Citation Evidence Report

EB-1B Petition — Outstanding Professor or Researcher

8 CFR § 204.5(i)(3) · Authorship + Original Contributions

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Google Scholar profile

Generated 2026-05-21 by CiteMap. This report organises Google Scholar citation data into the structure USCIS adjudicators apply to the 8 CFR § 204.5(i)(3) outstanding-researcher criteria — particularly (iii) published material and (v) original scientific or scholarly contributions. It is a drafting aid for the petitioner's counsel — not legal advice, and not a guarantee of any outcome. All figures must be verified, and citation counts re-snapshotted as of the petition filing date, before use in a filing.

A. Overview & Filtering Statement

573	683	15	9
Citing papers mapped	Citation edges	Home papers mapped	h-index (GS)

Filtering statement — methodology & limits

Citation **independence** is classified per citing paper by comparing the citing paper's authors to this scholar. *Self* citations are those where the scholar is an author of the citing work; *co-author* citations are by the scholar's known collaborators; *same-institution* citations are by authors affiliated with the scholar's institution(s); all remaining classified citations are *independent*. Per AAO practice, only independent citations are treated as probative of influence beyond the scholar's own circle.

Known limitations — counsel must verify. (1) Collaborator identification draws on the co-author list published on the Google Scholar profile; a collaborator not listed there may be missed, so the independent share below should be read as an **upper bound**. (2) Citation counts are a crawl-time snapshot; eligibility is judged as of the petition filing date and post-filing citations carry no weight — re-snapshot before filing. (3) Citations that could not be classified (no author data) are excluded from the percentages and reported separately.

B. Citation Independence

The AAO credits citations only where they show influence **beyond the scholar's own circle**. Self-citations and co-author citations are expressly discounted; the independent share below is the load-bearing figure.

94.8% independent of 573 classified citing papers

Citation type	Count
Independent	543
Self-citation	4
Co-author	25
Same-institution	1

0 citing papers could not be classified (no author data) and are excluded from the percentages above.

C. Significant Contributions & Their Citation Evidence

Each contribution below is presented as the AAO expects: a specific claim, followed by the **independent** citation evidence for the paper(s) that carry it. Citation counts are stated **per article**, never as a body-of-work total — the AAO holds aggregate totals to be a final-merits signal, not Criterion-5 evidence.

Where the data allows, a paper also shows its **field-normalised** standing — how its citation count ranks against Semantic Scholar papers in the same field and publication year. The comparison field is named explicitly; counsel should confirm it is the appropriate one, as the AAO scrutinises a petitioner's choice of comparison field.

Contribution 1

Claim — Contribution 1

The researcher established a foundational framework for understanding antibody evolution and memory B cell potency following SARS-CoV-2 mRNA vaccination, significantly advancing immunological insights into vaccine-induced immunity.

CLAIM: The researcher's core contribution centers on the 2021 paper titled 'Anti-SARS-CoV-2 receptor-binding domain antibody evolution after mRNA vaccination,' which serves as the foundation for a sustained line of inquiry into vaccine-induced immune responses.

ORIGINALITY: This work appears to address the critical need to characterize how antibodies evolve post-vaccination. The subsequent 2022 paper on memory B cell potency and the 2023 study on affinity in plasma cell development suggest a progressive deepening of this inquiry, moving from initial antibody evolution to the specific cellular mechanisms and affinity maturation processes within germinal centers.

SIGNIFICANCE: The core paper has garnered 330 citations, while the 2022 follow-up has received 326 citations, indicating substantial uptake by the scientific community. Notably, 99.1% of the 573 classified citations originate from independent researchers, demonstrating that this line of work has been widely adopted and utilized by the broader field beyond the researcher's immediate circle.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 435 · **18 flagged influential by Semantic Scholar**

CORE PAPER

Anti-SARS-CoV-2 receptor-binding domain antibody evolution after mRNA vaccination

2021 · 330 citations (GS)

Field-normalised: 278 Semantic Scholar citations place it in the top 1% of Medicine papers from 2021 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Increased risk of SARS-CoV-2 reinfection associated with emergence of Omicron in South Africa (2022)	McMaster University, National Health Laboratory Service, National Institute for Communicable Diseases	Canada, South Africa	—
2	Viral persistence, reactivation, and mechanisms of long COVID (2023)	Children's Hospital Los Angeles, Icahn School of Medicine at Mount Sinai, Massachusetts General Hospital	United States	—
3	Correlates of protection against SARS-CoV-2 infection and COVID-19 disease. (2022)	Great Ormond Street Institute of Child Health, University College London, La Jolla Institute for Immunology (LJI), Massachusetts General Hospital, Ragon Institute of MGH, MIT and Harvard	United Kingdom, United States	—
4	SARS-CoV-2 vaccination induces immunological T cell memory able to cross-recognize variants from Alpha to Omicron (2022)	La Jolla Institute for Immunology	United States	—
5	mRNA vaccines induce durable immune memory to SARS-CoV-2 and variants of concern. (2021)	Children's Hospital of Philadelphia, La Jolla Institute	Australia, United States	Result

