The Faculty of Medicine of Harvard University

Curriculum Vitae

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Name: Aron Gyorgypal

Office Address: Division of Rheumatology, Allergy and Immunology
Center for Immunology and Inflammatory Diseases (CIID)
Massachusetts General Hospital
149 13th Street, CNY 8-324, Charlestown, MA 02129

Work Email: Agyorgypal(a)mgh(d)Harvard(d)edu

Education:

09/2015 - 05/2018	Bachelor of Science (B.Sc.) Summa Cum Laude	Chemical Engineering	New Jersey Institute of Technology Newark, NJ, USA
08/2018 - 05/2023	Doctor of Philosophy (Ph.D.)	Chemical & Biochemical Engineering	Rutgers, The State University of New Jersey Piscataway, NJ, USA

Postdoctoral Training:

06/2023 - Present	Understanding the influences of IgG, and IgE glycosylation in immunological diseases	Immunology, Glycobiology Robert M. Anthony, Ph.D. & Michelle E. Conroy, M.D.	Harvard Medical School & Massachusetts General Hospitals Boston, MA

Appointments at Hospitals/Affiliated Institutions:

06/2023 - Present	Postdoctoral Research Fellow	Medicine, Division of Rheumatology Allergy and Immunology, Center for Immunology and inflammatory Diseases	Massachusetts General Hospital

Other Professional Positions:

12/2023 - Present	Scientific Advisory Board Member	Technology Network, Biopharma	4 days per year

Professional Societies

2015 - Present	American Chemical Society (ACS)
2015 - Present	American Institute of Chemical Engineers (AIChE)
2017 - Present	Tau Beta Pi, Engineering Honors Society
2018 - Present	Omega Chi Epsilon, Chemical Engineering Honors Society

Honors and Prizes:

2018	Albert Dorman Honors Scholar	New Jersey Institute of Technology, Albert Dorman Honors College	Academic Scholarship
2019	Off-Campus Dissertation Development Award	Rutgers School of Graduate Studies	Travel Grant
2022	BioPro World Talent Campus Fellowship	Novo Nordisk & Technical University of Denmark	Research Training
2022	Oak Ridge Institute for Science and Education (ORISE) Fellowship	U.S. Food and Drug Administration (FDA)	Research Training
2024	Outstanding Student in Research Award	Rutgers School of Engineering	Research
2024 - 2026	T32 Research Grant in Pulmonary, Immunology and Allergy at Massachusetts General Hospital	National Institutes of Health	Research Training

Report of Funded and Unfunded Projects

Past

06/2020 - 12/2022	Automated N-linked glycan analysis PAT to enable continuous biologics manufacturing Agilent Technologies Agilent Research Gift Project Lead (Shishir P.S. Chundawat) Enabling Real-time glycosulation monitoring using Agilent InstantPC chemistry integrated on flow-injection system
09/2020 - 08/2022	Advanced continuous upstream manufacturing of biotherapeutics U.S. FDA R01 R01FD006588 Graduate Student (Shishir P.S. Chundawat) Creation of monitoring toolkit to study N-linked glycosylation of monoclonal antibodies.
2023 - 2025	An Integrated Platform for Fully Automated, Continuous, & Real-Time Multi-Attributes Monitoring of Upstream Processes for Glycosylated Monoclonal Antibodies Production

NIIMBL: National Institute for Innovation in Manufacturing Biopharmaceuticals
PC5.2 PC5.2-112
Project Lead (Shishir P.S. Chundawat)
develop and validate integrated online sampling process analytical technology (PAT) workflows to rapidly monitor biological drug critical quality attributes (CQA) to enable advanced/continuous monoclonal antibody (mAb) biomanufacturing processes.

Current

08/2024 - 07/2025	Regulation of IgE and Atopic Itch NIH R01 R01AI167933 Project Lead (Michelle Conroy) Understand role of IgE glycosylation (sialylation) in atopic dermitis.

Report of Local Teaching and Training

Teaching of Students in Courses:

01/2019 - 05/2019	Chemical Engineering Thermodynamics I Undergraduate students	Rutgers University, Piscataway, NJ 3-hr sessions per week for a semester
09/2019 - 12/2019	Transport Phenomena I Undergraduate students	Rutgers University, Piscataway, NJ 3-hr sessions per week for a semester
01/2022 - 05/2022	Separation Processes Undergraduate students	Rutgers University, Piscataway, NJ 3-hr sessions per week for a semester

Report of Technological and Other Scientific Innovations

Automated real-time, on-line n-glycosylation monitoring methods and systems thereof (2024)	At least some embodiments disclosed here may be directed to design and implementation of a novel PAT tool for real-time (or near real-time) online N-glycosylation analysis through the use of sequential injection analysis (SIA) coupled with liquid chromatography; rapid and robust N-glycosylation monitoring during N-glycosylated protein (e.g., monoclonal antibody) bioprocessing enabled by instant, sensitive labeling chemistry; and systems thereof. U.S. Patent Application No. 18/375,243. This patent has been license by Pharmaceutical companies (i.e., Merck & Co.)

