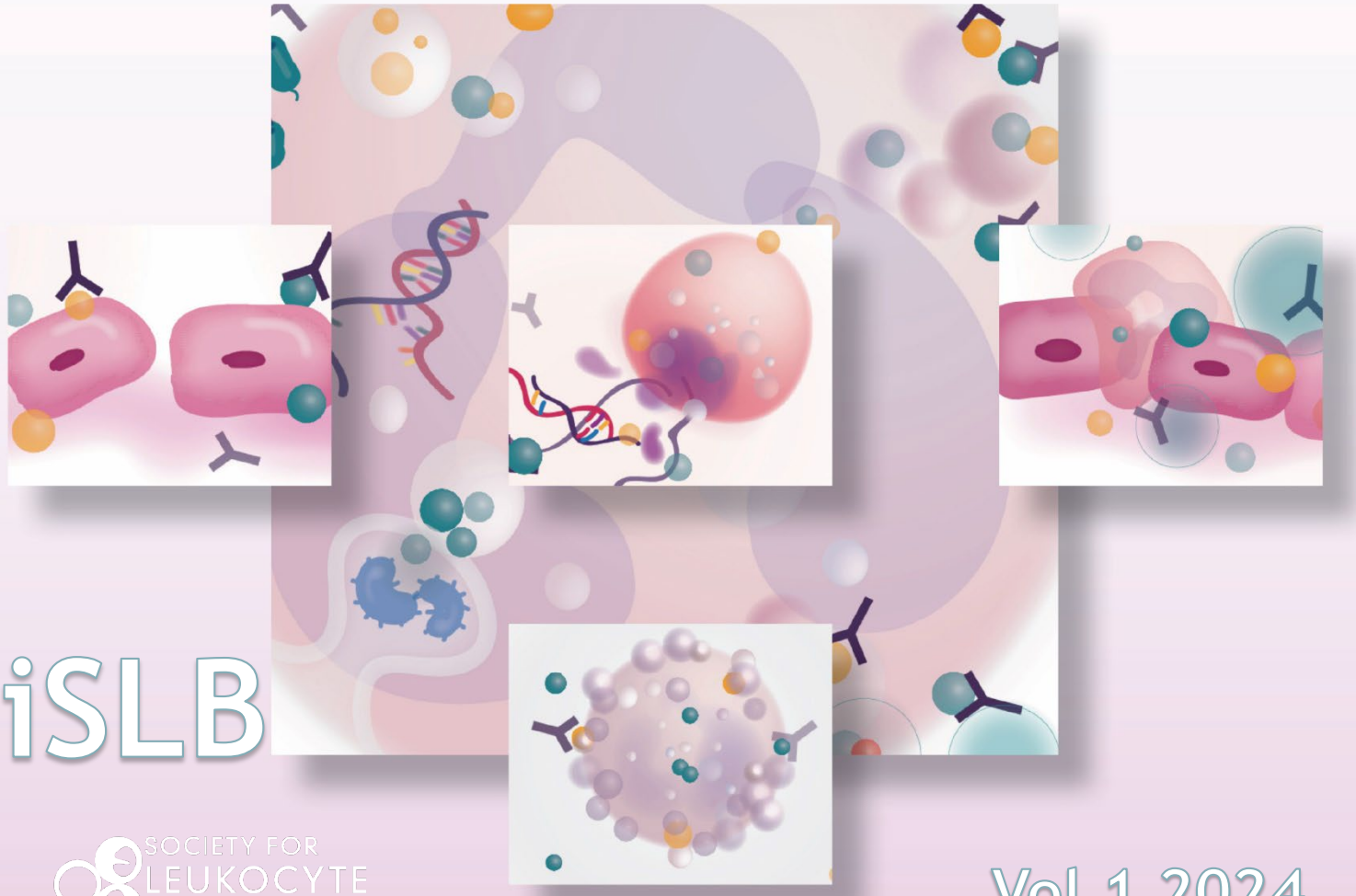


# iSLB

SOCIETY FOR LEUKOCYTE BIOLOGY

Vol 1 2024

## In this issue…..

# A Message from the President


Lou Justement

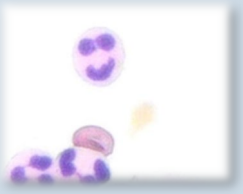
I am honored to have the opportunity to serve as President of the Society for Leukocyte Biology (SLB). SLB was the first professional scientific society I joined when I was a graduate student in the laboratory of Bruce S. Zwilling, my mentor, and a former SLB President. Over the years, I have greatly enjoyed being a member of SLB, getting to know many fellow scientists and trainees, who became friends, colleagues and collaborators. I was also fortunate to have the opportunity to be an active participant in the Society, serving as a member and Chair of the Nominating Committee, a member of the Professional Development Committee and finally a member and Chair of the Publication Committee. Prior to being elected as President, I served as a member of the SLB Council, which provided me with an appreciation of just how great SLB's focus is on supporting trainees, early-stage investigators, and women in science, as well as diversity, equity and inclusion. Over the years many people have told me that SLB is a welcoming and supportive organization that provides opportunities for its members to be involved and to contribute to the scientific community that is SLB. I have always found this to be true from a personal perspective and it is my goal to pay that forward by encouraging all members to work together to foster an inclusive organization that welcomes and supports everyone.

My first task as President is to thank David Underhill for his outstanding leadership over the past two years. David's dedication and vision helped SLB navigate numerous challenges and changes as the Society started to move past the pandemic; returning to a new normal in which we have now had two in-person meeting and have plans for outstanding annual meetings this year and next. Under David's tenure as President, the Journal of Leukocyte Biology initiated a new partnership with Oxford University Press and is in the process of transitioning its manuscript submission system to provide enhanced features and functionality for the Editorial Board and for authors. Like many other professional scientific societies SLB has had to navigate challenges posed by decreasing journal revenues. Under David's leadership, the Society has made a number of budgetary adjustments, and I am pleased to say that SLB is charting a fiscally-responsible course into the future that will ensure its long-term continued success, while at the same time continuing to offer members outstanding benefits. These are just a few of the issues that David has dealt with in conjunction with the Executive Leadership, Council, Committees and the membership at-large during his tenure. I am thrilled that David is not going far and I look forward to working with him as Past-President and Cindy Leifer who is President-Elect.

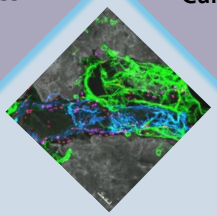
The future of SLB as a vibrant, welcoming organization that supports the leukocyte biology community is dependent on its members. Therefore, I challenge each of you who belong to SLB to do what you can to support your Society. Spread the word about our Society and recruit a new member to join. Consider attending *SLB 2024 - Not Lost in Translation: Innate and Adaptive Immunity* to be held in the Kellogg Hotel and Conference Center at Michigan State University, October 22-25th. Attending the annual meeting is an outstanding way to support the Society, and to benefit from opportunities to network, to present your science, to win awards and to participate in sessions focused on career and professional development, immunology education and much more. The organizers Amanda Brown, Jamie Sturgill and Nathaniel Lartey have put together an amazing agenda, including a day-long session in conjunction with IEIIS, as well as 4 Special Interest Group sessions to kick off the meeting. Finally, please consider publishing your work in the Journal of Leukocyte Biology as this will directly benefit the Society by promoting the success of the journal and increasing the revenue that it generates. These funds enable the Society to host outstanding annual meetings, to provide a wide range of awards for members and travel support for those in need to attend the annual meeting. If we all work together and do our part, there is no limit to the success that can be achieved and the benefits that you will enjoy as a member of SLB.

## SLB's Annual Image Contest

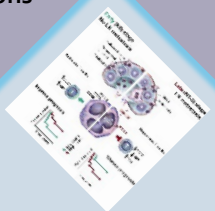
April 29th is the International Day of Immunology! SLB welcomes members to participate in a little fun. Submit an original, self-made, unpublished image in any of these categories and be entered into a prize drawing. Formats accepted include jpegs, gifs, pngs, and pdfs. Entries are being accepted **now through 5pm eastern Thursday, April 18th**. Winners to be announced on April 25th in celebration of the International Day of Immunology. Learn more and submit today!