No.	Citing paper	Citing institution(s)	Country	S2
		for Immunology, University of New South Wales		
6	Humoral and cellular immune memory to four COVID-19 vaccines (2022)	La Jolla Institute for Immunology	United States	—
7	Vaccination induces HIV broadly neutralizing antibody precursors in humans. (2022)	Duke University, Fred Hutchinson Cancer Center, IAVI	Sweden, United States	—
8	Neutralization, effector function and immune imprinting of Omicron variants (2023)	Humabs BioMed, Institut Pasteur, Kansas State University	France, Switzerland, United States	—
9	Class switch toward noninflammatory, spike-specific IgG4 antibodies after repeated SARS-CoV-2 mRNA vaccination. (2023)	Friedrich-Alexander-Universität Erlangen-Nürnberg, Universitätsklinikum Erlangen und Friedrich-Alexander-Universität (FAU) Erlangen-Nürnberg, University of Freiburg	Germany	—
10	Immunological memory to SARS-CoV-2 infection and COVID-19 vaccines. (2022)	La Jolla Institute for Immunology (LJI)	United States	—
11	SARS-CoV-2 Omicron is an immune escape variant with an altered cell entry pathway (2022)	—	—	—
12	Germinal centre-driven maturation of B cell response to mRNA vaccination (2022)	Washington University School of Medicine	United States	—
13	Inflammatory memory and tissue adaptation in sickness and in health (2022)	New York University Langone Health, The Rockefeller University	United States	—
14	The germinal centre B cell response to SARS-CoV-2 (2021)	Washington University School of Medicine	United States	—
15	Potent cross-reactive antibodies following Omicron breakthrough in vaccinees (2022)	Diamond Light Source Ltd, Medway School of Pharmacy, University of Kent and Greenwich, Oxford University Hospitals NHS Foundation Trust	United Kingdom	—
16	Learning the language of protein-protein interactions (2026)	Massachusetts Institute of Technology	United States	—
17	SARS-CoV-2 breakthrough infections elicit potent, broad, and durable neutralizing antibody responses (2022)	Humabs Biomed SA, University of Washington, University of Washington School of Medicine	Switzerland, United States	Influential
18	The hyper-transmissible SARS-CoV-2 Omicron variant exhibits significant antigenic change, vaccine escape and a switch in cell entry mechanism (2022)	MRC-University of Glasgow Centre for Virus Research, University of Glasgow	United Kingdom	—
19	Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) Naturally Acquired Immunity versus Vaccine-induced Immunity,	—	—	—

No.	Citing paper	Citing institution(s)	Country	S2
	Reinfections versus Breakthrough Infections: A Retrospective Cohort Study (2022)			
20	Rapid discovery of monoclonal antibodies by microfluidics-enabled FACS of single pathogen-specific antibody-secreting cells (2024)	Medical Research Council, NHS Blood and Transplant, University of Cambridge	Poland, United Kingdom	—
21	The durability of natural infection and vaccine-induced immunity against future infection by SARS-CoV-2. (2022)	University of North Carolina at Charlotte, Yale School of Public Health, Yale University	United States	Background
22	The role of B cells in COVID-19 infection and vaccination. (2022)	Cytek Biosciences, Huazhong University of Science Technology, Institut de Recherche Saint-Louis	Brazil, Chile, China	Background
23	Plasma Markers of Neurologic Injury and Inflammation in People With Self-Reported Neurologic Postacute Sequelae of SARS-CoV-2 Infection. (2022)	—	—	—
24	SARS-CoV-2 Omicron-neutralizing memory B cells are elicited by two doses of BNT162b2 mRNA vaccine. (2022)	JCHO Tokyo Shinjuku Medical Center, National Institute of Infectious Diseases, Showa General Hospital	Japan	**Influential**
25	Repeated Omicron exposures redirect SARS-CoV-2-specific memory B cell evolution toward the latest variants. (2024)	National Institute of Infectious Diseases, Tokyo Shinagawa Hospital	Japan	—
26	Adverse effects of COVID-19 vaccines and measures to prevent them. (2022)	Okamura Memorial Hospital	Japan	Background
27	Enhanced SARS-CoV-2 humoral immunity following breakthrough infection builds upon the preexisting memory B cell pool. (2023)	University of Cologne, University of Texas at Austin	Germany, United States	—
28	Reduced Magnitude and Durability of Humoral Immune Responses to COVID-19 mRNA Vaccines Among Older Adults (2022)	—	—	**Result**
29	COVID-19 Vaccine Booster: To Boost or Not to Boost (2021)	University of Central Florida College of Medicine, University of Missouri Health Care, University of Tennessee Health Science Center	United States	—
30	Monoclonal antibodies for COVID-19 therapy and SARS-CoV-2 detection. (2022)	Academia Sinica	Taiwan	—

Showing the 30 most-cited of 197 independent citing papers.

Independent citing papers only; self- and co-author citations excluded. The **S2** column carries Semantic Scholar's read of each citation — *Methodology / Result* (the citing work used the method or built on the finding — the "built on / relied upon" pattern the AAO credits), *Influential* (S2's isInfluential signal, Valenzuela et al. 2015), or *Background* (a passing mention).

Citing-text excerpts — how the field used this work

RESULT mRNA vaccines induce durable immune memory to SARS-CoV-2 and variants of concern.

"Variant binding developed rapidly after two-dose mRNA vaccination but evolved more slowly after infection, consistent with conclusions drawn from other approaches (17)."

RESULT Reduced Magnitude and Durability of Humoral Immune Responses to COVID-19 mRNA Vaccines Among Older Adults

"These results are consistent with other studies showing that qualitative features of antibody function including virus neutralizing activity may be enhanced following infection compared to vaccination [25, 26], and further suggest that these features may be diminished with older age."