Report of Education of Patients and Service to the Community

☐ No presentations below were sponsored by 3rd parties/outside entities.

☒ Those presentations below sponsored by outside entities are so noted and the sponsor(s) is (are) identified.

Educational Material for Patients and the Lay Community:

Books, articles, and presentations in other media

06/2022	Emerging Technological Landscapes in Biomanufacturing and Monoclonal Antibody Screening	Article, Interview	
03/2023	Embracing Data-Driven Modeling Approaches Into Biopharmaceutical Processing	Article, Interview	Gyorgypal, A. Embracing Data-Driven Modeling Approaches Into Biopharmaceutical Processing. Article Published: March 10, 2023.
09/2023	New Advances in the Bioprocess Pipeline	Listicle (Cytiva)	
11/2023	Biologic Production and Host Cell Proteins	Article, Interview	
12/2023	An Introduction to Cell Therapy	Article	
01/2024	The Applications of Cell Therapy	Article	
03/2024	Transformative Technologies in Vaccine Manufacturing	Article	
04/2024	Microbial Monitoring for Biopharma Manufacturing	Article	Gyorgypal, A. Microbial Monitoring for Biopharma Manufacturing. Article Published: May 10, 2024.
11/2024	How Our Brain Can Fight Infection	Article, Opinion	Gyorgypal, A. How Our Brain Can Fight Infection. Article Published: November 25, 2024.
12/2024	New Purification Techniques in Biopharmaceuticals	Article, Interview	Gyorgypal, A. New Purification Techniques in Biopharmaceuticals. Article Published: December 12, 2024.

Recognition:

12/2021	Publicity of Research work, "Ensuring the safety and efficacy of biologics products"	Drug Target Review
05/2022	Publicity of Research Paper, "What's Slowing Down Continuous Bioproduction Adoption?"	Genetic Engineering and Biotechnology News
05/2022	Publicity of Research, "Rutgers pair creates monitoring toolkit to speed production of biologic drugs"	Rutgers University
06/2022	Publicity of Research Paper, "In-Process Monitoring System Enables Real-Time Decision-Making"	Genetic Engineering and Biotechnology News

Report of Scholarship

* denotes equal authorship contribution

** denotes mentored trainee.

Peer-Reviewed Scholarship in print or other media:

Research Investigations

1. **Gyorgypal A**, Chundawat SPS. Integrated Process Analytical Platform for Automated Monitoring of Monoclonal Antibody N-Linked Glycosylation. Anal Chem. 2022 05 17; 94(19):6986-6995. PMID: 35385654
2. **Gyorgypal, A.,** Potter, O. G., Chaturvedi, A., Powers, D. N., Chundawat, S. P. (2023). Automated instant labeling chemistry workflow for real-time monitoring of monoclonal antibody N-glycosylation. Reaction Chemistry & Engineering.
3. Fratz-Berilla EJ, Kohnhorst C, Trunfio N, Bush X, Gyorgypal A, Agarabi C. Evaluation of single-use optical and electrochemical pH sensors in upstream bioprocessing. Heliyon. 2024 Feb 15; 10(3):e25512. PMID: 38371965

Other peer-reviewed scholarship

1. Chopda, V.; **Gyorgypal, A**.; Yang, O.; Singh, R.; Ramachandran, R.; Zhang, H.; Tsilomelekis, G.; Chundawat, S. P. S.; Ierapetritou, M. G. Recent Advances in Integrated Process Analytical Techniques, Modeling, and Control Strategies to Enable Continuous Biomanufacturing of Monoclonal Antibodies. J. Chem. Technol. Biotechnol. 2021, No. April, jctb.6765.

2. Tiwold EK, **Gyorgypal A**, Chundawat SPS. Recent Advances in Biologic Therapeutic N-Glycan Preparation Techniques and Analytical Methods for Facilitating Biomanufacturing Automation. J Pharm Sci. 2023 06; 112(6):1485-1491. PMID: 36682489

3. **Gyorgypal, A.**, & Anthony, R. M. TAM-ing the beast with IL-34 blockade. Science Immunology, 2024, 9(101), eadu0981.

