeutics. Soon, I will be commencing a fellowship to resume my pre-pandemic research on the role of the lymphatic system in extracellular dissemination of pathogens and the impact this has on disease and immune responses.

"Beyond my research niche, I have a broad interest in immunity and immune dysfunction, and I am already looking forward to BSI Congress 2022 in Liverpool later this year. Though I am a relative newcomer to the BSI, I have been hugely impressed by the organisation, and I am committed to giving what I can to help shape the strategy and maximise the positive influence and impact of the BSI."

Find out more

Find out more about our Board at **www.immunology.org/about-us/our-people/governance**.

BSI Forum: here to represent you

The BSI Forum is the place where the voice of our membership is fed into our activities. Chaired by Professor Ann Ager, the 18 elected members come from all sections of the Society's membership. Their role is to act as our 'think tank' on issues relating to education and careers, public engagement, policy and public affairs, and communications. Forum aims to help the Society in implementing its strategic plan by providing a mechanism by which the voice of the membership can be fed into our activities.

The most recent Forum meeting at the end of June was an action-packed session with our members coming together in person for the first time in over two years. First, Forum had the chance to feed into the BSI priorities for our new financial year as well as our BSI Diversity and Inclusion framework. There was an engaged discussion where Forum members shared their experiences and ideas on how to continue growing our EDI work.

In policy, we discussed the delayed progression of Horizon Europe association agreements with the UK. This was a topic that many on Forum felt passionately about, and they provided key insights and examples which will help the BSI's work in this space. We then explored the upcoming update to our 'Careers in Immunology' report. The recommendations from members were wide-ranging and incredibly valuable in shaping the new publication coming out later this year, which will also include feedback from

our wider membership. Lastly, we discussed the benefits of mentoring and the different formats it can take.

As usual, Forum then took an overview of all the external affairs and outreach activities that the BSI has undertaken to communicate the voice of our immunology community to the wider world.

This was the final meeting for our outgoing Early Career representative Dr Alice Burton, Clinical representative Dr Matthew Buckland, England representative Dr Helen McGettrick and Veterinary Representative Dr Elma Tchilian. A big thank you again for their dedication and contributions over their terms!

The BSI Forum and its members are here to represent you. If you would like to raise any issues for Forum to discuss at an upcoming meeting, please contact your relevant Forum member – you can find a list of your representatives on our website at **www.immunology.org/forum**. Alternatively, you can email our Director of External Affairs, Jennie Evans, at **j.evans@immunology.org**, who can pass the message on.

SOCIETY NEWS

Building peer review skills: lessons from our ECR Editorial Board Members

In celebration of Peer Review Week, starting on 19 September, we spoke to the early career researcher (ECR) editorial boards of our official journals about how they have been building skills and experience in peer review in their new roles as Editorial Board Members and the key lessons they have learned.

We recently ventured into new areas to develop how we can support the next generation of immunologists with the launch of dedicated Editorial Boards for ECRs within our official journals *Immunotherapy Advances* and *Clinical & Experimental Immunology*. After much interest, we recruited twelve ambitious and talented ECRs to join each journal's editorial team to develop their skills and confidence as peer reviewers, learn more about the editorial process and bring fresh perspectives to our journals.

We spoke to six of our ECR Editorial Board Members about key lessons they have learned when it comes to peer review during their time on the journals.

Use a structure

"A typical review starts with a brief summary highlighting the paper's key findings and what you think is the actual impact on the field. Then you can provide detailed comments on any major concerns (such as a lack of a key experiment) and minor concerns (such typographical errors). Based on these, you can finish the review by offering a recommendation to the editor."
Dr Alsya Affandi, Amsterdam UMC, Netherlands *Immunotherapy Advances* ECR Editorial Board Member

Be constructive

"Constructive criticisms and suggestions help improve the quality of manuscripts. Sometimes, authors can be so focused on certain aspects of their research findings while overlooking a potentially impactful angle. Fresh eyes of a reviewer can pick up on these aspects and nudge authors in that direction."
Dr Rebecca Chukwuanukwu, Nnamdi Azikiwe University, Nigeria. *Immunotherapy Advances* ECR Editorial Board Member

Focus on the science

"When reviewing, ask 'is the data presented robust, analysed correctly and with appropriate controls? Does it support the authors' conclusions?'. You're not a copyeditor, so don't spend too much time correcting typos and grammar. And avoid suggesting the authors consult a 'native' English speaker to proof-read their manuscript."
Dr Nicole Campbell, Hudson Institute of Medical Research, Australia. *Clinical & Experimental Immunology* ECR Editorial Board Member

Be realistic

"Even if the science is sound and the interpretation is validated, there is always more that can be done. However, as a reviewer, consider what the manuscript really needs to bring the take-home message of the article to fruition and satisfy the criteria of the selected journal."
Dr Caroline Weight, University College London, UK *Immunotherapy Advances* ECR Editorial Board Member

Keep your audience in mind

"Authors need feedback that is based on the quality of their research and accompanying claims in its current state, whereas the editors need to know the current position of the research within the field, the quality of the research and if additional experiments would sufficiently support the manuscript for further assessment."
Dr Theo van den Broek, University Medical Center Utrecht, Netherlands. *Clinical & Experimental Immunology* ECR Editorial Board Member

Be considerate

"To provide timely and constructive criticism, you have got to approach the peer review process as if it was your dearest colleague asking for advice on how to improve their manuscript. Focus on the critical, actionable points needing improvement that would turn the manuscript into the strongest, most convincing story."
Dr Damian Perez Mazliah, Hull York Medical School, University of York, UK. *Clinical & Experimental Immunology* ECR Editorial Board Member

Early Career Researcher Editorial Boards

The BSI journals are supporting early career researchers who want to get involved with research at the point of publication through our dedicated ECR Editorial Boards. You can find out more about the ECR Editorial Board Members here:
Immunotherapy Advances: https://bit.ly/3Q5QDw6
Clinical & Experimental Immunology: https://bit.ly/3Q3xTxy

Building peer review skills

Contributing fresh perspectives

Gaining editorial experience

SOCIETY NEWS

BSI journals: serving the immunology community

Our ECR Editorial Board Members work closely with a senior editor or board member with overlapping expertise to provide guidance on the editorial process as well as mentorship on any other matters relevant to early careers. There are plenty of opportunities for ECR editors to get involved in a range of important activities for our journals beyond peer review such as writing commentaries, summarising articles for our Immune Update feature (see page 30), contributing to our social media presence, and even guest-editing special collections.

Each of our journals has specially curated editorial teams with editors based across key subject areas or strategic regions. We work closely together to make sure our journals meet our mission of serving the immunology community through disseminating high-quality, cutting-edge research and providing excellent service to our authors.

With fast turnaround times, publishing discounts for our members and a growing international audience, there are many reasons to publish with the BSI.

Covering the translational pipeline for immunotherapy

34 days to first decision (on average)

20% discount on publishing fees for BSI members

Now indexed in PubMed Central

New discoveries in cellular & molecular immunology

Brand-new Open Access journal

20% discount on publishing fees for BSI members

International editorial team

The journal of translational immunology

19 days to first decision (on average)

5.732 2021 impact factor

33% discount on publishing fees for BSI members

SOCIETY NEWS

New EFIS report on European COVID-19 vaccination strategies

In August, the European Federation of Immunological Societies (EFIS) published a new expert report called 'Lessons learned from European COVID-19 vaccination rollout programmes' which features case studies of vaccination strategies across Europe in response to the COVID-19 pandemic.

The report examines different steps taken to encourage vaccination uptake in a range of countries and important lessons we can incorporate to strengthen international preparedness for future pandemics and advance global health. It outlines recommendations including how immunologists should collaborate across national borders to respond to health crises, proactively increasing public confidence in the importance of vaccination and directly informing governments.

The report has been produced by the EFIS Vaccine Task Force, a group of representatives from European immunology Societies chaired by Dr Doug Brown, Chief Executive of the British Society for Immunology. The Task Force aims to tackle issues around vaccination at a European level by providing a strong, evidence-based and collective voice.

One of the major efforts of the Task Force, in collaboration with the British Society for Immunology, has been to provide reliable evidence-based information around vaccination, including infographics in several European languages. The EFIS Vaccine Task Force also produced a report on COVID-19 vaccines in 2021 which reviewed a range of areas such as effective scientific communication and public engagement, long-term immune monitoring programmes across Europe and equitable access to vaccines.

Thank you to all the members of the EFIS Vaccine Task Force for their collaborative work to share knowledge and experience among immunologists and beyond, and in particular to Professor Anne Spurkland, Professor Felix Wensveen, Professor Aurelija Žvirblienė and Dr Doug Brown for sharing their views and experiences in the case studies.