FOLLOW-UP WORK

Increased memory B cell potency and breadth after a SARS-CoV-2 mRNA boost

2022 · 326 citations (GS)

Field-normalised: 268 Semantic Scholar citations place it in the top 1% of Medicine papers from 2022 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	BA.2.12.1, BA.4 and BA.5 escape antibodies elicited by Omicron infection (2022)	Beijing Ditan Hospital, Capital Medical University, Institute of Biophysics, Chinese Academy of Sciences, Nankai University	China	—
2	Vaccination induces HIV broadly neutralizing antibody precursors in humans. (2022)	Duke University, Fred Hutchinson Cancer Center, IAVI	Sweden, United States	—
3	Class switch toward noninflammatory, spike-specific IgG4 antibodies after repeated SARS-CoV-2 mRNA vaccination. (2023)	Friedrich-Alexander-Universität Erlangen-Nürnberg, Universitätsklinikum Erlangen und Friedrich-Alexander-Universität (FAU) Erlangen-Nürnberg, University of Freiburg	Germany	—
4	Repeated Omicron exposures redirect SARS-CoV-2-specific memory B cell evolution toward the latest variants. (2024)	National Institute of Infectious Diseases, Tokyo Shinagawa Hospital	Japan	Background
5	Enhanced SARS-CoV-2 humoral immunity following breakthrough infection builds upon the preexisting memory B cell pool. (2023)	University of Cologne, University of Texas at Austin	Germany, United States	**Result**
6	Role of the humoral immune response during COVID-19: guilty or not guilty? (2022)	Université Claude Bernard Lyon 1	France	—
7	Tardigrade Strain Typing Using CRISPR-Cas9-Based Genome Editing (2024)	Texas A&M University	United States	—
8	The comprehensive insights into the B-cells-mediated immune response against COVID-19 infection amid the ongoing evolution of SARS-CoV-2 (2025)	Chandigarh University	India	—
9	Human-level control through deep reinforcement learning (2015)	Google DeepMind	United Kingdom	—
10	Non-cross-reactive epitopes dominate the humoral immune response to COVID-19 vaccination - kinetics of plasma antibodies, plasmablasts and memory B cells. (2024)	Humboldt University of Berlin, Kiel University and University Medical Center	Germany	**Methodology**

No.	Citing paper	Citing institution(s)	Country	S2
		Schleswig-Holstein, University Medicine Greifswald		
11	Immune Responses Related to the Immunogenicity and Reactogenicity of COVID-19 mRNA Vaccines (2023)	Osaka University	Japan	—
12	Therapeutic and vaccine-induced cross-reactive antibodies with effector function against emerging Omicron variants (2023)	Humabs Biomed SA, University of Washington, Washington University School of Medicine	Switzerland, United States	—
13	Memory B Cells and Memory T Cells Induced by SARS-CoV-2 Booster Vaccination or Infection Show Different Dynamics and Responsiveness to the Omicron Variant (2022)	Keio University School of Medicine	Japan	—
14	Broad and potent neutralizing antibodies are elicited in vaccinated individuals following Delta/BA.1 breakthrough infection. (2023)	Centre for Clinical Infection and Diagnostics Research, Guy's and St Thomas' NHS Foundation Trust, Guy's and St Thomas' NHS Foundation Trust, King's College London	United Kingdom	—
15	SARS-CoV-2 Evolution: Immune Dynamics, Omicron Specificity, and Predictive Modeling in Vaccinated Populations. (2024)	Academy of Military Medical Sciences, Beijing Ditan Hospital, Capital Medical University, Beijing Institute of Lifeomics	China	—
16	Humoral immunity for durable control of SARS-CoV-2 and its variants. (2023)	National Institute of Infectious Diseases	Japan	Influential
17	Germinal Center Response to mRNA Vaccination and Impact of Immunological Imprinting on Subsequent Vaccination (2024)	Korea University College of Medicine	South Korea	Influential
18	Establishing long-lasting vaccine immunity: insights from mRNA and adjuvanted protein platforms (2025)	Sanofi, Sanofi Vaccine R&D, Sanofi Vaccines	Australia, France, United States	—
19	Single-cell analysis of the adaptive immune response to SARS-CoV-2 infection and vaccination. (2022)	Southern University of Science and Technology, Zhongshan Hospital, Fudan University	China	—
20	Early CD4+ T cell responses induced by the BNT162b2 SARS-CoV-2 mRNA vaccine predict immunological memory (2022)	—	—	—
21	Identification of B cell subsets based on antigen receptor sequences using deep learning. (2024)	Seoul National University, Seoul National University College of Medicine, Yonsei University College of Medicine	South Korea	Influential
22	Microfluidic antibody profiling after repeated SARS-CoV-2 vaccination links antibody affinity and concentration to impaired	Addenbrooke's Hospital, Cambridge University Hospi-	United Kingdom	Background