*2023 Winner: Carol Gardner*

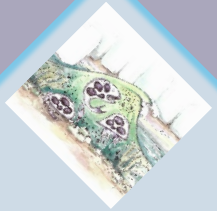
**Microscopic Images**



**Science Humor Cartoons**



**Graphical Abstracts**



**Scientific Art**

*By submitting your image and caption, you give SLB permission to include the images (with credit) in the next issue of iSLB and on the society website.*

# Data-Sharing Repositories

By Zhichao Fan and the SLB Publications Committee

The new NIH Data Management & Sharing (DMS) Policy took effect on January 25, 2023, and applies to all NIH-funded research resulting in scientific data to promote the sharing of scientific data. Although investigators will need to do additional work, data management and sharing have many benefits, including: 1) Collaboration: Data sharing encourages researchers to collaborate, which can lead to new findings. 2) Transparency: Data sharing can provide more transparency into how research has been conducted. 3) Research acceleration: Sharing scientific data can help biomedical research discovery by validating research results, providing access to datasets, and promoting data reuse. 4) Efficiency: Data sharing can be more efficient than other methods because it allows researchers to share resources. 5) Reduced costs: In healthcare, data sharing can help professionals access patients' public information to create customized treatment plans, reducing time and cost. 6) Improved data quality: Data management practices can improve the quality and consistency of data. They can also help organizations define data standards, incorporate validation rules, and perform data cleansing.

Besides large scientific data, such as molecular structure, sequencing, and proteinomics data, the new NIH DMS Policy requires investigators to share all types of data they generated. To help NIH-funded SLB members and JLB authors figure out how and where to publish and share their data following the NIH DMS Policy, we investigated and recommend some free-of-charge data-sharing repositories in this article. The *Journal of Leukocyte Biology* is committed to providing a positive author experience. The current policy of JLB expects data and unique reagents be made available to researchers, and recommends (but does not require) that data not present in the main manuscript or supplement be deposited in a public repository.

## 1. General repositories for all kinds of data

Biological and biomedical science generate different types of data using various experimental techniques. Thus, repositories accept multiple types of data that are needed for most research. Here, we listed some general repositories accepting all kinds of research data.

### 1.1 Harvard Dataverse

Harvard Dataverse is a free online data repository that allows researchers to share, preserve, cite, explore, and analyze research data. It's open to researchers from all disciplines, both inside and outside of the Harvard community. Harvard Dataverse is built on open-source software and provides access to a variety of datasets to support research. It includes the world's largest collection of social science research data. You can find data across research fields, preview metadata, and download files.

### 1.2 Dryad

Dryad is a free, open-access data repository for research data. It's built on open-source software and is used for sharing, publishing, and preserving publicly available research data. Dryad is primarily used for data related to scientific and medical publications, especially those in evolutionary, genetic, and ecology biology. Dryad makes data discoverable, freely reusable, and citable. It also offers a secure location for researchers to store their data. Dryad charges excess storage fees for data totaling over 50GB. For data packages in excess of 50GB, submitters will be charged $50 for each additional 10GB or part thereof. Dryad also allows users to make datasets private during the peer review process. This option provides a private URL that allows for a double-blind download of the dataset.

### 1.3 Figshare

Figshare is a free, open-access online repository for researchers to share their research outputs. It is a general-purpose file repository that accepts all forms of research output, including data files, figures, datasets, images, and videos. Figshare is free for researchers to use and provides free, open access for others to view and download research. All figshare.com accounts are provided with 20GB of private storage and are able to upload individual files up to 20GB.

### 1.4 Mendeley Data

Mendeley is a reference manager software that can be used to manage and share research papers and to generate bibliographies for scholarly articles. Mendeley Data is a free, open research data repository that allows researchers to upload and share their research data. It's a cloud-based repository that can store data, making it easy to share, access, and cite. Researchers can deposit any research data, including raw and processed data, video, code, software, algorithms, protocols, and methods. Datasets can be shared privately or publicly .

### 1.5 Open Science Framework

The Open Science Framework (OSF) is a free, open-source platform that can store and archive research data, protocols, and materials. OSF is a trusted repository that generates citations for each component in a project and assigns every project, component, and file a short URL. The OSF Registry is a permanent, transparent, and easily accessible repository that enables the archiving, sharing, searching, and aggregating of funded study plans, designs, data, and outcomes. OSF backs up operational data (e.g., config files) for other OSF services in primary cloud file storage for 60 days. Logs are primarily stored in Google Cloud cold storage indefinitely. OSF backs up operational data (e.g., config files) for other OSF services in primary cloud file storage for 60 days. Logs are primarily stored in Google Cloud cold storage indefinitely.

### 1.6 Synapse

Synapse is a data repository finder at MIT that allows researchers to share and describe data, analyses, and other content. Data and analyses can be stored in many types of locations, including private servers, local hard drives, or cloud storage. The free standard plan of Synapse allows sharing data less than 100GB.

### 1.7 Zenodo

Zenodo is a free, open-access repository that allows researchers to share and preserve their research. It's maintained by CERN, the European University Institute. Zenodo is a general-purpose data repository that accepts all forms of research output, including data files, research papers, research software, reports, and other digital artifacts. Scholars from any research discipline can upload data in any file format, and all Zenodo files

automatically receive a digital object identifier (DOI). Zenodo has no upper data limits, but there is a 50 GB limit per record. Items are retained for the lifetime of the repository, which is currently the lifetime of CERN.

**1.8 BioStudies**

The BioStudies database is a permanent repository for life sciences data. The mission of BioStudies is to provide access to all the data outputs of a life sciences study from a single place by organizing links to data in other databases at the European Bioinformatics Institute (EMBL-EBI) or elsewhere, as well as hosting data and metadata that do not fit anywhere else. The database accepts submissions via an online tool or in a simple tab-delimited format. BioStudies provides rich mechanisms for defining and using metadata guidelines specific to a particular data source, such as a project or a community, and organizes datasets in collections. The BioStudies database contains descriptions of biological studies, links to data from these studies in other databases at EMBL-EBI or outside, and data that do not fit in the structured archives at EMBL-EBI. The database can accept a wide range of types of studies described via a simple format. It also enables manuscript authors to submit supplementary information and link to it from the publication.

**2. Flow cytometry data repository - FlowRespository**

As a society focusing on leukocyte biology, flow cytometry is a standard experimental technique for phenotyping leukocyte populations and quantifying molecular expression. FlowRepository is a web-based database of flow cytometry experiments. It is provided by the International Society for Advancement of Cytometry (ISAC). FlowRepository allows users to: 1) Access, review, download, deposit, annotate, share, and analyze flow cytometry datasets; 2) Query and download data collected and annotated according to the MIFlowCyt standard; 3)Share annotated datasets upon publication.

**3. Microscopy image repositories**

Microscopy is the main technique to visualize and study the structure and function of cells and is very important for leukocyte research. Most microscopy techniques generate much larger data than other experimental procedures. Thus, special repositories to store and share microscopy images were established.

**3.1 Image Data Resource**

The Image Data Resource (IDR) is a public repository that stores, integrates, and serves image datasets from published scientific studies. The IDR allows the community to submit, search, and access high-quality bio-image data, even processing and analyzing the image data. Sharing data promotes the validation of experimental methods and scientific conclusions, the comparison with new data obtained by the global scientific community, and enables data reuse by developers of new analysis and processing tools. IDR datasets are annotated with author-supplied metadata (e.g., annotations, defined regions, feature vectors, and ontological annotations) stored and available for browsing. To date, the IDR has stored more than 14 million images larger than 384 TB from 125 studies.

**3.2 ShareLoc**

Single-molecule localization microscopy (SMLM) is a group of imaging techniques, including PLAM (photo-activated localization microscopy), STORM (stochastic optical reconstruction microscopy), and PAINT (point accumulation for imaging in nanoscale topography), that can capture biological structures at the molecular scale. SMLM can produce optical images with a spatial resolution of 2–25 nanometers. SMLM allows leukocyte biology researchers to illustrate more molecular details in determining molecular mechanisms of leukocyte function. ShareLoc is an open platform designed to facilitate the sharing, visualization, annotation, and community-based reutilization of SMLM data. ShareLoc consists of (i) a storage service backed by Zenodo, a widely used open-access repository mentioned above, and (ii) an extendable system of web plugins built upon ImJoy, a state-of-the-art platform for developing and deploying interactive data science tools. With a Zenodo login, users can easily upload and store SMLM data (localizations and/or raw images up to 50 gigabytes) through the ShareLoc platform, automatically generating a digital object identifier (DOI). Upon review and approval by a ShareLoc administrator, the new data will be shown on the ShareLoc website and available for download, visualization, export, and reanalysis.

Table 1. A list of data-sharing repositories:

| Name | Supported Data Type | Website link |
|---|---|---|
| Harvard Dataverse | All types | https://dataverse.harvard.edu/ |
| DRYAD | All types | https://datadryad.org/stash |
| Figshare | All types (up to 20GB) | https://figshare.com/ |
| Mendeley Data | All types | https://data.mendeley.com/ |
| Open Science Framework | All types (also publish preprints) | https://osf.io/dashboard |
| Synapse | All types | https://www.synapse.org/ |
| Zenodo | All types | https://zenodo.org/ |
| BioStudies | All types | https://www.ebi.ac.uk/biostudies/ |
| Image Data Resource | Microscopy images | https://idr.openmicroscopy.org/ |
| ShareLoc | Super-resolution microscopy | https://shareloc.xyz/#/ |
| FlowRespository | Flow cytometry data | http://flowrepository.org/ |

# Eosinophil – A Cell Faced with an Identity Crisis

By Amali E. Samarasinghe

A new feature in iSLB, we'll be highlighting various cell types, explaining their history, significance and future focus. Have a cell type you want to write about? Contact us!