EFIS Vaccine Task Force

Find out more

- Read the full report 'Lessons learned from European COVID-19 vaccination rollout programmes': **https://bit.ly/3QyzxH6**
- Find out more about the work and aims of the EFIS Vaccine Task Force: **www.efis.org/efis-task-forces/efis-vaccine-task-force.**
- Take a look at infographics on vaccination in several languages: **www.immunology.org/vaccine-translated-resources.**
- Read the 2021 Task Force report on COVID-19 vaccines: **https://bit.ly/2S1GU1n.**

Immunotherapy Advances now indexed in PubMed Central

Our official journal *Immunotherapy Advances* is now indexed in PubMed Central so all our content can reach an even wider audience and is fully searchable and accessible to all. This includes all articles published since the journal's launch, which you can access here: **www.ncbi.nlm.nih.gov/pmc/journals/4229**.

This is a crucial milestone for our first Open Access journal, which was launched in 2020 in partnership with Oxford University Press, and is a significant step in our mission to disseminate immunology research for the good of human and animal health. Acceptance into PubMed Central is the result of a major effort from *Immunotherapy Advances'* passionate editorial team, especially Founding Editor-in-Chief Professor Tim Elliott, and we would like to take this opportunity to thank BSI members for their continued support of the journal, particularly those who have contributed as authors, reviewers and advocates.

Our vision is for *Immunotherapy Advances* to be a globally recognised title that both serves the immunotherapy community and exposes new developments in the field to a wide and diverse readership.

The journal publishes scientifically rigorous research relating to manipulations of the immune system for the benefit of human and animal health in all disease areas. We offer a quick turnaround from our supportive editorial team, in addition to a 20% discount on publication fees to all BSI members.

We encourage our members to continue supporting our first Open Access journal by submitting your latest research. Income generated from our journals provides major financial support for the Society's activities.

Find out more

- Visit the official *Immunotherapy Advances* website to browse calls for papers including collections on antibody-based therapeutics and immune-related adverse events, and read the latest research on important topics in the field: **academic.oup.com/immunotherapyadv**.
- Follow **@IMTadvances** to discover new articles and keep up to date with the latest in your field.

SOCIETY NEWS

BSI public engagement funding: our updated grant scheme

We have updated our public engagement grant scheme, Communicating Immunology, to provide a better application process for our members and to be able to track the impact of the activities we fund more easily. This grant scheme is now called the BSI Communication & Engagement Grant and it will continue to provide financial support to help BSI members develop and deliver activities to engage with the public in all formats.

The funding can be used for any type of public engagement activity that meets the aims of the scheme to:

- **Spark interest in immunology**
- **Strengthen public understanding** to help people make informed decisions about their health
- **Improve trust in science** and increase the impact of immunology research, demonstrating the contribution, benefit and influence on society beyond academia
- **Provide opportunities for BSI members** to share their passion and build their skills and confidence in engagement and outreach

Aligned with our commitment to equity, diversity and inclusion, we encourage applications that are inclusive of diverse audiences including schools, families, adults and patients. Through this scheme we hope to inspire future immunologists and educate the public about careers in science as well as support proposals that develop and deliver innovative and original engagement methods.

The amount you can apply for has not changed, with applications accepted for funding up to £1,000. There will now be three deadlines throughout the year to apply: 1 October, 1 February and 1 June. Visit the BSI Communication & Engagement Grant page for details about how to apply, guidelines and marking criteria: **www.immunology.org/bsi-communication-engagement-grant**.

If you have any questions or wish to discuss details of the grant scheme, please don't hesitate to get in touch with Erika Aquino, BSI Public Engagement Manager, at **e.aquino@immunology.org**.

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BSI 2023 mentoring scheme

Applications are now open for mentors and mentees!

Over a 12 month period starting in January 2023, mentors and mentees will hold a series of online meetings that can be used to discuss career development, barriers faced at work and overcoming tough work situations.

Find out more and apply at **www.immunology.org/careers/bsi-mentoring-scheme.**

Deadline:
Monday 24 October 2022

British Society for immunology

Growing up is not (IL-)2 bad!

The winner of our Bright Sparks PhD session at the BSI Congress in 2021 was Lucía Labeur-Iurman from Imperial College London with her talk entitled 'An enriched IL-2 environment in early life limits T follicular helper cell development and protective immunity after respiratory virus infection'. Here, Lucía tells us more about her research on the immune response to RSV in early life and what it means for long-term protective immunity and potential therapies.

Lucía Labeur-Iurman receiving her 'Bright Sparks in Immunology' award from BSI Education and Careers Secretary, Dr Donald Palmer

It might be hard to believe, but SARS-CoV-2 is not the only existing respiratory virus. In fact, despite infants seeming to have a continuous runny nose and high fevers – just ask any parent – SARS-CoV-2 is very unlikely to be the cause of it. There is however one respiratory virus, despite its relatively anonymity, which is the leading cause of colds in children, the major cause of viral bronchiolitis in childhood, a main cause of infant hospitalisation, and one of the leading infectious mortalities in children under one-year old: respiratory syncytial virus or RSV.

RSV – a leading cause of mortality in children

RSV was first isolated in 1956. Today, almost 70 years later, RSV is still considered the leading cause of viral bronchiolitis in children under five. It is estimated that 95% of children worldwide have been infected by two years of age, resulting in a high number of hospitalisations in high-income countries and more than 100,000 deaths per year in low-income countries. Age is considered the strongest risk factor for developing severe disease after RSV infection, with one-third of infants developing severe bronchiolitis, but RSV only causes mild upper respiratory tract infection in the majority of adults.

RSV infection in early life is also concerning due to its associated sequelae, since infection with this pathogen represents an independent risk factor for the development of wheezing and allergic asthma in later life. Despite over 60 years of scientific effort, however, there is still no licenced vaccine against RSV, with the safe generation of immunity in infancy being particularly challenging. Indeed, both the RSV vaccines that have been trialled and RSV infection itself seem to cause poor specific antibody responses, which diminish relatively quickly, both in adults but particularly in children. Immune responses are so poor than people are routinely re-infected by a serologically identical RSV every one to two years, and it is not uncommon for children under five to get re-infected even in the same winter season.

Impaired antibody responses in infancy

So why is immunity to RSV, especially in early life, so limited? Early life is the period when we encounter the vast majority of antigenic stimuli we will ever see. Most importantly, we do so for the first time. Infancy is also the time where most of us receive the majority of our vaccinations.

'In our RSV mouse model, we saw that, even though the amount of RSV-specific $CD4^+$ T cells was the same across all ages analysed, the differentiation of these cells towards T_{FH} was reduced in early life when compared with adults.'

> 'Our work therefore highlights a fundamental difference between the early life and the adult immune landscape and a crucial need to study and understand early life as a distinct immunological context.'

In spite of all this, our understanding of the early life immune system is primarily extrapolated from immune responses observed in adults and adult models. But, when you actually examine the infant immune system you begin to realise that it does not quite function in the same way as it does in adults. In line with this, both our group and others have reported that the generation of high-affinity antibodies – which are critical to providing long-lasting immune responses against most common antigens and are the basis of most vaccinations – is often limited in early life. The lab, and my research, is therefore focused on understanding what mechanisms lead to this impaired antibody response in infancy and if they can be modified in order to improve immunity.

There are rightly many restrictions to studying infant immunity, especially in children experiencing severe illness. Therefore, to study the humoral immune response against RSV we used a mouse model of infection, where we can replicate most of the phenotype observed in humans. When given the same dose of RSV to one- and two-week-old mice (early life mice) and eight-week-old mice (adult mice) we saw that the generation of RSV-specific antibodies was reduced in early life when compared with adults. Concomitant with this poor antibody response, mice initially infected at one or two weeks of age also showed limited protection from re-infection.

The generation of high-affinity antibody responses predominantly takes place in germinal centres (GCs) – anatomically distinct areas within the B cell zones of secondary lymphoid organs where B cells can undergo somatic hypermutations and affinity maturation under the control of T helper cells. T follicular helper cells, or T_{FH}, are responsible for providing the specific cues that drive B cells to differentiate into memory B cells or plasma cells able to produce high-affinity antibodies. Because low-affinity antibody responses are observed in early life, and because the same outcome – propensity to re-infection – is observed in adult mice lacking T_{FH} cells, we speculated that the cross-talk between T_{FH} and B cells might be diminished in infancy. Indeed, in our RSV mouse model, we saw that, even though the amount of RSV-specific $CD4^+$ T cells was the same across all ages analysed, the differentiation of these cells towards T_{FH} was reduced in early life when compared with adults.