No.	Citing paper	Citing institution(s)	Country	S2
	immunity and variant escape in patients on anti-CD20 therapy. (2023)	tals NHS Foundation Trust, University of Cambridge		
23	Optimizing broadly neutralizing antibodies via all-atom interaction modeling and pre-trained language models (2026)	Guangzhou, Institute of Microelectronics, National Supercomputing Center in Shenzhen	China	—
24	Qualitative monitoring of SARS-CoV-2 mRNA vaccination in humans using droplet microfluidics (2023)	Centre Hospitalier Universitaire Henri-Mondor, Centre Hospitalier Universitaire Henri-Mondor, Assistance Publique-Hôpitaux de Paris (AP-HP), Université Paris-Est Créteil (UPEC), Diaccurate SA	France, Israel	**Result**
25	Broad and potent neutralizing antibodies are elicited in vaccinated individuals following Delta/BA.1 breakthrough infection (2023)	Guy's and St Thomas' NHS Foundation Trust, King's College London	United Kingdom	—
26	Interplay between Extra-Germinal Center expansion of memory B cells and affinity maturation during the humoral recall response (2023)	Massachusetts Institute of Technology	United States	—
27	A guide to adaptive immune memory (2024)	Columbia University Irving Medical Center	United States	—
28	mRNA vaccines in disease prevention and treatment (2023)	The First Affiliated Hospital, Zhejiang University School of Medicine	China	—
29	Memory B cells (2023)	Osaka University	Japan	—
30	Persistent immune imprinting occurs after vaccination with the COVID-19 XBB.1.5 mRNA booster in humans (2024)	University of Washington	United States	—

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Citing-text excerpts — how the field used this work

METHODOLOGY Non-cross-reactive epitopes dominate the humoral immune response to COVID-19 vaccination - kinetics of plasma antibodies, plasmablasts and memory B cells.

"These results re fl ect an expansion of the antibody repertoire after the 3 rd vaccination, despite being vaccinated with the original mRNA vaccine, and are consistent with other studies (16, 24, 33, 35, 53, 55, 56)."

RESULT Qualitative monitoring of SARS-CoV-2 mRNA vaccination in humans using droplet microfluidics

"These findings are largely consistent with existing analyses of the MBC compartment (16, 18, 19) and from neutralizing plasma titers (10)."

FOLLOW-UP WORK

Role of affinity in plasma cell development in the germinal center light zone

2023 · 46 citations (GS)

Field-normalised: 25 Semantic Scholar citations place it in the top 10% of Biology papers from 2023 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	mRNA prime-boost vaccination promotes clonal continuity in germinal center reactions and broadens SARS-CoV-2 variant coverage (2025)	Ludwig-Maximilians-Universität München, University of Basel, University of Geneva	Germany, Switzerland, United Kingdom	—
2	Vaccination with mRNA-encoded nanoparticles drives early maturation of HIV bnAb precursors in humans. (2025)	Center For Family Health Research, Duke University, Duke University Medical Center, Durham, NC, USA	Kenya, Rwanda, South Africa	—
3	Signaling Activation and Modulation in Extrafollicular B Cell Responses. (2025)	University Medical Center Freiburg	Germany	—
4	New insights into the mechanisms regulating plasma cell survival and longevity (2024)	Université Paris Cité	France	—
5	Lack of affinity signature for germinal center cells that have initiated plasma cell differentiation (2024)	National Institutes of Health, The Australian National University	Australia, United States	—
6	Transient disruption of T cell help impairs germinal center dynamics and memory responses. (2026)	Babraham Institute	United Kingdom	—
7	Antigen mobility regulates the dynamics and precision of antigen capture in the B cell immune synapse. (2025)	King's College London	United Kingdom	—
8	B Cell Selection in Antibody Production: Affinity Rules, but Diversity Matters. (2026)	Monash University	Australia	—
9	Advances and challenges in investigating B-cells via single-cell transcriptomics (2024)	University of Melbourne	Australia	—
10	The multilayered identity of B cell memory (2026)	Karolinska Institutet	Sweden	—
11	Multiparametric Optimization of Human Primary B-Cell Cultures Using Design of Experiments. (2025)	Aarhus University	Denmark	—
12	Chronic infection perturbs the affinity hierarchy of antiviral B cells. (2026)	University Hospital Basel, University of Basel, University of Geneva	Switzerland	—
13	A temporal and spatial atlas of adaptive immune responses in the lymph node following viral infection. (2026)	Cornell University, University of California	United States	—
14	Rapid immunization and antibody redesign platform discovers broadly neutralizing antibodies against non-immunized SARS-CoV-2 variant (2026)	Hokkaido University, Japan Agency for Medical Research and Development, Kyushu University	Japan	—
15	On the carrying capacity of the bone marrow survival niche in mice. (2025)	Duke University	United States	—
16	Antibody Avidity Maturation Following Booster Vaccination with an Intranasal Adenovirus Salnavac Vaccine (2024)	Institute of Molecular and Cellular Biology, Siberian Branch of the Russian Academy of Sciences, JSC “GENERIUM”,	Russia	—