Complexities and unknowns about the immune system have baffled immunologists for centuries and will continue to do so. New knowledge about our favorite immune cells may either be garnered due to advancements in technology or rather serendipitously. Like most innate immune cells, eosinophils were discovered over a century ago. Although the earliest references to a granule cell in blood is made by Thomas Wharton in 1846 where the description and sketches are remarkably similar to an eosinophil,[1] it was Paul Ehrlich – Nobel prize laureate in physiology and medicine in 1908 – who is credited for the discovery of eosinophils and mast cells. During Ehrlich's doctoral training, the chemical dye industry was booming in Germany, among them, the development of eosin (a class of fluorescein dyes) by Heinrich Caro. The innovative application of these dyes in histology permitted Dr. Ehrlich to identify and study blood cells including 'eosin-lovers' – eosinophils. Using microscopy-based experiments alone, he described different types of granules in immune cells categorizing eosinophils as cells with alpha granules. Other discoveries by Ehrlich include the recruitment of these cells in response to certain triggers and that eosinophil granule products were 'secreted'.[2]

Fast forward a century and eosinophils are fully characterized as an innate immune cell that is derived from the $CD34^+$ hematopoietic stem cell co-expressing PU.1, GATA1, and c/EBP transcription factors in a well-orchestrated sequence.[3,4] Increased expression of the IL-5R on the cell surface marks commitment to the eosinophil progenitor lineage.[5] Interleukin 5 is recognized as a vital growth factor and chemokine for eosinophils in addition to the recognition of an entire group of chemokines termed 'eotaxins' (CCL11, CCL24, and CCL26) as regulators of eosinophil recruitment and survival in tissues.[6,7] A mature eosinophil is indeed a thing of beauty marked by a bilobed nucleus and numerous mature granules made up of an electron dense core comprised of major basic protein (MBP) and an electron lucent matrix that contains other eosinophil proteins (**Fig 1**). Density-based isolation methods are still more accurate than the use of surface markers, as eosinophils, like other innate immune cells are in a constant dress rehearsal altering the expression of surface markers depending on the environmental cues and activation status. Unlike other granulocytes however, eosinophils are unique in their ability to release their granule contents by four different avenues: a) piecemeal degranulation, b) classical exocytosis, c) compound exocytosis, d) cytolysis[8] The choice of the pathway depends on the activation signal and microenvironmental cues.

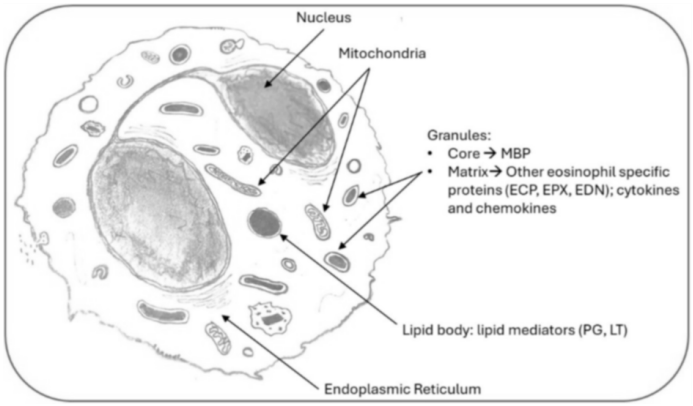
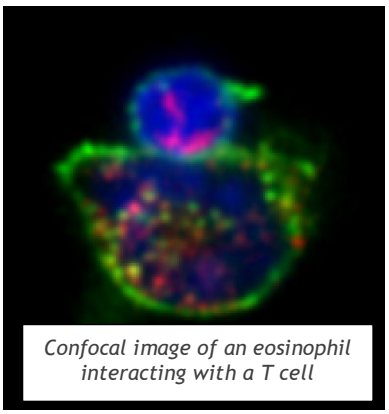



***Figure 1**: Eosinophil morphology with major organelles marked*

The primary role of eosinophils in the immune system was considered to be in anti-parasite defenses. Eosinophil granule proteins, MBP, eosinophil peroxidase (EPX), eosinophil cationic protein (ECP), and eosinophil RNases all have known functions in neutralizing extracellular parasites.[9] In addition to direct neutralization of helminths, these granule proteins partake in cross communication with neighboring innate immune cells such as dendritic cells to promote T cell bias toward a Th2 phenotype which is beneficial to kill and expel parasites.[10] The 'old friends' hypothesis and derivatives thereof, suggest that allergic diseases that are predominantly of Th2 bias with eosinophilia are a result of faulty activation of the anti-parasite immune defenses.[11-13] Allergic diseases like asthma are common through starvation in a more specific manner (mepolizumab: anti-IL-5 and benralizumab: anti-IL5Rα) compared to corticosteroids which also kill eosinophils. In these Th2-biased conditions of the immune system, eosinophils are painted as an unsophisticated killer that simply degranulate on site to release proteins that are sufficiently potent to cause damage to parasite exoskeletons inadvertently damaging host tissues. In that light, eosinophils are a nuisance to be removed from the host (as in asthma).

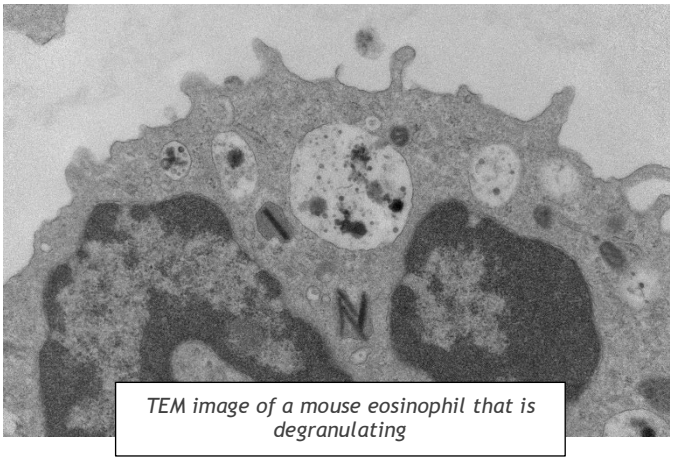
However, the identification that eosinophils have been evolutionarily preserved for over 400 million years in vertebrates and invertebrates alike[14] brings to question the true function of these cells. Perhaps due to their "known" functions in Th2-prone diseases, additional functions of eosinophils in host defense against microbes have gone unnoticed by large.[9] For example, eosinophil granule proteins have been shown to be both antibacterial and antiviral.[9] Additionally, during viral infections, eosinophils have been shown to play an important immunoregulatory role by antigen presentation and enhancement of cellular immunity.[15] However, eosinophils are not among the first to be recruited in either viral or bacterial infections despite their known capacity to neutralize both types of pathogens. What then, could their role be in immune defense strategies to viruses or bacteria?



*Confocal image of an eosinophil interacting with a T cell*

In the local immunity and/or remodeling/repair (LIAR) hypothesis proposed in 2010 by the late Dr. James Lee, eosinophils are preserved in the host for both early and late phases of immune responses.[14] Considering that eosinophils are found in early phases of development, and in varying organs including non-mucosal sites not commonly associated with infections (eg: mammary gland, thymus).[16] Novel functions for eosinophils as important mediators of the wound healing or repair phase after perturbation is gaining attention given the kinetics of eosinophil recruitment into the tissue.[14,16] Mitochondrial remodeling occurs in activated eosinophils,[17] further suggesting that eosinophils are active participants in immune responses rather than simply cells designed to release their cargo and die. Most recently, eosinophils are found to play a role in host anti-tumor responses;[18] an exciting new feather for this truly multifunctional cell.

Since its discovery by simple technologies like tissue staining and light microscopy in 1879, eosinophils have been investigated, mostly as bad actors in the host. However, with the advent of recent technologies that make possible the study of these fragile cells help shed new light on them to explain what their true purpose is in the immune system to mark them worthy of 400 million years in the making.