Last piece of the puzzle

The most accepted view in the field is that T_{FH} differentiation depends on the balance of two signalling and transcription molecules which commonly act downstream of cytokines, STAT3 and STAT5. The literature supports the fact that, both IL-6 and IL-12, which are the main cytokines driving T_{FH} differentiation in mouse and humans respectively, promote the phosphorylation of STAT3. Conversely, IL-2 would promote STAT5 phosphorylation which in turn will drive naïve $CD4^+$ T cells to differentiate into alternative pathways such as T_{H1} or T_{H2}.

Interestingly, we observed an enriched IL-2 environment in early life when compared with adulthood, since the production of IL-2 was increased in one-week-old mice when compared with the eight-week counterparts in both RSV infected and baseline conditions. Early life naïve $CD4^+$ T cells also have an increased expression of IL-2 receptors and our experiments showed an increased predisposition of early life antigen-experienced $CD4^+$ T cells to phosphorylate the T_{FH} antagonist STAT5 over the pro-T_{FH} signal STAT3. So, it is not only that IL-2 is more readily available in early life when compared with adulthood, but the ability to interact and respond to this cytokine is also increased, potentially explaining the poor T_{FH} differentiation observed in infancy.

To further confirm that IL-2 suppresses protective immunity in early life, we infected one-week-old mice with RSV while neutralising IL-2. Mice in which IL-2 signalling was blocked showed an adult-like response with increased T_{FH}, GC B cell and plasma cell numbers accompanied by a higher RSV-antibody titre and better control upon re-infection. This response however, required T_{FH} help, because in mice where the T_{FH} response was abrogated, the increased humoral response was not observed, even in the context of IL-2 neutralisation.

In conclusion

Overall, our work shows that, while there is a strong antibody response against RSV re-infection in adults, this is diminished in early life due to an enriched IL-2-STAT5 signalling that hinders T_{FH} differentiation. So, growing up is not too bad! We were pleased to have our study published;[1] nevertheless, our work doesn't finish here since more research needs to be conducted focusing on early life immunity to apply this knowledge into therapies and vaccines that will help us combat childhood viruses such as RSV. Even though here we have shown a detrimental role for IL-2, which suppresses humoral immune responses in early life, the IL-2 signalling pathway is critically used by a number of lymphocyte populations – Tregs, T_{H2} cells, NK cells, ILCs... you name them! – which might explain why IL-2 signalling needs to be upregulated in infancy.

Our work therefore highlights a fundamental difference between the early life and the adult immune landscape and a crucial need to study and understand early life as a distinct immunological context in order to provide better therapies specialised for this targeted age group.

Lucía Labeur-Iurman
PhD student, Inflammation, Repair and Development Section, National Heart and Lung Institute, Imperial College London

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A revised view on promiscuity in the adult (gut)

The winner of our Bright Sparks Postdoc session at the BSI Congress in 2021 was Dr Johanna Kabbert from Lund University with her talk entitled 'High microbiota reactivity of human intestinal IgA requires somatic mutations'. Here, Johanna tells us more about her research on the underlying mechanisms and effects of IgA binding to different microbial species in the gut, introducing a new aspect of IgA–microbiota interactions in the adult intestine.

Dr Johanna Kabbert receiving her 'Bright Sparks in Immunology' award from BSI Education and Careers Secretary, Dr Donald Palmer

Terms like 'work–life balance' and the 'importance of a beneficial microbiota' to host health and gut homeostasis are no longer obscure concepts but have entered the vocabulary of our everyday lives and seem to go hand in hand with a well-balanced diet. Similarly, there is more awareness of the consequences of an 'unhealthy' microbiota regarding diet-associated intestinal inflammation and inflammatory bowel disease (IBD), both associated with dysbiosis. Dysbiosis, a major shift in microbial composition, has been linked to a variety of diseases – not only confined to the intestine but affecting the entire body e.g. metabolic syndromes such as obesity and diabetes and even neurological disorders.

The intestine – home to the good and the bad

The intestine is the largest mucosal surface in the body and home to trillions of symbiotic bacteria – the microbiota. The companionship of the intestinal microbiota is evolutionarily conserved and is essential to host health. The host immune system is in constant and mutualistic dialogue with the microbiota that is required to maintain gut homeostasis. Miscommunication in this dialogue and inappropriate immune responses can drive dysbiosis where opportunistic microbial members become disease-promoting (pathobionts). A hallmark host immune response at intestinal mucosal surfaces is the production and secretion of immunoglobulin A (IgA) into the gut lumen. In the gut, IgA is the most abundant antibody isotype and protects the host from pathogens and viruses. Intestinal IgA not only binds pathogens but also targets a large fraction of the microbiota in the steady state gut. Thus, the binding of IgA to gut bacteria has both positive and negative outcomes and is crucial to prevent dysbiosis.

IgA and the microbiota – stay connected with your friends

In the gut, IgA can be generated either with or without T cell help – pathways referred to as T cell dependent (TD) and T cell independent (TI). The mechanisms of how IgA protects the host from pathogens are relatively well described. Functional outcomes, including immune exclusion and neutralisation of pathogens, require highly specific immune responses against the respective antigen. Here, effective IgA responses rely on TD affinity-matured antibodies, where somatic hypermutation (SHM) and affinity maturation fine-tune antibody specificity and affinity to the invading pathogen. However, the functions of IgA seem to extend beyond merely protecting against pathogens, as IgA is also generated in response to the intestinal microbiota in the absence of overt pathogenic challenge.

How exactly IgA interacts with the microbiota and what factors determine which members of the microbiota are targeted in the steady state gut is less clear and it is still controversial whether microbiota-binding IgA relies on T cell help. A lot of this controversy stems from the model species used for experimental analysis. Perhaps unsurprisingly, in young laboratory mice that are rarely exposed to changing antigenic challenge, most of the microbiota-binding IgA is of TI origin. However, recently it has been shown that, in adolescent mice, TD responses give rise to microbiota-targeting IgA, thus both TI and TD IgA responses can contribute to microbial coating. This scenario is even more complicated by different binding modes described for IgA–microbiota interactions, including canonical binding that relies on Ig–Fab mediated binding, non-canonical binding, mostly facilitated via glycans, and polyreactivity i.e. unspecific binding to structurally

unrelated antigens. Collectively, it is hard to say which mode of binding is predominant as diverse binding modes may co-exist and, until recently, in the human gut, the exact contributions of these pathways to microbial IgA binding were never systematically resolved.

For us, the major unanswered question remained, what are the underlying mechanisms and effects of IgA binding to the microbiota in the gut, as IgA binding evidently does not lead to the eradication of entire microbial species. We speculated that IgA induced in response to the microbiota in the adult human intestine may rely on distinct mechanisms and may even have the opposite effect to immune exclusion, i.e. promoting inclusion of microbial members in distinct intestinal niches.

The quest for the mechanism of IgA cross-species reactivity

To assess the molecular basis of IgA binding to the microbiota and whether the IgA–microbiota system may differ in inflammation we tested a large panel of monoclonal IgA antibodies (mAbs), derived from intestinal plasma cells from either healthy donors or IBD patients, for their microbiota reactivity. To our surprise, an unexpectedly large proportion of single mAbs showed substantially high microbiota-binding capacity, with some mAbs binding up to 30% of intestinal bacteria. Considering the relative abundances of all the different microbial species in the gut, this suggested that IgA binding may not be limited to a single species. Ultimately, bacterial 16S sequencing revealed that single mAbs, from both healthy donors and IBD patients, bound multiple species of the microbiota, often phylogenetically unrelated. Moreover, some bacterial species were commonly targeted by multiple mAbs whereas others were exclusively bound by single mAbs only.

We coined this 'promiscuous' mode of IgA–microbiota binding 'cross-species reactivity'. In addition, cross-species-reactive antibodies did not uniformly enrich all members of a targeted species, implying that cross-species-reactive IgA may target distinct genetic sub-strains within bacterial species or bacteria in a particular growth state. Importantly, neither polyreactivity nor non-canonical binding accounted for microbiota cross-species IgA binding. Instead, cross-species-reactive IgA mAbs had substantial numbers of somatic mutations, typically a feature of TD affinity maturation. By reverting these mutations of IgA mAbs to generate germline variants we finally found the answer to our quest. The majority of germline variants lost their microbiota-binding capacity, revealing that accumulated somatic mutations were indeed key to high microbiota binding and cross-species reactivity. Notably, the majority of both mutated and germline mAbs exhibited little to no polyreactivity indicating that the acquisition of somatic mutations is chiefly responsible for the broad but specific binding of IgA mAbs to different members of the microbiota.