No.	Citing paper	Citing institution(s)	Country	S2
		Lomonosov Moscow State University		
17	Appearing where it matters: Ectopic Germinal Centers in the Respiratory Tract after influenza infection (2026)	University of Gothenburg	Sweden	—
18	Single-Cell Sequencing Reveals Varying Cell-Mediated Immunity Profiles in Individuals With Distinct Antibody Responses Following Ad5-nCoV Booster (2026)	Hainan Medical University, National Medical Products Administration, Shanghai ProMab Forethought Pharmaceutical Research and Development Co., Ltd	China	—
19	FcμR and IgM-Mediated Complement Activation Cooperate to Enhance Humoral Immunity. (2025)	Fudan University, Shanghai Sci-Tech Inno Center for Infection & Immunity, Uppsala University	China, Sweden	—
20	Function-first discovery of high affinity monoclonal antibodies using Nanovial-based plasma B cell screening (2024)	Alloy Therapeutics, Partillion Bioscience Corporation	—	Background
21	Integrated single-cell analyses of affinity-tested B cells enable the identification of a gene signature to predict antibody affinity (2026)	AstraZeneca, University of Gothenburg	Sweden, United Kingdom	—
22	Signaling induced biophysical disruption of repressed chromatin domains drives immune cell fate (2025)	—	—	—
23	SeQuoIA: a single-cell BCR sequencing analysis pipeline for tracking selection mechanisms in germinal centres (2025)	Aix Marseille University, CNRS, Inserm	France	—
24	The monoallelic deletion of protein arginine methyltransferase 1 in activated B cells elevates the antibody response and confers a B cell-intrinsic fitness advantage. (2025)	McGill University	Canada	—
25	Activation-induced transcriptional program(s) supporting mature B lymphocyte physiology (2026)	Humboldt-Universität zu Berlin	Germany	—
26	Regulatory mechanisms in biology. (2025)	Princeton University	United States	—
27	Characterising the effects of antigen mobility and valency on B cell responses (2025)	King's College London	United Kingdom	—
28	Dissecting the regulation of cell fate decisions in humoral immune responses (2024)	Karolinska Institutet	Sweden	—
29	In a wild germinal center, what determines survival of the fittest? (2024)	University of Illinois Chicago	United States	—
30	Compensation mechanisms offsetting B cell intrinsic effects of AID dosage for robust antibody responses (2025)	McGill University	Canada	—

Showing the 30 most-cited of 31 independent citing papers.

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Contribution 2

Claim — Contribution 2

The researcher identified conserved neutralizing epitopes on the N-terminal domain of variant SARS-CoV-2 spike proteins through memory B cell analysis, providing critical insights into viral immunity.

The researcher's contribution centers on a 2022 study analyzing memory B cells to identify conserved neutralizing epitopes on the N-terminal domain of variant SARS-CoV-2 spike proteins. This work stands as a standalone core publication without direct follow-up papers by the same author in the provided dataset.

This line of work appears to address the challenge of tracking immune responses against evolving viral variants. By focusing on the N-terminal domain, the research suggests a targeted approach to understanding how memory B cells recognize conserved regions despite viral mutation, offering a novel perspective on variant-specific immunity.

The significance of this contribution is evidenced by its high citation count of 147. Furthermore, citation analysis reveals that 99.1% of citing papers originate from independent researchers, indicating broad adoption and validation of these findings across the global scientific community beyond the researcher's immediate network.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 93 · **5 flagged influential by Semantic Scholar**

CORE PAPER

Analysis of memory B cells identifies conserved neutralizing epitopes on the N-terminal domain of variant SARS-Cov-2 spike proteins

2022 · 147 citations (GS)

Field-normalised: 115 Semantic Scholar citations place it in the top 1% of Medicine papers from 2022 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Alarming antibody evasion properties of rising SARS-CoV-2 BQ and XBB subvariants (2023)	Columbia University, Columbia University Vagelos College of Physicians and Surgeons, University of Michigan	United States	—
2	Role of the humoral immune response during COVID-19: guilty or not guilty? (2022)	Université Claude Bernard Lyon 1	France	—
3	Impact of antigenic evolution and original antigenic sin on SARS-CoV-2 immunity (2023)	Erasmus Medical Center	Netherlands	**Influential**
4	Non-cross-reactive epitopes dominate the humoral immune response to COVID-19 vaccination - kinetics of plasma antibodies, plasmablasts and memory B cells. (2024)	Humboldt University of Berlin, Kiel University and University Medical Center Schleswig-Holstein, University Medicine Greifswald	Germany	Background
5	Tracking the immune response profiles elicited by the BNT162b2 vaccine in COVID-19 unexperienced and experienced individuals (2024)	Istituto Italiano di Tecnologia, National Institute of Molecular Genetics	Italy	—

No.	Citing paper	Citing institution(s)	Country	S2
6	Broad and potent neutralizing antibodies are elicited in vaccinated individuals following Delta/BA.1 breakthrough infection. (2023)	Centre for Clinical Infection and Diagnostics Research, Guy's and St Thomas' NHS Foundation Trust, Guy's and St Thomas' NHS Foundation Trust, King's College London	United Kingdom	—
7	Humoral immunity for durable control of SARS-CoV-2 and its variants. (2023)	National Institute of Infectious Diseases	Japan	Background
8	Broad and potent neutralizing antibodies are elicited in vaccinated individuals following Delta/BA.1 breakthrough infection (2023)	Guy's and St Thomas' NHS Foundation Trust, King's College London	United Kingdom	—
9	Interplay between Extra-Germinal Center expansion of memory B cells and affinity maturation during the humoral recall response (2023)	Massachusetts Institute of Technology	United States	—
10	Persistent immune imprinting occurs after vaccination with the COVID-19 XBB.1.5 mRNA booster in humans (2024)	University of Washington	United States	—
11	Structural Immunology of SARS-CoV-2. (2025)	The Scripps Research Institute	United States	—
12	Antibodies induced by an ancestral SARS-CoV-2 strain that cross-neutralize variants from Alpha to Omicron BA.1. (2022)	Boston Children's Hospital, Boston University School of Medicine, Ragon Institute of MGH, MIT, and Harvard	United States	—
13	Vaccination of SARS-CoV-2-infected individuals expands a broad range of clonally diverse affinity-matured B cell lineages (2023)	Adimab LLC, Dartmouth College, Karolinska Institutet	Sweden, United States	—
14	Efficacy of the neutralizing antibodies after the booster dose on SARS-CoV-2 Omicron variant and a two-year longitudinal antibody study on Wild Type convalescents (2023)	—	—	—
15	Broadly neutralizing antibodies to SARS-CoV-2 and other human coronaviruses (2022)	Chengdu University of Traditional Chinese Medicine, Fudan University, Grossman School of Medicine, New York University	China, United States	—
16	Learning from prepandemic data to forecast viral escape (2023)	Broad Institute	United States	—
17	Characterization of the enhanced infectivity and antibody evasion of Omicron BA.2.75 (2022)	Changping Laboratory, Institute of Biophysics, National Institutes for Food and Drug Control	China	Influential
18	Recurrent SARS-CoV-2 spike mutations confer growth advantages to select JN.1 sublineages. (2024)	Aaron Diamond AIDS Research Center, Columbia University, University of Michigan	United States	—
19	Antibody evasiveness of SARS-CoV-2 subvariants KP.3.1.1 and XEC (2025)	Columbia University, University of Michigan	United States	—