*TEM image of a mouse eosinophil that is degranulating*

**Personal note:** I have been working on allergic asthma since 2006 when I began working in the laboratory of Dr. Jane Schuh at North Dakota State University. It was then that I first laid eyes on the eosinophil, and it was indeed love at first sight. However, I would only have the opportunity to observe eosinophils on the sidelines as a marker of the allergic state as my project was already focused and provided no time, space, or money for additional avenues. Following my PhD in 2010, I moved to the department of Infectious Diseases under the mentorship of Dr. Jon McCullers at St. Jude Children's Research Hospital to incorporate respiratory infections into my skillset and interests. Unexpectedly, eosinophils made their way into my research on influenza, giving me the luxury of focusing on them as a key player in the antiviral response in hosts with allergic asthma. [Out of affection, I wrote the following poem during my postdoctoral training in 2011.] My work in this area not only led to new discoveries about eosinophils, but also laid the foundation to a new field of study on immune responses to infection in hosts with an underlying chronic disease. The journey then, or now, was not easy, but totally worth every agony as I have the privilege of working on a cell that I adore. Click here to review References

Oh eosinophile, such is your beauty,
Over a century has passed since your discovery,
And yet, you continue to be true mystery.
Numerous are your flavors selected by organ type,
Plenty are your functions based on cytokine,
You fight a good battle against the macro-parasite,
But what do you do when you see the dust-mite?
Who calls you in and who makes you die? And how do you process that peptide?
Alas! Your secrets keep me occupied,
Safe at last, from my P.I.

# Behind the Science: Interviews with JLB Authors

Read the full article in JLB...

by Subhash Arya

Contact Jhefferson to learn about his work.

*Jhefferson Barbosa Guimarães and lab members*

## Inulin prebiotic ameliorates type 1 diabetes dictating regulatory T cell homing via CCR4 to pancreatic islets and butyrogenic gut microbiota in murine model.

**Jhefferson Barbosa Guimarães,** Vanessa Fernandes Rodrigues,Ítalo Sousa Pereira, Gabriel Martins da Costa Manso, Jefferson Elias-Oliveira, Jefferson Antônio Leite, Mariana Camila Gonçalves Miranda Waldetario, Sarah de Oliveira, Arilson Bernardo dos Santos Pereira Gomes, Ana Maria Caetano Faria, Simone Gusmão Ramos, Vânia L.D. Bonato, João Santana Silva, Marco Aurélio Ramirez Vinolo, Ulliana Marques Sampaio, Maria Teresa Pedrosa Silva Clerici, and Daniela Carlos

**Q:** Where did your journey in science begin (what inspired you to pursue a career in science)?

**A:** Since my childhood, I have always harbored a deep curiosity to unravel the intricate secrets of how the world around me functions. Therefore, upon entering university, I chose the field of biomedicine. In my first semester, I had the remarkable opportunity to receive a scientific initiation scholarship in the microbiology laboratory.

Upon completing my undergraduate studies, I decided to continue my academic journey by enrolling in the Master's program in Basic and Applied Immunology at the renowned University of São Paulo, a prominent institution in Latin America. In this high-level research environment, I significantly honed my skills in molecular and cellular biology. The inspiring force that guided my academic path was undoubtedly the professors who proved to be true mentors, skillfully guiding me into the realm of scientific research.

**Q:** How did you choose your current research topic and interest?

**A:** Due to my work experience in microbiology and my affinity for immunology, I had the opportunity to meet Dr. Daniela Carlos, an expert

in the study of autoimmune diseases and the understanding of the role of the intestinal microbiota in this context. This intersection between the two disciplines represents an integrated approach aligned with my interests.

**Q:** Could you use a few lay sentences to describe/summarize your findings in this paper?

**A:** Recently, we discovered that maintaining a healthy balance of bacteria in the intestine, through the inclusion of a prebiotic (dietary fiber) called inulin in the mice's diet, plays a crucial role in preventing type 1 diabetes. This prebiotic helped induce special cells, called Treg Foxp3+CCR4, in the lymph nodes of the cecal region of the mice's intestines. These cells are essential for controlling inflammation, and their presence proved vital not only in the intestine but also in preventing the development of this disease.

**Q:** What was the most exciting or memorable moment(s) during the process of this research?

**A:** Certainly, all the results we found to explain the mechanism behind the intervention used in our study were exciting and unforgettable.

**Q:** What was the biggest hurdle or challenge associated with this story?

**A:** The mental and physical strain during scientific research became even more challenging due to issues arising from the COVID-19 pandemic. The need for constant adaptation, additional pressure, and uncertainties caused by the global situation heightened the fatigue experienced both mentally and physically throughout the research process.

**Q:** Besides your PI is there anyone that significantly helped on your path to become a scientist?

**A:** Colleagues and laboratory technicians played an essential role in conducting the experiments.

**Q:** What's next for you?

**A:** I hope to join the faculty of a university as a professor and researcher.

**Q:** What would your advice be for junior or incoming Ph.D. Students who want to pursue a career in science and perhaps your field?

**A:** It is crucial to cultivate persistence and determination to achieve this goal.

**Q:** Tell us something about yourself outside of being a scientist.

**A:** In my free time, I enjoy playing the guitar and watching series.

## Bacteria- and fungus-derived PAMPs induce innate immune memory via similar functional, metabolic, and transcriptional adaptations

Contact Maggie to learn about her work...

Read the full article in JLB...

*Maggie McBride and lab members*

**Margaret A. McBride**, Cody L. Stothers, Benjamin A. Fensterheim, Katherine R. Caja, Allison M. Owen, Antonio Hernandez, Julia K. Bohannon, Naeem K. Patil, Sabah Ali, Sujata Dalal, Mohsin Rahim, Irina A. Trenary, Jamey D. Young, David L. Williams, and Edward R. Sherwood

**Q:** Where did your journey in science begin (what inspired you to pursue a career in science)?

**A:** I was inspired to pursue a career studying infectious disease by my experience in Science Olympiad, an extracurricular activity I did in middle school and high school. I was exposed to many scientific fields though Science Olympiad but was most excited about epidemiology. I was inspired to pursue medicine by my mom, who is a nurse anesthetist. I have been working on my MD and PhD degrees at Vanderbilt since 2017, where I am surrounded by inspirational scientists, physicians, and physician scientists.

**Q:** How did you choose your current research topic and interest?

**A:** I attended a talk by a senior Vanderbilt MSTP student mentored by Dr. Sherwood. He showed how mice that received MPLA prior to infection were protected from Gram positive, Gram negative, and fungal pathogens. That's when I learned about innate immune memory and about Dr. Sherwood's lab.

Our group studies the mechanisms behind multiple innate immune memory-inducing agents, including β-glucan and MPLA. Both protect broadly against infection but accomplish this through distinct mechanisms. By comparing these molecules directly, we can understand what mechanisms are common and perhaps essential to this memory response and understand the relative strengths and weaknesses of each molecule.

**Q:** Could you use a few lay sentences to describe/summarize your findings in this paper?

**A:** Our immune system has strategies to protect against specific infections, and strategies to protect us broadly from anything that may infect us. In this study, we compared two strategies to boost the broadly protective immune responses. Though they both protected mice from infection to the same degree, we found that they accomplished this by altering characteristics of immune cells differently.

**Q:** What was the most exciting or memorable moment(s) during the process of this research?

**A:** Figure 8B is a principal component analysis of RNA-sequencing data demonstrating how LPS treatment changes the transcriptomic profile in unstimulated macrophages compared to those previously exposed to MPLA or β-glucan. It reduces the thousands of data points we had for each sample to a 2D map, providing a 10,000 ft view of their transcriptomes. I think it is the best single panel to summarize the findings of the paper, since it shows that β-glucan has gentler effect on the macrophage response to an inflammatory stimulus compared to MPLA. Seeing that graph finally appear was very exciting because it was the result of many hours learning to use the program Rstudio.

**Q:** What was the biggest hurdle or challenge associated with this story?

**A:** As a lab, we were skilled in most of the methods we used in this study, and they did not present major technical challenges. However, I did not

have experience with large datasets like our RNAseq data, and I found it challenging until I learned some new skills.

**Q:** Besides your PI is there anyone that significantly helped on your path to become a scientist?

**A:** The list is long. I had great parents, science teachers, science Olympiad coaches, and undergraduate professors to encourage me to pursue science. Dr. Samantha King, Dr. Lorraine Ware, the Vanderbilt MSTP leadership, Dr. Julia Bohannon, and Dr. Ed Sherwood (my PI) have all been supportive and essential for me to stay on the path to become a scientist.

**Q:** What's next for you?

**A:** Submitting another manuscript, defending my dissertation, and returning to medical school for my final year. Then, matching into pediatric residency in 2025.

**Q:** What would your advice be for junior or incoming Ph.D. Students who want to pursue a career in science and perhaps your field?

**A:** Remember that you are a junior Ph.D. student. No one expects you to be great at anything when you start. If you are doing your job correctly, you will encounter challenges, make mistakes, and fail at things. At the end of your Ph.D., you will get to review all your work for your dissertation and see how much you improved during the process.