Our results may appear counterintuitive – bending the principle of increased specificity as a result of affinity maturation found in immunology textbooks. Nevertheless, we found that SHM refines IgA responses in such a way that they become broadly binding but not at the expense of specificity and affinity, a mechanism that is distinct from polyreactivity.

Microbiota cross-species reactivity – functional consequences for the host

Our findings raise some important questions about the nature of IgA responses to the microbiota. First, what is the evolutionary benefit in maintaining such a system? In both the healthy and inflamed intestine, the presence of cross-species-reactive antibodies likely increases the probability of antibody encounter with intestinal bacteria, enabling efficient host–microbiota interactions and possibly contributing to effective antibody–pathogen agglutination.

Second, it remains unclear which bacterial structures enable the initiation and selection for cross-species IgA reactivity and how these complex processes are regulated *in vivo*. We propose that bacterial glycans or peptides conserved across phylogenetically unrelated bacteria may be prime candidates to allow for the selection of cross-species reactivity. Mechanistically, the continuous exposure to varied but conserved bacterial structures may act as the initial antigen and ultimately drive the selection of cross-species reactive B cells. Here, the re-entry of circulating memory B cells into gut-associated lymphoid tissues exposed to different antigenic environments may lead to successive accumulation of mutations during multiple rounds of affinity maturation, thus shaping the generation of cross-species-reactive IgA-secreting plasma cells. While microbiota reactive antibodies in young mice and human newborns include polyreactive responses, we suggest that, during ageing, these 'early' polyreactive antibodies become gradually supplanted by affinity-matured, cross-species-reactive antibodies representing a common mechanism of IgA–microbiota binding in adulthood.[1]

Finally, we were very happy to have contributed to the concepts of B cell biology by introducing a new aspect of IgA–microbiota interactions in the adult intestine. Paradigms are not the limit of research – they are often just the beginning.

Dr Johanna Kabbert, Postdoctoral fellow, Immunology Section, Department of Experimental Medical Sciences, Lund University

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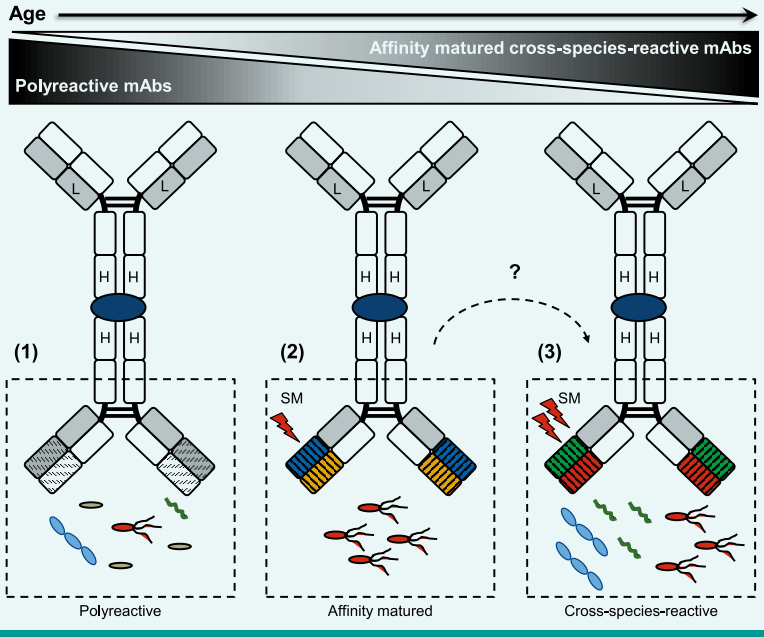


Transition of the prevalent mechanism of microbiota binding from polyreactive IgA in young individuals to affinity-matured, cross-species-reactive IgA in adults. (1) Cross-species reactivity early in life is likely driven by polyreactive germline antibodies lacking somatic mutations (SM), with low but broad affinity to diverse microbial members. (2) Later in life polyreactive antibodies may become supplanted by highly mutated, affinity-matured antibodies. (3) Through the continuous accumulation of SMs (red arrow) antibodies may increase their binding breadth but maintain specificity of microbial reactivity.

From Poland to the UK and back again: an international BSI member's perspective

The British Society for Immunology represents over 4,000 members around the world from a wide range of sectors and career stages. Here, BSI member Professor Danuta Gutowska-Owsiak from University of Gdańsk shares her journey in immunology across two countries, from her undergraduate degree in Poland, her exciting career in the UK and her move back to Poland to start her own lab, and highlights the impact the BSI has had during this time.

Dr Lilit Hovhannisyan, Prof Danuta Gutowska-Owsiak, Mr Adrian Kobiela and Dr Joanna Frackowiak at BSI Congress 2019 in Liverpool (L-R).

Budding scientist

From an early age I was drawn to experiments, watering the plants grown in the allotment by my blissfully unaware dad with a variety of mixtures. Gradually as I developed more interest in humans, I decided to study medicine. I applied to the Medical University of Gdańsk to see what I could learn about human physiology and disease. After graduation in 2003, I left Poland – with a medical degree but almost no clinical practice – to work as a waitress in a hotel in the middle of nowhere. What I knew at this stage was that I found immunology fascinating and that I wanted to pursue my career in an experimental setting.

Discovering the BSI

To cut a long story short, I ended up at the University of Liverpool, first as an honorary research assistant, then as a PhD student, investigating NKT cells in rheumatoid arthritis patients. It was there that I came across the British Society for Immunology and attended my first BSI Congress. It was a completely different and rich world for me – having been stuck in a small lab with little help and no money for reagents, and not many people to talk to about immunology.

I was over the moon when I was offered the position of postdoctoral immunologist in Oxford, in the group of Professor Graham Ogg at the Weatherall Institute of Molecular Medicine, MRC Human Immunology Unit. I got involved in researching the skin barrier and its regulation by inflammation, and had a continued interest in the lipid-specific immune responses. Oxford is such a terrific place and I was so excited being exposed to the great immunology brains all the time. The group was fantastic, and my boss was my mentor; I learned a lot during my eight years there.

New roots

But I knew that I wanted to start my own research group; at the same time family responsibilities were dragging me and my family back to Poland. To be fair, our initial idea was to come to the UK for one or two years; it was already 13 years and my family obligations in my home country started piling up. So, I started applying for homing grants. I was successful obtaining both a Marie Skłodowska-Curie-co-founded POLONEZ Fellowship from the Polish National Science Centre and a generous 'First TEAM' grant to start my own lab, from the Foundation for Polish Science. We made our return journey at the end of 2017, after 14 years in the UK, coming back as a family of four.

I ended up at the Intercollegiate Faculty of Biotechnology; a very unique formation set between the University of Gdańsk and the Medical University of Gdańsk. The lab's main research theme is communication between cells during immune response in the skin and beyond. We are especially interested in small extracellular vesicles, such as exosomes secreted by keratinocytes upon exposure to allergens and pathogens and how they convey the message to the immune system.

At the time there was no immunology research carried out at the university, so it was really challenging to start an immunology research programme from scratch. Immunology is greatly underrepresented in Poland with the Polish Society for Experimental and Clinical Immunology having only roughly 200 members. I knew I would have to organise myself for some basic equipment, such as an ELISpot reader. The first year was especially challenging; at the end of the second year, things started looking a bit brighter but then the pandemic hit and we had to close down, losing precious expanded keratinocyte cultures and not being able to finalise the experiments we planned. We are finally back on track now with first papers out. The lab went into a logarithmic phase, and we expect to submit several papers describing our work in the coming year.

'I kept my membership status active after my move to Poland and attended the BSI Congresses at all cost! The BSI is such a brilliant supportive environment and resource, and this is what I keep telling my team.'

No regrets

I am lucky to have built a group of interested and passionate people who contribute their time and effort and for whom immunology is also captivating. I kept my collaborations, many from the UK, and have now expanded my research partner network outside the Isles, into Poland and beyond. Several grants later, new studies are coming up, new ideas develop; I am exploring avenues that I would never have imagined finding. Overall, changing my path into 100% experimental immunology was the best career decision I made; I have no regrets with personally not having any clinical involvement, since I have collaborations with clinicians to satisfy my craving in this area. I am drawn to experimental work. I realised early on that clinical involvement would be a major distraction for me. At the same time, there have been many challenges but also rewards for me being back in Poland, both from a research and personal perspective.