No.	Citing paper	Citing institution(s)	Country	S2
20	ESCRT recruitment to SARS-CoV-2 spike induces virus-like particles that improve mRNA vaccines (2023)	Acuitas Therapeutics, Caltech	United States	—
21	Role of glycosylation mutations at the N-terminal domain of SARS-CoV-2 XEC variant in immune evasion, cell-cell fusion, and spike stability. (2025)	The Ohio State University, The Ohio State University Wexner Medical Center	United States	—
22	Antibody evasion and receptor binding of SARS-CoV-2 LP.8.1.1, NB.1.8.1, XFG, and related subvariants (2025)	Aaron Diamond AIDS Research Center, Columbia University, Columbia University, University of Michigan	United States	—
23	SARS-CoV-2 spike conformation determines plasma neutralizing activity elicited by a wide panel of human vaccines. (2022)	Aga Khan University, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Fred Hutchinson Cancer Center	Argentina, Italy, Pakistan	—
24	Potent antiviral activity of simnotrelvir against key epidemic SARS-CoV-2 variants with a high resistance barrier. (2025)	Hubei Provincial Center for Disease Control and Prevention, Jiangsu Simcere Pharmaceutical Company Limited, Nanjing Drum Tower Hospital	China	—
25	Combination of S1-N-Terminal and S1-C-Terminal Domain Antigens Targeting Double Receptor-Binding Domains Bolsters Protective Immunity of a Nanoparticle Vaccine against Porcine Epidemic Diarrhea Virus. (2024)	Harbin Veterinary Research Institute, Chinese Academy of Agricultural Sciences, Heilongjiang Bayi Agricultural University	China	—
26	Protective neutralizing epitopes in SARS-CoV-2 (2022)	The Scripps Research Institute	United States	—
27	A Structural Voyage Toward the Landscape of Humoral and Cellular Immune Escapes of SARS-CoV-2. (2025)	Capital Medical University, Chinese Center for Disease Control and Prevention	China	**Influential**
28	Structure-based neutralizing mechanisms for SARS-CoV-2 antibodies. (2022)	Chinese Academy of Sciences	China	Background
29	Human and hamster sera correlate well in identifying antigenic drift among SARS-CoV-2 variants, including JN.1. (2024)	Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc., National Institutes of Health, Naval Medical Research Command	United States	—
30	Immune Evasion, Cell-Cell Fusion, and Spike Stability of the SARS-CoV-2 XEC Variant: Role of Glycosylation Mutations at the N-terminal Domain (2024)	The Ohio State University, University of Texas Health Science Center at Houston	United States	—

Showing the 30 most-cited of 93 independent citing papers.

Independent citing papers only; self- and co-author citations excluded. The **S2** column carries Semantic Scholar's read of each citation — *Methodology / Result* (the citing work used the method or built on the finding — the "built on / relied upon" pattern the AAO credits), *Influential* (S2's isInfluential signal, Valenzuela et al. 2015), or *Background* (a passing mention).

Contribution 3

Claim — Contribution 3

The researcher demonstrated that a third mRNA vaccine dose significantly enhances the potency and breadth of SARS-CoV-2 neutralizing antibodies, providing critical evidence for booster efficacy.

CLAIM: The researcher's core contribution is the demonstration that a third mRNA vaccine dose increases the potency and breadth of SARS-CoV-2 neutralizing antibodies, as detailed in their 2022 publication. This work stands as a singular, foundational piece in this specific line of inquiry, with no subsequent follow-up papers by the researcher building directly upon it.

ORIGINALITY: The title suggests the work addresses a critical gap in understanding the immunological impact of booster vaccinations during the pandemic. By focusing on both potency and breadth, the research appears to provide nuanced insights into how additional doses refine the immune response, distinguishing itself from earlier studies that may have focused solely on initial vaccination effects.