**Q:** Tell us something about yourself outside of being a scientist.

**A:** I had two daughters during my Ph.D. who are now three and one year old. My older daughter and I are starting our first and last years of school at the same time. She is going to preschool, and I am starting my last year of medical school. We're both ready for a new challenge.

# Fireside Chat with the 2024 Legacy Awardee, Alfred Ayala

*An Interview by Julia Bohannon*

*In this exclusive interview, it was my pleasure to sit down with Dr. Alfred Ayala, a distinguished figure in the field of trauma and sepsis, currently serving as the Director of the Division of Surgical Research at Lifespan-Rhode Island Hospital/the Alpert School of Medicine at Brown University. Recognized for his significant contributions to the study of post-trauma immune dysfunction and sepsis, Dr. Ayala's expertise has left a lasting mark on this field.*

*The recipient of the esteemed Society for Leukocyte Biology Legacy Award this year, Dr. Ayala's accolade stands as a testament to his exemplary career and substantial impact on the field. As we delve into the intricacies of his research journey and the challenges he has navigated, Dr. Ayala offers valuable insights and reflections on his experiences. I have known Dr. Ayala dating back to my early graduate school years through interactions with SLB and have long been and admirer of his work. Our shared research interests have provided me with valuable learning experiences, and through this interview, I have gained even deeper insights from his wealth of knowledge.*

**Q: What brought you into the field of post-trauma immune dysfunction and sepsis?**

**A:** My journey into this field wasn't a direct one. My interest in immunology began during both my undergraduate and graduate studies, albeit on a more peripheral level. While pursuing my graduate degree at Cleveland State University (CSU), I had limited opportunities, but my interactions with the CSU/Cleveland Clinic faculty deepened my understanding of immunology. I initially focused on cell regulatory science and protozoan biology during my early years as a graduate student, studying symbiotic relationships. Leveraging my didactic background in immunology along with what I'd done as a Ph.D. student, I found my way into studying the protozoan parasite *Trypanosoma cruzi* and its interaction with infected hosts leukocytes.

My transition to real world immunology occurred when I joined an immuno-parasite lab at Michigan State University (MSU) that allowed me to expand my skill sets. This fellowship lasted two years and marked a significant step in my career and life. As you are aware, mentors play a crucial role in our professional development. I was fortunate to have had some excellent mentors during my academic journey, including a highly Socratic one during my graduate studies, Dr. Dale Wise, who encouraged me to adopt a broad perspective in approaching biology – a valuable lesson. However, a major turning point came when I joined Dr. Irshad Chaudry's lab at MSU after my initial 2-year fellowship. He provided me with independence and exposed me to his newly funded proposal in the field of host response in the shocked/injured animal/patient, allowing me to work on projects independently. His mentorship not only helped me understand how good science looks and is presented but also introduced me to influential leaders in the field.

Being in a clinical department grounded me in the importance of modeling, although to this day I still emphasize the limitations of models to my mentees. These models led my entry into the area of post-trauma immune dysfunction and sepsis, which was driven by intriguing questions that emerged during my postdoc. These questions stemmed from very simple observations, building upon the insights of those who preceded me. Without the groundwork laid by these pioneers, I would not have known the path to follow. The advancements in technology since then have intensified the exploration of these questions.

Early experiments in Irshad's lab revealed baseline changes over time in models related to shock, trauma, and injury. These observations sparked my interest in understanding the suppressed function exhibited by myeloid cells when stimulated. Prompted by this simple, yet compelling observation, I naturally began pondering the underlying factors driving this phenomenon. This led to my 1st NIH grant, focusing on the differential effects of sepsis (within different organ/tissue beds) on macrophage function. The central question that has driven my lab for the past 30+ years is why certain cells appear immunosuppressed while others do not in response to common injurious/infectious stimulus.

Over the years, my research has evolved, delving into the complex interplay of factors affecting cell death and immune dysfunction. We've explored the role of various stimuli, shock, trauma, sepsis, infection, and (tissue) locale, discovering the intricate complexity that hinders straightforward therapeutic approaches in immunology. Assessing protein expression (profiles), we found not only that lymphocytes expressed increases in cell death markers and co-inhibitor cell surface molecule expression (checkpoint proteins), but also could occur in macrophage. This discovery expanded to include regulatory innate lymphocytes, adaptive lymphocytes, myeloid cells, and even non-immune cells. The last 15 years of my work have been dedicated to

unraveling the functions of these cell surface checkpoint proteins, leading me to where I am today. This story would not have been possible without the contributions of the many individuals in my lab who have played a crucial role in bringing these ideas to life. I consider myself fortunate to be the spokesperson for this talented group.

**Q: What has been the most impactful or exciting discovery in your research so far?**

**A:** One of the most exciting discoveries in my research, particularly during my time at MSU, related to establishing the contribution of the process of programmed cell death to shock/sepsis immune/organ dysfunction. This significantly influenced the way the field perceives the regulation of such death-inducing functional responses in cells during conditions like injury, trauma, and sepsis.

Another notable breakthrough (made at RI Hospital/Brown University) was the observation that checkpoint proteins, such as PD-1 and PD-L1, could be manipulated to alter the course of function and responses in sepsis and shock. This discovery, which Richard Hotchkiss' also contributed to and eventually advanced to clinical trials, has placed us (the field) in a phase of waiting for a more personalized medicine approach. The challenge now is to improve the identification of patients who will respond to these therapies. Despite the frustration of this phase, the positive aspect lies in contributing to the discussion of personalized medicine and refining our approach to these critical questions.

**Q: What are some of the key challenges facing the field and where do you see the field going next?**

**A:** One of the significant challenges in the field of shock-trauma-sepsis, which several labs are addressing effectively, involves the complex landscape of drug development. The key concept at the forefront is sub-grouping or endotyping, aiming to better define the specific characteristics of the patient in front of us. This involves understanding which known or unknow drugs they are likely to respond to. With this detailed information, we can improve our ability to determine the most suitable approach, such as identifying individuals who would benefit from anti-inflammatory, immunostimulatory, or anti-coagulopathy therapies.

It is also crucial to recognize that immune dysfunction is just one part of the story. Changes in the immune response parallel dysfunctions in other organs/tissues/cells, and it may not be the overt component driving the condition in every individual. The key challenge lies in remaining open to the complexity and understanding that tailoring therapies, including combinatorial approaches, based on individual patient responses is the path forward.

**Q: What are you most excited about right now and for the future of your research program?**

**A:** Currently, our research program is employing reductionist methods alongside descriptive computational analyses to explore potential pathways that may have been overlooked through our earlier pseudo-reductionist approaches. In simpler terms, we are striving to overcome our own inherent biases. The lab is actively transitioning towards computational foundation.

In the early days of investigating checkpoint proteins, CTLA and PD-1 took center stage, with PD-1 maintaining its prominence. However, we now recognize the existence of over 200 checkpoint proteins. Our current focus is on unraveling the significance of these proteins, with specific targets in our sights as we propel our research forward.

**Q: How about your lab? How many trainees do you currently have?**

**A:** My lab is relatively small, due to funding constraints. At present, I am supervising one postdoctoral researcher, two graduate students, one medical student, and three undergraduate students. Over the years, I have been fortunate to work with a diverse range of trainees, which has greatly contributed to the overall dynamic of the group.


*Ayala Lab Group 2024*

**Q: Can you tell us more about your involvement with the Society for Leukocyte Biology: how long you've been involved, how impactful the Society has been for your career and for your trainees, and what it means to you to be selected as the Legacy Awardee this year?**

**A:** My involvement with SLB dates back to the late 90s when Dr. Carol Miller-Graziano encouraged me to join. She sponsored my membership and facilitated my participation in one of the earlier Boston meetings. Initially, I took on a leadership role in a committee focused on promoting local funding and engaging with local companies. Drawing from my experiences in other scientific societies, I found SLB to be a valuable and more focused community compared to larger immunological societies. It serves as my version of continuing medical education in this field, offering a more intimate setting where many feel at ease among fellow introverted scientists.

SLB has been instrumental in my networking efforts over the years. As an introverted scientist, I appreciate the comfort of interacting with like-minded individuals. Society has provided an opportunity to meet and connect with researchers whose work I have followed and admired for years. SLB excels at involving its members, and I have happily taken on various roles within the organization.

For my trainees, SLB has been a fantastic platform. Several have been recognized with travel awards and presidential undergraduate awards, showcasing their achievements. They consistently express their enjoyment of SLB meetings, emphasizing the valuable opportunities to present their work, either through podium presentations or poster sessions. The exposure and experiences gained at SLB meetings have played a pivotal role in propelling them to the next level in their careers. Being selected as the Legacy Awardee is a tremendous honor. The individuals who preceded me in receiving this award are esteemed figures from whom I've learned a great deal. Even for a brief moment, being considered among them is truly special. This recognition not only acknowledges my contributions to both the society and our scientific work but also highlights the collaborative efforts that have enriched our shared journey.