As far as the BSI is concerned, as my experiences were always fantastic, I kept my membership status active after my move to Poland and attended the BSI Congresses at all cost! The BSI is such a brilliant supportive environment and resource, and this is what I keep telling my team. As a PI I want the best for the members of my lab, so now my PhD students and postdocs have also become BSI members! We have attended the BSI Congress together and I do my best to send them to the BSI Summer Schools, so they can learn and talk about their research in a supportive and friendly environment. My personal experience as a BSI overseas member has been nothing short of excellent so far and I would encourage anyone from any country in the world to join and stay in touch!

Professor Danuta Gutowska-Owsiak,
University of Gdańsk

The BSI community

Being a member of the BSI means being part of one of the largest networks in the world for those interested in the immune system. We offer members unique opportunities to:

- Build your skills and advance your professional development through our varied grant schemes
- Engage with others working in immunology and grow your network at our popular events, including BSI Congress
- Keep up to date with cutting-edge research through the BSI family of journals

And much more! Find out more about your benefits here: **www.immunology.org/membership.**

A unique position to inspire the public: how do our bodies fight viral infections?

To continue responding to the increased curiosity of the public following the pandemic, researchers at the University of Oxford developed activities about virus biology and the immune responses to viruses for the Oxford Science and Ideas Festival. Here, the organisers share their experience and learnings.

Volunteers at the MRC WIMM stall as part of the IF Science and Ideas Festival 2021; Gulnar Abdullayeva, Zixi Yin, Vivien Ho and Lizzie Horton (L-R).

The Oxford Science and Ideas Festival is a not-for-profit charity which organises a festival every October in various locations across the city. In 2021, 575 people from businesses, universities, non-profit groups and communities engaged around 35,000 people over 19 days.

The festival encompassed one-off discussion sessions, such as 'Why is getting it wrong good for science', hosted by Elsevier at the Natural History Museum; and workshops such as 'How to bake a star on Earth', run by the UK Atomic Energy Authority, in which participants baked doughnuts and learned about fusion energy (the power of stars), research of which occurs in doughnut-shaped fusion machines. There were also exhibitions such as Explorazone in the Town Hall and Science at the Shops.

Ten of our researchers took part this year, engaging the public and fostering conversations about the important immunological research we do at the MRC Weatherall Institute of Molecular Medicine at the University of Oxford. The BSI supported our participation in this event with a Communication & Engagement Grant (**www.immunology.org/bsi-communication-engagement-grant**) to fund reusable resources for the activities.

Shopping for science

As part of Science at the Shops, we held a stall in Templars Square Shopping Centre with the theme 'Fighting viral infections'. We aimed to engage with members of the community, teaching them what viruses are and how our immune system detects and fights them. We decided to focus our attention on innate immune and T cell responses to virus infection as we felt that the B cell and antibody responses had already been widely discussed in the news during the pandemic.

To develop these ideas, we thought of the key messages we wanted the public to take away from the stalls, and then fun, practical ways to display them for adults and children. One key message was that cells use innate sensors to recognise viruses and sound the alarm to alert the rest of the immune system. To demonstrate, we asked visitors to remove viral genetic material (pipe cleaners) from balls to represent endosomes expelling genetic material into the cytoplasm. The genetic material was then wrapped around the corresponding innate receptor (golf tee) and a bell was rung.

Next, we described what happens to viral proteins in the cell using a tube and magnetic beads. Each bead represented an amino acid of the viral protein and long strings of these were fed through a proteasome tube and chopped into smaller strings using sliders.

The importance of these small viral protein fragments was then described in our final activity. T cells recognise small protein fragments on the surface of cells bound to MHC molecules. Using a 3D-printed bank of cells expressing MHC, visitors were asked to find the correct T cell ping pong ball that fitted onto the MHC like a jigsaw puzzle. Once the correct T cell was identified and fitted together, it would either light up yellow to show that the cell was healthy or red to show that the cell was infected and needed to be killed.

Excellent engagement

After interacting with each activity, we hoped that visitors understood what a virus is, how they are sensed and that T cells specifically sense infected cells and kill them. We had accompanying posters and leaflets to go more in-depth for older audiences.

Over the weekend, we spoke to around 200 members of the public – hijacking their casual shopping trips! The reaction to the exhibition was very positive, with all volunteers receiving excellent feedback, some children returning multiple times and some groups spending over 30 minutes with us. We also spoke to a few teachers who took pictures and notes about the stand so that they could talk to their classes about it the following week, showing that our explanations and activities were simple enough for the information to be passed on.

Cool jobs!

As activity designers, it was rewarding to see our ideas come to life and engage children and adults about the research that we do. As volunteers at the event, we were able to discuss somewhat complex research questions and scientific ideas at a level understood by all, showcasing the importance of medical research. This allowed reflection on how niche and 'cool' our jobs as research scientists are, and our unique position to educate and enthuse the public about it too.

Lizzie Horton, Dr Dannielle Wellington and **Dr Catherine Seed**
MRC Weatherall Institute of Molecular Medicine, University of Oxford

Congratulations

This is the section of the magazine where we celebrate the achievements of our members. Our congratulations to all who are mentioned here.

BSI Equality, Diversity & Inclusion activity grants

The BSI is delighted to fund the following projects run by BSI members in the latest round.

- **Dr Jonny Coates** from Queen Mary University London – Preprints in Motion podcast; Diversity specials
- **Eunice Kiamba** from MRC Unit The Gambia at LSHTM – Equality, Diversity and Inclusion – Vaccines and Immunity Theme
- **Dr Laura Pallett** from University College London – Race Equality Workshop
- **Dr Rachel Tanner** from University of Oxford – Jennerating Opportunity

This grant scheme helps fund activities and events that promote diversity and inclusion across the immunology community and the wider biomedical sciences.

BSI career enhancing grant winners

The BSI career enhancing grant scheme ran for a second round earlier this year. We are delighted to have awarded 19 grants to the following BSI members, amounting to a total of £69,317.

Oliver Ashton (Queen's University Belfast), **Dr Matthew Burgess** (University of Edinburgh), **Dr Joseph Chi-Fung Ng**, (King's College London), **Dr Sally Clayton** (University of Birmingham), **Dr William Foster** (Babraham Institute), **Dr Ester Gea-Mallorqui** (University of Oxford), **Sofia Hain Porter** (University of Birmingham), **Dr Harry Horsnell** (University College London), **Francis Hughes** (National Health Service), **Dr Ruth Jones** (Cardiff University), **Dr Anna Karagiani** (University of Edinburgh), **Rachael Kee** (Queen's University Belfast), **Ana Kisovar** (University of Oxford), **Lucia Labeur-Iurman** (Imperial College London), **Justyna Lopatecka** (University of Plymouth), **Dr Daniel O' Connor** (University of Oxford), **Paschalia Pantazi** (Imperial College London), **Stephanie Schlichtner** (Medway School of Pharmacy, Universities of Kent and Greenwich), **Dr Sarah Spear** (Imperial College London).

BSI Summer School winners

During the BSI Summer School, 11–13 July in Coventry, delegates developed their skills in our lightning round presentations. Congratulations to **Sofia Hain** (University of Birmingham), **Aure Afalo** (University of Cambridge) and **Chloe Lockwood** (University of Birmingham) who took first, second and third prize respectively for their fantastic presentations.

BSI Summer School lightning round winners with BSI Education & Careers Secretary, Dr Donald Palmer.

Lister Prize

Congratulations to BSI members **Dr Shoba Amarnath** and **Dr David Bending** who have been announced as Lister Institute's 2022 Prize Fellows. Lister Institute provides research funding to outstanding early career scientists whose work shows excellent potential to make an impact in the field of biomedical sciences.

Imperial College President's Medal for Excellence

Congratulations to BSI member **Dr Viki Male**, Lecturer in Reproductive Immunology at Imperial College London, who won the President's Medal for Excellence in Societal Engagement for her work engaging with and helping to inform the public, particularly about COVID-19 vaccine safety in pregnancy.

Royal Society's Copley Medal

Big congratulations to the Oxford-AstraZeneca Vaccine Team who have been awarded the Royal Society's Copley Medal for their rapid development and deployment of a vaccine against COVID-19.

Kennedy Trust Senior Research Fellowships

Congratulations to BSI members **Dr Sinisa Savic** (University of Leeds) and **Dr Elizabeth Rosser** (University College London) for being awarded five-year fellowships at the Kennedy Trust Senior Research Fellowship scheme. This scheme is awarded to promising independent researchers with a proven track record of excellence in the field of rheumatology or related musculoskeletal or inflammatory disease.

We would love to hear from you about your achievements. Have you or a colleague recently received grant funding, passed your PhD viva or accepted a new appointment? If so, let us know by emailing **media@immunology.org**.