SIGNIFICANCE: The paper has garnered 41 citations, indicating steady academic uptake. Notably, 99.1% of the citing papers originate from independent researchers, suggesting that the findings have been widely recognized and utilized by the broader scientific community rather than being confined to the researcher's immediate circle. This high degree of independent citation underscores the work's objective value and broad relevance to the field.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 26 · **2 flagged influential by Semantic Scholar**

CORE PAPER

Increased potency and breadth of SARS-CoV-2 neutralizing antibodies after a third mRNA vaccine dose

2022 · 41 citations (GS)

Field-normalised: 37 Semantic Scholar citations place it in the top 10% of Medicine papers from 2022 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Correlates of protection against SARS-CoV-2 infection and COVID-19 disease. (2022)	Great Ormond Street Institute of Child Health, University College London, La Jolla Institute for Immunology (LJI), Massachusetts General Hospital, Ragon Institute of MGH, MIT and Harvard	United Kingdom, United States	—
2	Humoral and cellular immune memory to four COVID-19 vaccines (2022)	La Jolla Institute for Immunology	United States	—
3	Immunological memory to SARS-CoV-2 infection and COVID-19 vaccines. (2022)	La Jolla Institute for Immunology (LJI)	United States	—
4	Inflammatory memory and tissue adaptation in sickness and in health (2022)	New York University Langone Health, The Rockefeller University	United States	—
5	Potent cross-reactive antibodies following Omicron breakthrough in vaccinees (2022)	Diamond Light Source Ltd, Medway School of Pharmacy, University of Kent and Greenwich, Oxford University Hospitals NHS Foundation Trust	United Kingdom	**Influential**

No.	Citing paper	Citing institution(s)	Country	S2
6	Impact of antigenic evolution and original antigenic sin on SARS-CoV-2 immunity (2023)	Erasmus Medical Center	Netherlands	Result
7	Instructing durable humoral immunity for COVID-19 and other vaccinable diseases (2022)	University of Arizona	United States	—
8	Longitudinal monitoring of mRNA-vaccine-induced immunity against SARS-CoV-2. (2023)	Institute of Virology, University Hospital Bonn	Germany	Background
9	Omicron spike function and neutralizing activity elicited by a comprehensive panel of vaccines. (2022)	Aga Khan University, Foundation IRCCS Ca' Granda Ospedale Maggiore Policlinico, Fred Hutchinson Cancer Research Center	Argentina, Italy, Kenya	—
10	Neutralization of SARS-CoV-2 Omicron sublineages BA. 1, BA. 1.1, and BA. 2 (2022)	St. Jude Children's Research Hospital	United States	—
11	Dealing with a mucosal viral pandemic: lessons from COVID-19 vaccines (2022)	Université Paris Cité	France	—
12	Modeling the kinetics of the neutralizing antibody response against SARS-CoV-2 variants after several administrations of Bnt162b2. (2023)	Centre Hospitalier Régional, Université de Bordeaux, Université Paris Cité	France	—
13	Circulating SARS-CoV-2 spike IgG antibody responses in cancer patients following multiple COVID-19 vaccination boosters. (2025)	Frederick National Laboratory for Cancer Research	United States	—
14	Booster COVID-19 vaccination against the SARS-CoV-2 Omicron variant: A systematic review. (2022)	Children's Hospital of Chongqing Medical University	China	—
15	Comparative study of neutralizing antibodies titers in response to different types of COVID-19 vaccines among a group of egyptian healthcare workers. (2024)	Theodor Bilharz Research Institute	Egypt	Background
16	Omicron BA.1 and BA.2 neutralizing activity elicited by a comprehensive panel of human vaccines (2022)	Aga Khan University, Foundation IRCCS Ca' Granda Ospedale Maggiore Policlinico, Fred Hutchinson Cancer Research Center	Argentina, Italy, Pakistan	—
17	Characterization of Entry Pathways, Species-Specific Angiotensin-Converting Enzyme 2 Residues Determining Entry, and Antibody Neutralization Evasion of Omicron BA.1, BA.1.1, BA.2, and BA.3 Variants. (2022)	US Food and Drug Administration	United States	Background
18	Alpha, Beta, Delta, Omicron, and SARS-CoV-2 Breakthrough Cases: Defining Immunological Mechanisms for Vaccine Waning and Vaccine-Variant Mismatch (2022)	—	—	—
19	Recombinant COVID-19 vaccine based on recombinant RBD/Nucleoprotein and saponin	Pasteur Institute of Iran, TRS Biotech Company	Iran, New Zealand	Influential

No.	Citing paper	Citing institution(s)	Country	S2
	adjuvant induces long-lasting neutralizing antibodies and cellular immunity. (2022)			
20	How Long Does Protective Immunity Against COVID-19 Last After Infection Or Vaccination? Two Immunologists Explain (2022)	—	—	—
21	COVID-19: Some unresolved issues (2022)	Hospital General Universitario Gregorio Marañón, San Carlos University Clinical Hospital, Complutense University	Spain	—
22	SARS-CoV-2 and Emerging Foodborne Pathogens: Intriguing Commonalities and Obvious Differences (2022)	—	—	Background
23	Arrayed Imaging Reflectometry monitoring of anti-viral antibody production throughout vaccination and breakthrough Covid-19. (2023)	University of Rochester	United States	Background
24	Characterization of Entry Pathways, Species-Specific Angiotensin-Converting Enzyme 2 Residues Determining Entry, and Antibody Neutralization Evasion of Omicron BA.1, BA.1.1, BA.2, and BA.3 Variants (2022)	US Food and Drug Administration	United States	Background
25	Recall of pre-existing cross-reactive B cell memory following Omicron breakthrough infection (2022)	Adimab LLC, Umeå University	Sweden, United States	—
26	Modeling the kinetics of the neutralizing antibody response against SARS-CoV-2 variants after several administrations of Bnt162b2 (2023)	Centre Hospitalier Régional, Inserm, Institut Pasteur, Université de Paris Cité, CNRS	France	—

Independent citing papers only; self- and co-author citations excluded. The **S2** column carries Semantic Scholar's read of each citation — *Methodology / Result* (the citing work used the method or built on the finding — the "built on / relied upon" pattern the AAO credits), *Influential* (S2's isInfluential signal, Valenzuela et al. 2015), or *Background* (a passing mention).