**Q: What advice would you offer to the next generation of scientists?**

**A:** My advice to the next generation of scientists is to be prepared for some sacrifices in the pursuit of your true aspirations. If you genuinely believe your work holds value, it should be driven by passion. Passion becomes a powerful force that can navigate through various challenges.

Although obstacles may present themselves in different forms, having a deep passion for your work allows you to adapt and overcome.

Revisiting essential questions about the importance of your work and how much you still enjoy it is crucial. Life introduces numerous distractions, but by consistently evaluating your commitment to your research, you can navigate through these challenges. Additionally, seek out excellent mentors. While luck plays a role, creating your luck involves being in the right place at the right time and surrounding yourself with the right people (and that's in part what a mentor should do). Finding a mentor who provides the right balance of guidance and flexibility can help you determine what's truly important and what aspects to prioritize.

**Q: What hobbies do you enjoy outside of the lab?**

**A:** I have a few hobbies, although my wife, Carol, might argue that I don't have enough. When the weather is pleasant, typically from March to October in the Northeast, I enjoy cycling. It's a great way to clear my mind and get some exercise. Another hobby of mine is spending time with my wife, particularly on weekends and evenings—we're approaching our 44th year of marriage. Throughout our marriage, we've had many dogs, and I find enjoyment in training them in agility, which involves obstacle course training, and nose-work, which involves scent training. Engaging in these activities provides a welcome diversion, offering me something else to focus on and work on beyond the realm of science.


Carol, Reno & Lil

**Q: Anything else you'd like to add or anyone to acknowledge?**

**A:** I want to express gratitude to all the individuals who have contributed to the endeavors of this lab over the years, dating back to my time as a postdoc. I've been fortunate to collaborate with (and be befriended by) some truly exceptional people along the way. Their contributions have been invaluable in exploring ideas that I found intriguing. Moreover, the unwavering support of someone (my wife Carol) who has stood by me for over 40 years has been truly incredible.

# Global Science: A Voyage from Australia to Mexico

An interview with Damian Maseda

*Marion E. G. Brunck received her PhD in Immunology and Systems Biology from the University of Queensland (Australia) in 2015, and stayed Down Under for a post-doctoral training at the Translational Research Institute in Brisbane. She joined Tecnológico de Monterrey in Mexico as faculty in 2017. Marion Brunck's research focuses on neutrophil biology especially in the context of granulocyte transfusions and on the immunology of human breastmilk.*

**Q:** Marion, please tell us about your career journey, and how you came to work in immunology.


**A:** I always loved biology, trying to make sense of life and how evolution has brought us to be how we are today. Immunology in particular became of interest when my mum got sick with breast cancer and I witnessed her undergo a neutropenic episode with fever. I was working as a research assistant at the University of Queensland in Brisbane, Australia at the time, in a group developing microneedle patches for vaccine delivery. Next door, bioengineers were growing human neutrophils at large scale, to develop a universal therapy against neutropenic infections. I started my PhD in this lab and learned so much about neutrophil biology, neutropoiesis, mouse models and flow cytometry. I then joined the lab of Jean-Pierre Levesque, another Frenchie in Brisbane, working on hematopoietic stem cell mobilization from the bone marrow. More mouse work with pretty cool Cre/Lox models. But postgrad studies are not just hard work, they are also lots of fun and parties with other nerds, which is where I met my industrial microbiologist Mexican future husband Cuauh. Cuauh always wanted to go back to Mexico, giving back to the country that helped make the successful scientist he is today, he suggested we try, and move elsewhere if we did not feel comfortable. We amazingly both got hired by Tecnológico de Monterrey, the first private university of the country, as research professors. That was very cool because working in distinct disciplines, I thought that would be impossible.

**Q:** How would you describe your research? What are some pros and cons about performing research in your current location?

**A:** I proposed 2 completely novel lines of research for the Department of Bioengineering within the School of Engineering and Sciences. First, neutrophils as a novel therapeutic platform. That includes understanding some features of neutrophil biology so we can contemplate editing the cell for therapeutic purposes, and growing neutrophils in the lab. The second research line of my lab was born together with my son 7 years ago: I investigate immunological bioactives in human breastmilk, including antibodies, leukocytes and cytokines. I am particularly interested in understanding how maternal obesity may regulates theses bioactives. We do find striking differences in the immunological composition of colostrum that can be attributed to maternal obesity. In fact we work with a colleague epidemiologist from Karolinska Institutet who help us analyze prospective cohort data, and gives us a different perspective. This line of research is quite attractive right now, and working in Mexico is an advantage due to the unfortunate high prevalence of obesity, as well as the relatively high birth rate. In the lab, we do a lot of flow cytometry and *in vitro* assays. I like that we collaborate with clinicians who also give a different perspective on the relevance of what we study. It is fun to discuss results with MDs, they are super interested in the results and start speculating on causal or consequences that would not have crossed my mind otherwise (for example, the impact of anesthesia drugs on cytokines in colostrum).

**Q:** Could you share with us more about working in academia in Mexico?

**A:** Moving to Mexico as a foreigner has come with challenges pervasive to my personal and professional lives, including being away from my family, learning a new language, the way to relate and reach-out to fellow researchers, and the expected administrative work at the university. A major barrier to doing science in Mexico right now is the current limited availability of government funding. In 2020 on average 4.9% of the GPD was directed to research in the USA, vs 0.3% of in Mexico. In addition, it takes a crazy amount of time to receive reagents, for example it takes approximately 3-4 months to receive an antibody from the time of purchasing. This said, publishing robust science in this context is exhilarating and derives from resilience, persistence, and collaborative hard work, which is good for life in general in my opinion. I was privileged to have a postdoc researcher funded by my institution working with me for 2 years. My postgraduate students (4 PhD, 2 Masters) are the heart of my lab. Prospective students from anywhere in Mexico usually email asking for positions, and I like to have candidates come onboard for a month or 2 to have them check the lab and the science and make sure of their decision, as well as checking we all get along well. We must work together for everything, from placing orders and swiping floors, to go collect patients' samples, run experiments and write papers and grants. I think knowing how to write papers is my superpower and I strive to pass this on to my students early on.

**Q:** Marion, throughout your career you have always supported and promoted the involvement of women in science. You have also made one of your missions to regularly participate in mentoring activities and public interventions to democratize access to cutting-edge knowledge. Would you like to say something about that?

**A:** I want to advocate for systematically considering LMIC (Low / Middle Income Country) scientists in international collaborations. I believe that diversity and inclusion must be addressed not only in local university-settings but globally, by including underdogs in international scientific endeavors. With globalization, underdogs of science have much to bring to the table. We can help address today's challenges more effectively, more globally, by including an alternative perspective, a distinct population, a different context, not always present in major studies. This promotes a virtuous cycle of mutual understanding, across geographical areas, across socio-economic situations, and across cultures, promoting further collaborations and scientific discoveries. These collaborations also help build research capacities in the underdog's country, paying it forward. Through our distinct context, we help expand the scope of research findings, which promotes innovative ideas. Additionally, our alternative reality has led us to tremendously optimize resources which may reduce the costs of some types of research, and help decrease research footprint (we reuse nitrile gloves for example). I believe working with LMIC scientists is both the right thing to do, and a considerable win-win for science. About science "vulgarization", I am the co-founder of "el infocito" (a word play between lymphocyte and news in Spanish), which is the immunology magazine for everyone from the Mexican Society of Immunology. The editorial committee is making a point of having the articles easily accessible to anyone with high-school education. We also have a children's story about a B lymphocyte called "Little White Riding Hood" (Caperucita Blanca). Please check it out if you speak Spanish: https://sociedadmexicanadeinmunologia.org/el-infocito/

I think we are all humans doing our best and I like to talk about where I come from (none of my family studied at a university), to show that anyone interested and motivated can achieve their dream job in immunology.

# Using Model-Based Instruction to Teach Undergraduates About 'Systems' Immunology : A Cell Collective-ImmunoReach Collaboration


Louis B. Justement, Sumali Pandey and Rebekah Taylor

The immune system is complex and consists of an interactive network of cells, organs and soluble factors that regulate the nature of the immune response to distinct classes of pathogens. The educational challenge is to help students appreciate how these networks of cells, tissues, organs and receptor : ligand pairs regulate the specificity of the immune response while providing a conceptual focus that does not overwhelm the learner. 'Systems' is noted as a cross-cutting concept in the Next Generation Science Standards (NGSS) (1) and as a core concept in the Vision and Change report for Undergraduate Life Science Education (2) and in the SLB endorsed Learning Framework for Immunology (3). As students progress through their learning about the immune system, they should be able to:

1. Identify different components of immune system and illustrate how these components work together to generate and regulate the response
2. List functions that the immune system carries out, and understand how individual components play a role in mediating specific functions
3. Model the interactions of the immune system with other systems (e.g. the nervous system)

A strong pedagogical tool to approach systems-level thinking is to use Model-Based Instruction (MBI) (4). Different types of models can be utilized by an instructor based on their learning objectives, including simulations, diagrams and animations, tactile models, concept mapping and structure-behavior-function models. Simulations are particularly helpful as they allow students to make and test predictions of immunological phenomena that are otherwise hard to visualize.