Non-peer reviewed scholarship in print or other media:

Reviews, chapters, and editorials

1. **Gyorgypal, A.,** & Anthony, R. M. (2024). TAM-ing the beast with anti-IL-34 blockade. *Science Immunology*

Other non-peer reviewed scholarship

1. **Gyorgypal, A.,** Fratz-Berilla, E., Kohnhorst, C., Powers, D. N., Chundawat, S. P. (2023). Temporal Effects of Galactose and Manganese Supplementation on Monoclonal Antibody N-Linked Glycosylation in Fed-Batch and Perfusion Bioreactor Operation. bioRxiv, 2023-04. https://doi.org/10.1101/2023.04.15.535602
2. Chopda, V.; **Gyorgypal, A.,** Chaturvedi, A.; Reddy, V. J.; Ou, Y.; Chundawat S.P.S., Ierapetritou, G. M. Experimental and Model-based Investigation into the influence of pH and Temperature Perturbations During MAb Bioprocessing
3. **Gyorgypal A.**, Chopda, V., Chaturvedi, A., Zhang, H., Chundawat S.P.S.; Evaluating the Impact of Serum-free Media and Feed Combinations on CHO Cell Culture Performance and Monoclonal Antibody Trastuzumab Production. Preprint under preparation for submission. Target Journal: Biotechnology Progress

Thesis:

1. Gyorgypal, A. (2023). Enabling and investigating real-time monoclonal antibody N-linked glycosylation for upstream processing of biotherapeutics.

Abstracts, Poster Presentations, and Exhibits Presented at Professional Meetings:

1. N-GLYcanyzer: A tool for Automated Near-Real Time Monitoring of Biotherapeutic Glycosylation. The 26th Symposium on the Interface of Regulatory and Analytical Sciences for Biotechnology Health Products (WCBP). (Oral Presentation)
2. Integrated Process Analytical Platform for Automated Monitoring of Monoclonal Antibody N-Glycosylation. Cambridge Healthtech Institute's 12th Annual PEPTALK, Higher-Throughput Bioproduction Analyzing & Improving Processes, San Diego, Ca, United States, January 16-20, 2023 (Oral Presentation)
3. Enabling Monoclonal Antibody N-Linked Glycosylation Monitoring during Upstream Bioprocessing. Terrapin's 5th Annual Festival of Biologics USA, Upstream Processing: Cell culture & cell line development, San Diego, Ca, United States, March 20-22, 2023 (Oral Presentation)

Narrative Report

I am a postdoctoral research fellow in the Center of Immunology and Inflammatory disease at Massachusetts General Hospital working within the Anthony and Conroy Labs. I specialize on conducting research in the fields of immunology and glycoscience, primarily studying the influence of N-linked glycosylation in health and human disease. My biochemical engineering background has proven invaluable as I have transitioned into biomedical research.

The primary focus of my research is to elucidate the influence of IgG and IgE antibody glycosylation in the context of allergy. My main research projects are split into 2 facets: an R01 funded project on antibody glycosylation as it pertains to atopic dermatitis to understand the IgE-neuroimmune axis, as

well as into drug allergy to study the structure and function of cepholosporin in IgE mediated drug allergy. I have been awarded NIH T32 funding to study further study drug allergy understand the mechanism involved in cephalosporin mediated anaphylaxis, for which little is known. This work has also led to additional U01 funding, allowing for a deeper exploration of these mechanisms. While our work is still in the early stages, we have been able to find specific phenotypes involved in the sialylation of IgE in disease state producing a proinflammatory allergic response, data that is mirror translationally between mouse and human samples. We have identified key IgG therapeutic mechanisms that protect against anaphylaxis as well.

Besides research, I have maintained a strong focus on education and scientific dissemination. I've had the opportunity to teach undergraduate courses in chemical engineering and aim to teach more courses during my post-doctoral tenure. As a member of the Scientific Advisory Board for Technology Network Biopharma I contribute expertise in several educational articles on topics related to biomanufacturing, cell therapy as well as immunology for a general audience. This advisory role also provides valuable opportunities to engage with other academic and industry professionals outside my area of expertise, identify emerging scientific trends, and contribute to the advancement and broadening of research in my field. My involvement in these activities reflects my dedication to fostering knowledge exchange and promoting scientific literacy within both academic and industry settings.

I am excited to continue pushing the boundaries of immunology and glycobiology research during my tenure as a post-doctoral research fellow until I start my faculty search to become a principal investigator of my own lab, where I plan to continue studying glycosylation in health and disease. I am currently working on understanding the role of IgE glycosylation different diseases. My goal is to leverage my interdisciplinary background to make meaningful contributions to the field immunology, ultimately producing therapeutics to improving patient care.