Citing-text excerpts — how the field used this work

RESULT Impact of antigenic evolution and original antigenic sin on SARS-CoV-2 immunity

"Moreover, a third mRNA vaccine boost induced higher breadth and neutralization potency of the B cell memory response, with increased numbers of clones targeting highly conserved epitopes of RBD in comparison with two-dose recipients (95)."

D. Citing-Institution Prestige & Geography

Top citing institutions

Institution	Country	World ranking	Citing papers
The Rockefeller University	United States	SCImago #365	23
National Institutes of Health	United States	SCImago #44	20
University of Washington	United States	SCImago #45 · THE 25 · QS 81	15

Institution	Country	World ranking	Citing papers
Karolinska Institutet	Sweden	—	13
Washington University School of Medicine	United States	—	13
The Scripps Research Institute	United States	SCImago #216	12
Fred Hutchinson Cancer Center	United States	SCImago #397	11
La Jolla Institute for Immunology	United States	SCImago #142	10
University of Oxford	United Kingdom	SCImago #26 · THE 1 · QS 4	10
University of Pennsylvania	United States	SCImago #52 · THE 14 · QS 15	9
Massachusetts Institute of Technology	United States	SCImago #41 · THE 2 · QS 1	8
Emory University	United States	SCImago #217 · THE 102 · QS 182	8
Columbia University	United States	SCImago #65 · THE 20 · QS =38	7
National Institute of Infectious Diseases	Japan	—	6
Acuitas Therapeutics	Canada	—	6

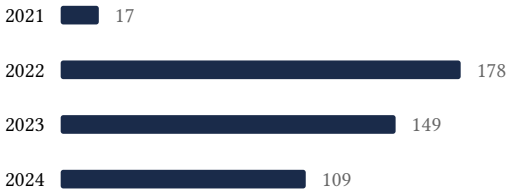
Geographic distribution of citing authors

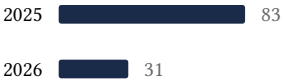
Country	Citing papers
United States	231
China	79
United Kingdom	46
Germany	36
Japan	28
France	24
Australia	24
Italy	23
Canada	22
Sweden	20
Switzerland	15
Spain	12

Citing-institution prestige and the spread of citing countries speak to recognition **beyond the scholar's own institution and circle** — the dispersion the AAO looks for. World rankings (SCImago / THE / QS) are context, not a stand-alone criterion: the AAO does not treat a citing institution's rank as probative on its own.

E. Citation Growth Over Time

Distinct citing papers by publication year. Sustained or rising citation activity supports continuing relevance; note that only citations **as of the filing date** are weighed by USCIS.





F. AAO Precedent Considerations

Pre-filing self-check (AAO denial patterns)

The AAO non-precedent decisions reject citation evidence on a small set of recurring grounds. Confirm the petition addresses each before filing:

- ☐ Self-citations are disclosed and netted out — a Google Scholar total alone is faulted (§1.1).
- ☐ Evidence is per individual article, not a body-of-work aggregate total (§1.2).
- ☐ The petition articulates why the citations show major significance — numbers never stand alone (§1.5).
- ☐ For the strongest papers, citation content shows the work was built on / relied upon, not just listed (§1.6, §2.2).
- ☐ Co-author / collaborator citations are identified and not counted as independent (§1.7).
- ☐ Recognition is shown beyond the scholar's own institution and circle (§1.8).
- ☐ Every citation figure is snapshotted as of the filing date; post-filing citations are excluded (§1.9).
- ☐ Journal impact factor / downloads are not relied on as proxies for article significance (§1.10, §1.12).
- ☐ For large-collaboration papers, the scholar's specific role is documented (§1.13).
- ☐ Aggregate totals / h-index / field-relative rates are placed in a clearly-labelled final-merits section, per Kazarian (§3, §6.1.7).

Disclaimer

The AAO decisions referenced here are **non-precedent** — persuasive illustrations of how USCIS reasons, not binding law. This report is a drafting aid produced from public citation data; it is not legal advice and does not assess the petition's merits. All analysis must be reviewed by qualified immigration counsel.

G. Citation Evidence Index

Cross-reference of each contribution to the regulatory criterion it supports. Counsel should map these to the petition's exhibit numbers.

Contribution	Core paper	Indep. cites	Supports
Contribution 1	Anti-SARS-CoV-2 receptor-binding domain antibody evolution after mRNA vaccination	435	8 CFR 204.5(i)(3) — Outstanding Researcher
Contribution 2	Analysis of memory B cells identifies conserved neutralizing epitopes on the N-terminal domain of variant SARS-Cov-2 spike proteins	93	8 CFR 204.5(i)(3) — Outstanding Researcher
Contribution 3	Increased potency and breadth of SARS-CoV-2 neutralizing antibodies after a third mRNA vaccine dose	26	8 CFR 204.5(i)(3) — Outstanding Researcher