The ImmunoReach (www.immunoreach.net) team initiated a collaboration with Cell Collective to utilize their dynamic computer modeling-based platform to create learning modules that are designed to show students how components of the immune system work together to regulate specific processes in a holistic manner. Importantly, Cell Collective (www.cellcollective.org) enables instructors and students to experience MBI without having to write the computer code themselves. The first ImmunoReach-sponsored module that is available on Cell Collective is entitled "Cytokines and the Adaptive Immune Response to Pathogens" (5). The module demonstrates, through modeling and simulation, how cytokines regulate T-helper cell differentiation and in turn how the overall T-helper cell response is tailored to the specific type of pathogen encountered. ImmunoReach hopes to create a portfolio of these simulation and modeling-based modules for use in a variety of immunology-focused educational settings. We invite instructors who are interested in working with ImmunoReach to implement the existing module in their classrooms. Additionally, we invite educators to contact us if they have an interest in being involved in future module development. **Please share your intent by filling out this form (see here) or by emailing** (ImmunoReach leaders - Louis B. Justement lbjust@uab.edu, Sumali Pandey sumali.pandey@mnstate.edu, Rebekah Taylor rtaylor@frostburg.edu, or Cell Collective leaders - Skylar Loecker; skylar.closesmith@gmail.com and Tomas Helikar thelikar2@unl.edu)

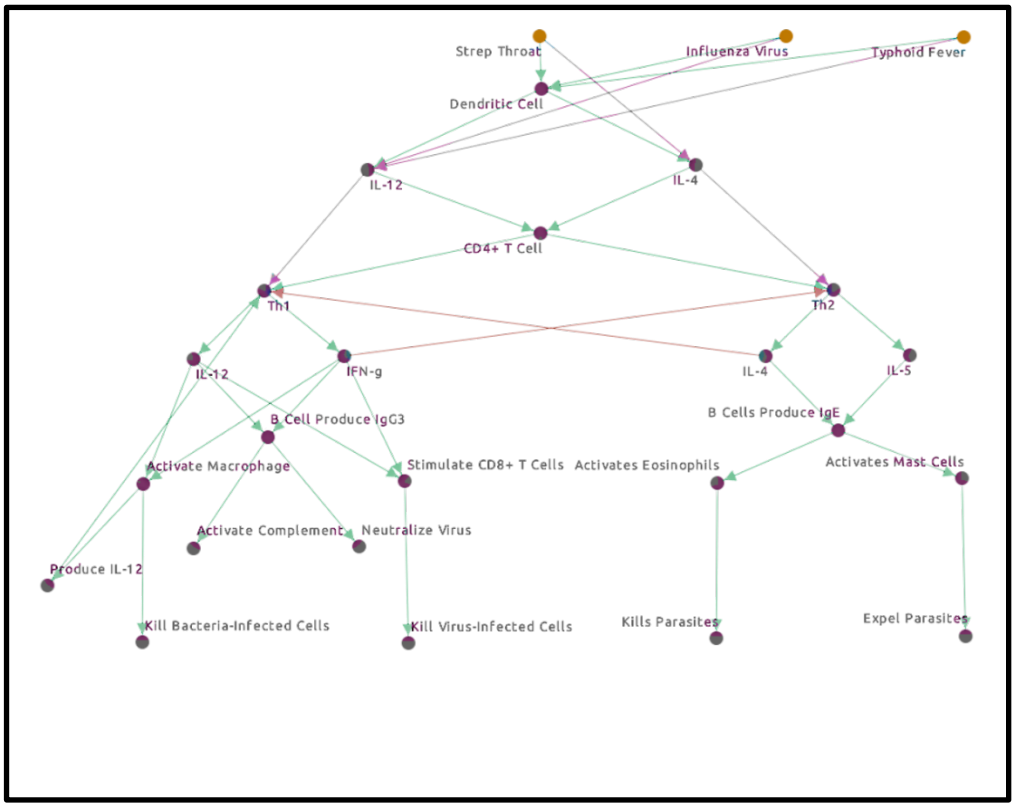



**Figure: A Representative Image from the Cell Collective Module (5)**

Check out ImmunoReach's 2024 Symposia Schedule. FREE to attend!

**References**


1. *The Next Generation Science Standards website* (https://www.nextgenscience.org/)
2. *The Vision and Change in Undergraduate Biology Education: A Call To Action*, AAAS, 2010 (https://www.aps.org/programs/education/undergrad/upload/Revised-Vision-and-Change-Final-Report.pdf)
3. *CourseSource Immunology Learning Framework.* Pandey S, Bruns HA, Condry D, Justement LB, Kleinschmit AJ, Lal A, Liepkalns J, Mixer PF, Paustain T, Sletten S, Sparks-Thissen RL, Taylor RT, Vanniasinkam T, Wisenden BD, Elliott SL (2023). https://qubeshub.org/community/groups/coursesource/courses/immunology/
4. *Modeling in the Classroom: Making Relationships and Systems Visible.* Wilson K. J., Long T. M., Momsen J. L. and Bray Speth E. CBE-Life Sciences Education (2020) Vol. 19, Issue 1.
5. *Cell Collective Module "Cytokines and the Adaptive Immune Response to Pathogens"* Loecker S., Taylor R. T., Pandey S., Justement L. B. and Helikar T. (www.cellcollective.org)


## *A note from the Editors of JLB*: Call for Hot Topics for JLB

We would like to remind all SLB members that JLB publishes both invited and unsolicited review articles on a regular basis. We seek articles that not only review and summarize current ideas in emerging areas, but also offer forward-thinking perspectives. We welcome suggestions for potential hot review article topics and authors for 2024 (self-nominations are welcome). Please send your suggestions directly to Michael Schnoor, Editor-in-Chief, mschnoor@cinvestav.mx, or Michael Cancro, Reviews Deputy Editor, cancro@pennmedicine.upenn.edu.

# SLB Awardees: Where are they now?

An interview by Bryan Heit

Dr. Prajwal Gurung received the SLB's President Award in 2019 and is currently an Associate Professor of Internal Medicine-Infectious Diseases at the University of Iowa. Dr. Gurung received his PhD in Immunology from the University of Iowa College of Medicine, which was followed by his Postdoctoral training in Immunology at St. Jude Children's Research Hospital in Memphis, Tennessee. Dr. Gurung's work is focused on NLR receptors and their role in cell death, infectious diseases, inflammatory diseases, and in autoimmunity.

**Q:** *Where did your journey in science begin (what inspired you to pursue a career in science)?*

**A:** I was born and raised in Nepal and was intrigued by biology from my early ages. This was emboldened once I started my studies in biology here in the United States during my Undergraduate years. Specifically, my biology professors there, Drs. Ted Wilson and Kim Bates helped me realize my potential and encouraged me to follow a path in science and research.

**Q:** *At what stage in your career were you when you received the President's award, and where are you now?*

**A:** I received the President's award as a 1st year Assistant Professor at the University of Iowa. I am currently an Associate Professor here at the University of Iowa.

**Q:** *How did you choose your current research focus?*

**A:** I was trained as a T cell biologist during my PhD years, but I switched field and chose to study how innate sensors regulate host immune responses during my postdoc years. These experiences have shaped my current research focus, where I investigate how innate immune sensors are involved in regulating host immune responses to pathogen and damage.

**Q:** *Could you summarize your research in a few lay sentences?*

**A:** My lab focuses on cytoplasmic sensors, which are proteins present within the cells. These sensors play an integral role in detecting intracellular pathogens as well as disturbances within the intracellular microenvironment. We study the roles of these cytoplasmic sensors in the context of infections (Leishmania spp., Listeria spp., Staphylococcus spp. ), damage (radiation, DSS-induced colitis) and autoinflammatory syndromes (neutrophilic dermatosis). The overall goal is to elucidate the molecular mechanisms regulated by these cytoplasmic sensors in response to these various stimuli, which could be potentially targeted for therapeutic benefits in humans.

**Q:** *What was the most exciting or memorable moment(s) in your early years as a new investigator?*

**A:** The excitement of being able to test your ideas and hypothesis is something that I was really excited about when starting as a new investigator, and I have to say it hasn't changed after all these years.