FUTURE FOCUS

Hitting the road at last: ECRs at an international conference

After over two years of travel restrictions and many COVID obstacles, in-person scientific conferences are sprouting up again all over the world. Here, the Leukocyte Trafficking Group from the University of Birmingham share their exciting experience at the 15th World Congress on Inflammation (WCI2022) earlier this year, including their highlights, challenges and top tips for ECRs presenting their research.

One of the best perks of working in academia is the opportunity to travel and attend conferences all over the world. Conferences allow early career researchers like ourselves to learn about novel research from experts and enable discussion across multiple disciplines and professional borders. However, balancing attending talks, practising our presentations and making new contacts can be challenging.

Our highlights

WCI2022 was a fascinating four-day event bringing together world-leading researchers from across the globe to discuss all aspects of current inflammation research. Here are our highlights!

- Meeting other researchers. This was the first experience since COVID where we all had to go out and meet other scientists in the real world instead of behind a screen.

- Sharing our research. We were very grateful to be able to share so much work from our lab through numerous poster presentations and talks. Presenting provides an excellent opportunity to receive helpful feedback from other experts.

- It was also very exciting to see scientists getting awards for their achievements, which included awards for early career researchers and lifetime achievement awards. One of the most moving parts was to see the 'Woman in Inflammation Science Award' given to Dr Veroniique Witko-Sarsat and Dr Therea Pizarro – two very strong, encouraging and extraordinary scientists in the field.

Our challenges

The biggest challenge was getting all of us to Rome! This wouldn't have been possible without the support of several travel grants. For a successful travel grant application, you first need to find out all the different options for grant funding. These may include Societies such as the BSI or internal college funding, but there are many other options – research foundations, pharmaceutical companies, or even the conference itself. Ensure you've found out about deadlines way ahead of the conference (we all left our travel grant applications very last minute which didn't go down well when asking our PIs to write a statement of support in 24 hours!). Grants are more likely to be accepted if you already have an abstract accepted as this proves active participation. Really emphasise in your application how this will benefit your career and the justification for financial help.

Once at the conference, one challenge was deciding which sessions to attend as we often wanted to be in two places at once! We would recommend attending sessions related to your own research but also ensure that you make an effort to attend sessions completely unrelated to give a fresh perspective on new scientific techniques and results. It would be useful to do some research on speakers and their research prior to the conference. This will save you some time and help you to make an informed decision on which talks to attend. Another way we managed this was to make sure the group covered as many sessions as we could and we each presented a short recap of our favourite talks to each other at a lab meeting, to give an overview of sessions we might have missed.

It was also very tempting to stay with our colleagues; however, we would recommend engaging with others to make the most of the experience. Although putting yourself out of your comfort zone can be challenging, all delegates we interacted with were very approachable! You should go with an open mind to engage with as many delegates as possible, especially those who reside in a different country to you. This is your chance to begin building strong networks with individuals you would not usually interact with. The likelihood is that they are also feeling anxious, however, once the ice is broken, conversation just starts flowing!

'For a successful travel grant application, you first need to find out all the different options for grant funding. These may include Societies such as the BSI or internal college funding, but there are many other options – research foundations, pharmaceutical companies, or even the conference itself.'

Presenting your data

WCI2022 also provided several students from our lab the fantastic opportunity to present their data via posters or oral talks. Jenefa Begum and Abbey Lightfoot (two award-winning poster presenters!) have put together some tips on how to present a poster:

Tips for presenting a poster

✓ Make sure you submit an abstract! It doesn't cost any extra and can be a great way to meet potential collaborators

✓ Make sure the text is an appropriate size and important information is visible to the audience. Have a good structure with a good balance of text and figures that is simple and easy to follow through each section of your poster

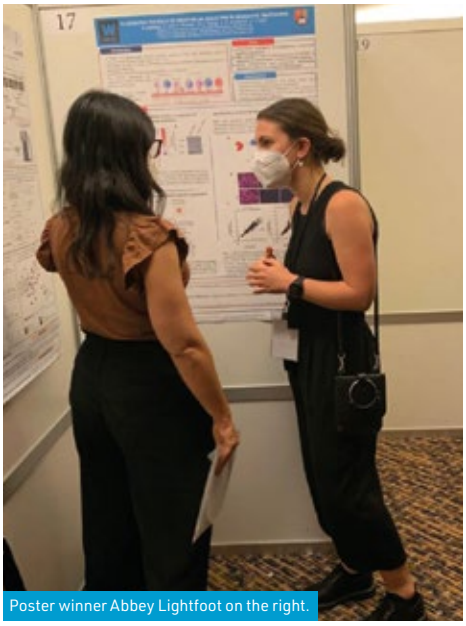
✓ Introduce yourself as the author/ presenter and let the reader know you are happy to talk them through your poster or answer any questions

✓ Put it up early during the conference

People always focus on presenting but actually there's a lot that can be gained from attending poster sessions. To make the most of a poster session:

- Take time early in the conference to look at the posters and make note of any that you'd like to discuss with the author during the poster sessions
- Engage! Ask people to talk you through their poster
- After speaking with the authors, ask for contact information and take the opportunity to reach out after the conference and further develop that research connection

Julia Manning, Sophie Hopkin, and Poppy Nathan (Oral Communications award winner) also had the opportunity to share their work through short oral communications and have put together some do's and don'ts for oral presentations!



Poster winner Abbey Lightfoot on the right.

Poster winner Jenefa Begum on the left.

Do's and don'ts for oral presentations

✓ Keep it simple! All you want to do is convey the take-home messages to the audience in a logical fashion – they do not need to see all of your data

✓ Try to talk at a good pace (not too slow, not too fast) and talk clearly – we find the best way to practise is in front of a mirror so you get used to talking in front of people

✓ If you're feeling anxious, take three deep breaths before standing up for the presentation. Remember, this is just an opportunity for you to share your research with the wider scientific community and not a viva!

✓ Don't just stare at your slides, look at the audience to make them feel included – a presentation is you communicating your findings to the audience not the screen!

✓ If you are faced with some difficult questions or comments don't get defensive. We are all faced with limitations in studies so all you can do is justify your decision-making but agree that more research can be done

In summary

Overall – we had a great time at WCI2022. This incredible experience allowed us to develop our understanding of the wider inflammatory biology field and share our knowledge on leukocyte trafficking with the wider community. We are incredibly thankful we got the opportunity to explore the beautiful city of Rome and spend time together as a lab – which we've not been able to do so much during our PhDs due to the pandemic. If we were to go again we would learn from some of our mistakes, and maybe not stay out at karaoke until 4.30am the night before our flight home! We would like to thank the BSI for awarding us travel grants to attend this conference, and politely request that next year WCI provides free wine during the poster sessions.

Leukocyte Trafficking Group, University of Birmingham
Poppy Nathan, Sophie Hopkin, Imy Wilson, Abbey Lightfoot, Danielle Lezama, Jenefa Begum, Julia Manning, Kathryn Frost, Oladimeji Abudu, Mussarat Wahid and Mustafa Sevim

FUTURE FOCUS

BSI Summer School 2022

An important part of the British Society for Immunology's mission is to support future generations of immunologists. We do this through numerous initiatives, including our Summer School event, which offers immunology students at PhD level the opportunity to hear from leading immunologists and to present their work. Here, our Education & Careers Secretary, Dr Donald Palmer, shares some highlights of the excellent talks given and showcases the bright future of immunology.

'Sent to Coventry'

The term 'sent to Coventry' is a rather old-fashioned phrase meaning to be banished (it's even got its own Wikipedia page!) and while the location of our BSI Summer School 2022 could be considered remote, the entire session generated an interactive and vibrant affair. It's been five years since we've had an in-person Summer School and organisers, delegates – being mostly PhD students – and speakers arrived looking excited and eager to hear the latest in immunology. This year's three-day event consisted of speakers, career panels, but also a number of PhD students were given the opportunity to present their research in lightning talks. In addition to presenting their own research, speakers gave an introductory overview of their specialist area so to provide delegates with a greater appreciation of immunology. Throughout these three days, delegates had plenty of opportunity to engage and interact directly with speakers; which is one the major aims of our Summer School.

After the introduction, Dr Calum Bain (University of Edinburgh) started proceedings by wondering if the current description of macrophages into M1 and M2 is sufficient given their heterogeneity and their diverse roles in health and diseases. John Cole (University of Glasgow) gave a history of 'omics' and provided an 'easy guide' to the field of bioinformatics and coding. A career panel, consisting of Dr Ane Ogbe (Adaptimmune), Dr Elly Rankin (Miltenyi Biotec) and Dr Zania Stamataki (University of Birmingham), described their career journey and fielded questions about the next steps after your PhD. The day ended with a session of fascinating lightning talks given by delegates.

Day 2 – supervisor relationships

Day 2 started with Prof Graham Anderson (University of Birmingham) describing how a possible failure in thymic medulla regeneration during bone marrow transplantation can lead to auto-graft versus host disease. Dr Fiona Culley (Imperial College London) described the immunological factors that protect the lung in the infant and how these change with age.

A session entitled 'Getting the best out of your supervisor relationship' with a panel consisting of Dr Calum Bain, Dr Anne Corcoran (Babraham Institute) and Prof Jim Kaufman (University of Edinburgh) generated a lively discussion with a lot of useful information and insight; the best one being 'there is no one-size-fits-all supervision'.

Prof Danny Altmann (Imperial College London) provided the latest in COVID-19 research highlighting the increasing prevalence of long COVID and the need for more research in this area. Dr Zania Stamataki provided an insight into liver diseases and how immune cells interact with liver resident cells. Prof Sarosh Irani (University of Oxford) described the identification of neurological autoantibody that mediates CNS diseases. The day ended with two further rounds of interesting lightning talks from delegates.

Final talks and lightning winners

The final day session started with Dr Sian Henson (Queen Mary, University of London) who described the metabolic requirements of primary human senescent T cells. Dr Anne Corcoran showed the epigenetic mechanisms in B cell development which are associated with antibody gene segments recombination. In his lecture Prof Jim Kaufman spoke about the importance of comparative immunology using the chicken MHC genes

> "What a brilliant time at #BSISummerSchool thank you to all at @britsocimm for all the hard work, to the speakers for the great talks and for being so involved. I learned so much and have lots of thoughts and ideas to work through. Just wonderful."
>
> **Chris Thorpe**

to highlight this area of biology. Prof David Wraith (University of Birmingham) described the development of antigen-specific epitopes that can be used as immunotherapy agents to treat various autoimmune diseases.

The final talk was delivered by Prof Teresa Lambe (University of Oxford) who gave an excellent overview of how the COVID-19 vaccine was developed and the lessons learnt.

The winners of the lightning talks were also announced. In first place was Sofia Hain from the University of Birmingham, second place was Aure Aflalo from the University of Cambridge and third place Chloe Lockwood from the University of Birmingham. Our congratulations to all winners and to all the delegates who gave such high-quality lightning round presentations.

"Thoroughly enjoyable 3 days in Coventry! Great variety of topics covered for someone who, like me, is new to immunology, and great for making new connections. Would highly recommend!"

Claire Adams

Excellent feedback

One of the key aims of Summer School is to provide networking opportunities for early career immunologists to interact with their peers and with the speakers. That was certainly achieved with a friendly and inclusive atmosphere generated and multiple opportunities to ask questions and get to know fellow delegates. Feedback on the event was extremely positive with 9.4/10 saying they would recommend attending BSI Summer School to a friend or colleague.

Thanks go to our sponsors Miltenyi Biotec and PeproTech, BSI staff – in particular Jennie Evans and Eolan Healy, staff at DoubleTree, speakers, chairs, judges for the lightning round and delegates. We're now looking forward to BSI Summer School 2023 – watch this space for more details!

Dr Donald Palmer
BSI Education & Careers Secretary

BSI Immunosenescence Affinity Group

The British Society for Immunology's Immunosenescence Affinity Group is a network connecting scientists with a key interest in changes to immunity during ageing and differentiation. Here, committee members of the Group tell you more about their upcoming conference, including some exciting speakers to look forward to and plenty of networking opportunities.

The BSI Immunosenescence Affinity Group is holding a two-day meeting on **Monday 3 and Tuesday 4 October 2022** in Sheffield, UK. The theme for the meeting is 'Immune surveillance in the ageing microenvironment'; it will explore the complex relationship between the aged local and systemic microenvironment as they play a fundamental role in tissue maintenance and contribute to the initiation and progression of numerous diseases.

The Group aims to represent changes that occur to both innate and adaptive immunity during ageing and differentiation. This network brings together researchers to highlight changes to all leukocyte types in the immune environment, focusing on how they are integrated, and the impact of intrinsic (cellular–molecular) and extrinsic (physiological–environmental) factors on immune alterations.

The contribution of the microenvironment in the establishment of a 'senescent state' in different cell types and its influence on immune surveillance is often overlooked. This meeting aims to address this by bringing together experts to shed light on this key issue with talks from Dr Masashi Narita about how the endothelium is a non-autonomous SASP target and an organising centre for immune-mediated senescence surveillance. Professor Dan Lambert will discuss the role of non-coding RNA in the microenvironment, while Dr Alice Denton will explain how ageing affects the ability of fibroblasts to support an immune response. Dr Matt Yousefzadeh will show how an aged immune system drives senescence and ageing of solid organs. Finally, Professor Shelia Francis will talk about how endothelial senescence impacts upon age-related diseases.

We are also keen to emphasise how the use of different model systems can be used in ageing research and Dr Michael Rera will discuss how intestinal barrier dysfunction is an important event that can act as a proxy for predicting how ageing and disease develop across a variety of organisms, from flies to fish and, possibly, humans. There will also be a talk from Dr Jenny Regan who uses *Drosophila* to understand how the dynamic behaviour of immune cells differs between sexes and how these affect the response to infection, inflammation and ageing.

The BSI Immunosenescence Affinity Group has put together an exciting programme that puts particular emphasis on the crucial role played by the microenvironment in immune surveillance in different tissues and species across the life course and in health and disease. We are keen to give a platform for PhD students and Early Career Researchers to showcase their work and have created flash talks in every session, together with posters. There will be plenty of opportunities for attendees to interact and network with each other and invited speakers during the sessions, as well as at the more informal social event arranged for the evening. Finally, we would welcome people getting involved to discuss and potentially prepare a publication for *Discovery Immunology*, an official journal of the BSI, at the end of the conference.

Registration is still open and we look forward to seeing you at the meeting!

Dr Sian Henson, Dr Catarina Henriques & Dr Natalie Riddell,
BSI Immunosenescence Affinity Group Committee members

> 'There will be plenty of opportunities for attendees to interact and network with each other and invited speakers during the sessions, as well as at the more informal social event arranged for the evening.'

Find out more

- More details and to register for the upcoming conference: **www.immunology.org/events/immune-surveillance-in-the-ageing-microenvironment**.
- To join the Group and take part in upcoming activities, visit their page: **www.immunology.org/immunosenescence-affinity-group**.
- Follow the Group on Twitter **@BSI_immunosen**

Immune Update

The BSI journals

A round-up of new research published in the British Society for Immunology's official journals, written by ECR board members of *Clinical & Experimental Immunology*. Members can access these journals free of charge at **www.immunology.org/journals** and benefit from discounted publication fees.

Discovery Immunology

New rules needed for TCR engagement?

The binding of peptide–MHC complexes by TCRs underlies T cell immunity. This review by Hopkins *et al.* describes the presentation pathway for human MHC class I (HLA-I)-bound peptides, the antigens recognised by cytolytic $CD8^+$ T cells. They catalogue published peptide–HLA-I complexes that don't show the typical expected characteristics, shedding light on the diversity of antigen presentation.

Among the oldest known 'rule-breaking' peptides are those seemingly too long for HLA-I, achieved by peptides bulging out of or extending beyond the binding groove. More recent examples include variations in either the peptides or the HLA resulting in different presentation, or how binding of TCR or drugs can induce HLA structural changes. Non-crystallographic structural methods have revealed more of the dynamics of molecules involved. Notably, observations that variation in the HLA or even the bound peptide can affect the flexibility of the HLA, impacting TCR discrimination, has important implications for T cell research.

The authors conclude that, as increasing numbers of researchers build HLA-I-targeting therapies, it is important that we understand the rules of 'unconventional' peptide presentation, especially as it may be more common than we expect.

Hopkins *et al.* 2022 *Discovery Immunology* kyac001 **https://doi.org/10.1093/discim/kyac001**. Summary by Dr James Heather, MGH Cancer Center, Harvard University

Immunotherapy Advances

Understanding adrenergic signalling regulation of macrophages

Macrophages are immune cells that play a pivotal role in both the innate immune response and tissue remodelling. Depending on the microenvironment, macrophages acquire a broad range of phenotypes, ranging from classically activated highly pro-inflammatory, IL-6, TNF-α and IL-1β producing M1-like macrophages, to alternatively activated IL-4, IL-13 and IL-10 releasing M2-like macrophages, which are involved in tissue repair and homeostasis.