**Q:** *What was the biggest challenge you experienced in your career since receiving the President's award?*

**A:** The President's award is a great recognition for early stage investigators and definitely helped me in getting my name out in the scientific research community. As a new investigator, there are many challenges that I had to overcome - 1) Setting up the laboratory, 2) Slow pace of research compared to your Postdoc mentors lab because of the lack of resources and reagents, 3) writing grants constantly to get first NIH level funding. Thus, understanding that my time was stretched thin between all these various activities, and balancing research and personal life was some challenges I faced early on.

**Q:** *Besides your PhD and PDF mentors, is there anyone that significantly helped on your path to become a scientist?*

**A:** I will say my Undergraduate biology Professor Dr. Ted Wilson played an important role in encouraging me to apply for graduate school. I was all set to become a medical technologist (was a medical technologist major), but his encouragement and advice led me to switching my major my 4th year and applying to graduate schools instead.

**Q:** *What would your advice be for junior or incoming Ph.D. students who want to pursue an academic science career?*

**A:** Be curious, don't be afraid to ask questions, and work hard.

**Q:** *Tell us something interesting outside of being a scientist about yourself.*

**A:** I train Brazilian jiu jitsu as hobby and to recharge. I see a lot of parallels between Jiu Jitsu and science. You fail many times, but as long as you show up put in the work, things will start working out for you.

**Q:** *What's next for you?*

**A:** Just keep on the path that I am on currently. Train and inspire new generation of scientists (undergraduate, graduate student and postdocs) and continue on the path of science.


## ICYMI

SLB's on-demand library of scientific and professional development videos continues to grow! Available to society members anytime, check out the resources available anytime. The latest additions includes talks on T-Cell subsets in health and disease, Development of a T-Cell based vaccine, and Neutrophil priming as a critical factor in resilience against bacterial lung infection.

Watch

# FASEB CORNER

*SLB joined FASEB – the nation's largest coalition of biomedical researchers, representing 30 scientific societies – in 2019. FASEB corner is a regular feature providing updates on recent initiatives that demonstrate the Federation's dedication to its member societies.*

**Collaborative Advocacy for Biomedical Research** – On March 13, nearly 50 advocates representing 19 member societies from 25 states participated in FASEB's annual Capitol Hill Day. SLB was represented by Suzanne Bohlson. President Lou Justement and President-Elect Cynthia Leifer also participated in Capitol Hill Day. Advocates spoke to their senators and representatives about fiscal year 2025 funding priorities for the National Institutes of Health, National Science Foundation, and other federal science agencies. They also discussed how prior investments in scientific research have either eradicated or contained diseases once considered uncurable, such as smallpox, tuberculosis, and tetanus.

**DEAI Updates** – To facilitate cultural change and make a positive impact on early-career researchers, FASEB is launching a new project, DRIVE (Driving Culture Change in a Federation of Biological Societies via Cohort-Based Early-Career Leaders). The program will be funded through a grant from the National Science Foundation Leading Culture Change through Professional Societies of Biology program. DRIVE's objectives are to (1) document the current baseline for current policies, practices, and recommendations to promote inclusion within FASEB's member societies; (2) pilot a cohort-based project for early-career researchers that provides mentorship, support, and leadership training; and (3) create an infrastructure for change through identified strategies, resource sharing across member societies, and outreach. Strategies to address barriers will serve as the foundation for future support to be shared across societies and will provide a framework for the participants to act as change agents.

Applications are also now being accepted for FASEB CARES (Career Advancement and Research Excellence Support) Awards which provide $5,000 in financial support to alleviate burdens associated with caregiving—enabling individual researchers to continue their scientific training, professional development, and career progression. SLB members are eligible for the CARES Awards as a benefit of the society's membership in FASEB. Applications for 2024 CARES Awards are due by April 12, 2024. Additional information about the CARES Awards is available online.

**Supporting Efforts to Promote Data Sharing** – FASEB DataWorks! continued its work to facilitate a culture of data sharing and reuse. FASEB sponsored an informational breakfast and an exhibit table at the 2023 SLB annual meeting. The ongoing DataWorks Salons series explored data integration tools and software (November), creating a NIH Data Management and Plan (January), preparing data for submission to a repository or a journal (February), and best practices for finding the right place to store research data (March). The March Salon also included an overview of NIH policy requirements for data repositories, guidance on selecting a suitable repository, and resources to help select the repository that works best for specific areas of research.

In addition, new tools were added to the DataWorks! Help Desk, including how-to guides and resources to help SLB members develop data management plans in alignment with the NIH Data Management and Sharing Policy.

**Advancing Open Science** – In observance of the White House Office of Science and Technology Policy's designation of 2023 as the Year of Open Science, FASEB presented two free workshops as an exclusive benefit for staff at Full Member societies. The workshops provided an overview of U.S. federal agency draft plans and a review of business models that support open access in biological and biomedical sciences.

## iSLB

Society for Leukocyte Biology
10770 Columbia Pike
Suite 300
Silver Spring, MD 20901
301-204-2233
www.leukocytebiology.org

contacts:
Membership
Meetings
Administrative Office

- Registration, abstract and award applications now being accepted through July 11
- Check out the FASEB CARES program for caregiver support to attend SLB 2024
- Volunteer to co-chair a concurrent session during abstract submissions – it's a great opportunity to network and get involved


Help spread the word with this printable flyer!

References for **Eosinophil – A Cell Faced with an Identity Crisis**


1. Jones TW. The Blood-Corpuscle Considered in Its Different Phases of Development in the Animal Series. Memoir II.-Invertebrata. Edinb Med Surg J 1850;73:395-411.
2. Ehrlich P, Lazarus A. Histology of the Blood, Normal and Pathological1900.
3. McNagny K, Graf T. Making eosinophils through subtle shifts in transcription factor expression. The Journal of experimental medicine 2002;195:F43-7.
4. Yamaguchi Y, Nishio H, Kishi K, Ackerman SJ, Suda T. C/EBPbeta and GATA-1 synergistically regulate activity of the eosinophil granule major basic protein promoter: implication for C/EBPbeta activity in eosinophil gene expression. Blood 1999;94:1429-39.
5. Yamaguchi Y, Hayashi Y, Sugama Y, et al. Highly purified murine interleukin 5 (IL-5) stimulates eosinophil function and prolongs in vitro survival. IL-5 as an eosinophil chemotactic factor. The Journal of experimental medicine 1988;167:1737-42.
6. Humbles AA, Conroy DM, Marleau S, et al. Kinetics of eotaxin generation and its relationship to eosinophil accumulation in allergic airways disease: analysis in a guinea pig model in vivo. The Journal of experimental medicine 1997;186:601-12.
7. Rothenberg ME, MacLean JA, Pearlman E, Luster AD, Leder P. Targeted disruption of the chemokine eotaxin partially reduces antigen-induced tissue eosinophilia. The Journal of experimental medicine 1997;185:785-90.
8. Spencer LA, Bonjour K, Melo RC, Weller PF. Eosinophil secretion of granule-derived cytokines. Frontiers in immunology 2014;5:496.
9. LeMessurier KS, Samarasinghe AE. Eosinophils: Nemeses of Pulmonary Pathogens? Current allergy and asthma reports 2019;19:36.
10. Yang D, Chen Q, Su SB, et al. Eosinophil-derived neurotoxin acts as an alarmin to activate the TLR2-MyD88 signal pathway in dendritic cells and enhances Th2 immune responses. The Journal of experimental medicine 2008;205:79-90.
11. van Tilburg Bernardes E, Arrieta MC. Hygiene Hypothesis in Asthma Development: Is Hygiene to Blame? Archives of medical research 2017;48:717-26.
12. Strachan DP. Hay fever, hygiene, and household size. Bmj 1989;299:1259-60.
13. Rook GA, Lowry CA, Raison CL. Microbial 'Old Friends', immunoregulation and stress resilience. Evolution, medicine, and public health 2013;2013:46-64.
14. Lee JJ, Jacobsen EA, McGarry MP, Schleimer RP, Lee NA. Eosinophils in health and disease: the LIAR hypothesis. Clinical and experimental allergy : journal of the British Society for Allergy and Clinical Immunology 2010;40:563-75.
15. Samarasinghe AE, Melo RC, Duan S, et al. Eosinophils Promote Antiviral Immunity in Mice Infected with Influenza A Virus. Journal of immunology 2017;198:3214-26.
16. Jacobsen EA, Helmers RA, Lee JJ, Lee NA. The expanding role(s) of eosinophils in health and disease. Blood 2012;120:3882-90.
17. Bonjour K, Palazzi C, Silva TP, et al. Mitochondrial Population in Mouse Eosinophils: Ultrastructural Dynamics in Cell Differentiation and Inflammatory Diseases. Frontiers in cell and developmental biology 2022;10:836755.
18. Varricchi G, Galdiero MR, Loffredo S, et al. Eosinophils: The unsung heroes in cancer? Oncoimmunology 2018;7:e1393134.