Macrophage differentiation and functions can also be regulated by mediators produced by the nervous system, including catecholamines, noradrenaline and adrenaline, which interact with α- and β-adrenergic receptors (AR) expressed by macrophages. β2AR and αAR receptors are involved in either inhibition or stimulation of pro-inflammatory and anti-inflammatory cytokine production by macrophages, including IL-6, TNF-α, IL-1β and IL-10, depending on the specific context. What is more, both α- and β-receptors are involved in macrophage phagocytic and microbicidal activities, that is, by regulation of nitric oxide (NO) production.

Macrophages are also able to produce catecholamines endogenously, which can then act in an autocrine or paracrine way. In summary, diverse interplay of AR signalling and macrophages is unquestionable and needs further studies.

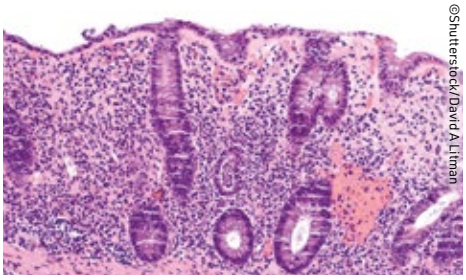
Freire *et al.* 2022 *Immunotherapy Advances* **2** ltac010 **https://academic.oup.com/immunotherapyadv/article/2/1/ltac010/6596705**. Summary by Dr Marzena Lenart, Jagiellonian University

Clinical & Experimental Immunology

Features of patients with IL10/IL10R deficiency: a systematic review

Interleukin10 (IL10) and IL10 receptor (IL10R) deficiencies are monogenic inborn errors of immunity (IEI) causing early-onset inflammatory bowel diseases (IBD).

Sharifinejad *et al.* assessed 286 patients as part of a systematic review, including 267 patients with genetic diagnosis of IL-10 deficiency (8, 3%) and IL-10R deficiency [IL-10RAD (185, 69.3%), IL-10RBD (68, 25.5%), IL-10RAD/RBD digenic (6, 2.2%)]. Most patients were male (55.5%) from Asia (67.4%) and born to non-consanguineous parents (72.2%). The median age at first presentation was between 1 month and 1.4 years. Patients with IL-10RAD were diagnosed and were more likely to pass away at lower ages compared with those



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with IL-10RBD.

Gastrointestinal manifestations included IBD, malnutrition/FTT and perianal disorders like fistulae, abscesses and skin tags. The most common extra-intestinal symptom was skin disorders (45.5%) and respiratory infections (23.9%). Notably, skin disorders and FTT were found in IL-10RD but not IL-10D. Besides immunosuppressive agents and HSCT, 57.5% of patients required surgery. Patients who received a transplant did not relapse.

The authors attributed distinct clinical manifestations of IL-10RAD and IL-10RBD to interactions between the target tissue and cytokines other than IL-10 capable of binding to IL-10RB, requiring further translational studies.

Sharifinejad *et al.* 2022 *Clinical & Experimental Immunology* **208** 281–291 **https://doi.org/10.1093/cei/uxac040**. Summary by Dr Mahnaz Jamee, Shahid Beheshti University of Medical Sciences

Around the journals

A summary of some of the latest papers from the world of immunology.
Written by Edd James, Louisa James and Donald Palmer.

pH sensing controls inflammatory circuits and tissue homeostasis

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Tissue acidification occurs during inflammation in chronic inflammatory disease such as inflammatory bowel disease (IBD). pH-sensitive G protein-coupled receptors, in particular GPR65, is associated with IBD and its loss triggers exacerbation of inflammation. How these receptors and their variants contribute to tissue homeostasis and control of inflammation is poorly understood.

Here, Chen and colleagues show that a disease associated variant of GPR65 (Ile231Leu) reduced anti-bacterial responses in bacteria-induced colitis and increased inflammation in a T cell transfer model of colitis. These changes were associated with a switch in $CD4^+$ T cell differentiation from Th17 and Th22 polarisation to Th1-like cells, a reduction in anti-inflammatory IL-10 production and increased pro-inflammatory cytokines TNF-a and IFN-g. Interestingly, Ile231Leu also induced production of pro-inflammatory cytokines and prolonged antigen presentation in dendritic cells.

These findings allow a better understanding of inflammation and tissue homeostasis, which may be exploited for therapeutic benefit in the future.

Chen *et al.* 2022 *Nature Immunology* **23** 1063–1075

Viral infection engenders bona fide and bystander subsets of lung-resident MBCs through a permissive mechanism

Long-lived, lung-resident memory B cells (MBCs) have been recently identified as a functionally distinct subset from those in the circulation. Gregoire and colleagues used an Aicda-reporter mouse to track populations of lung-resident MBCs during experimental influenza infection, independent of their antigen-specificity.

Single-cell profiling identified two major MBC subsets that were distinguishable by differential expression of the chemokine receptor, CXCR3. Whereas $CXCR3^+$ MBC were specific for influenza antigens and differentiated into antibody-secreting cells upon secondary challenge, $CXCR3^-$ MBC were not antigen-specific and originated from distinct clonal lineages. Intriguingly the $CXCR3^-$ subset had undergone class switching to IgG and were derived from germinal centre reactions, likely a bystander effect of localised IL-4 production by T follicular helper cells. $CXCR3^-$ MBC expressed high levels of IgM Fc receptor and could capture IgM immune complexes.

This suggests a functional role for bystander MBCs in the local capture and retention of antigen, supporting the differentiation of their antigen-specific counterparts during secondary antigen exposure.

Gregoire *et al.* 2022 *Immunity* **55** 1216–1233

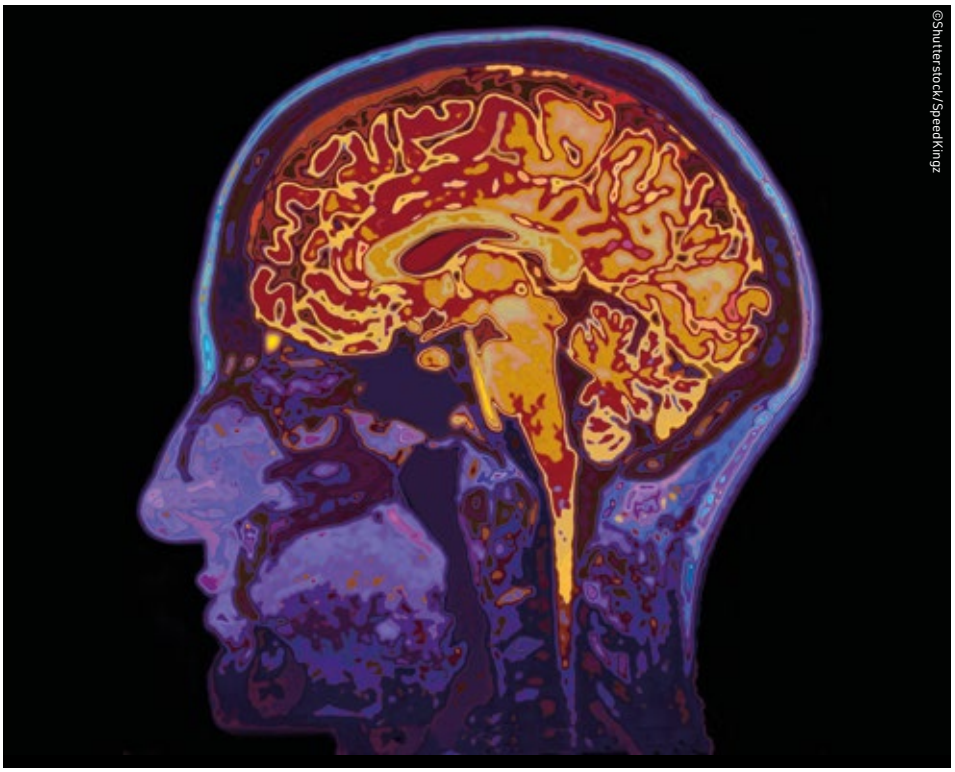
Brain-specific IL-2 gene delivery as effective protection against neuroinflammation

Tissue-resident Treg cells have been identified in a number of non-lymphoid tissues including low levels in the brain, casting further doubt on the notion that the CNS is an immune privilege site. Interestingly, studies have revealed that the number of CNS-resident Tregs cells alter under various neuroinflammatory conditions.

To explore the potential role of these cells further, using transgenic technology, Yshii and colleagues specifically delivered IL-2 in astrocytes and observed that this enhanced level of IL-2 increased CNS-resident Treg cells, which were able to alleviate disorders associated with traumatic brain injury, stroke and multiple sclerosis.

These studies highlight that CNS-resident Treg cells could potentially be a therapeutic agent in various neuroinflammatory disorders.

Yshii *et al.* 2022 *Nat Immunol.* **23** 878–891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