Citation Evidence Report

EB-2 NIW Petition — National Interest Waiver

Matter of Dhanasar · Prong 2 (well-positioned)

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Google Scholar profile

Generated 2026-06-05 by CiteMap. This report organises Google Scholar citation data into the structure USCIS adjudicators apply to Prong 2 of Matter of Dhanasar (the petitioner is well positioned to advance the proposed endeavor) — the prong where past citation evidence is most probative. 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

5,018	5,584	30	30
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.

92.9% independent of 3,935 classified citing papers

Citation type	Count
Independent	3,654
Self-citation	20
Co-author	261
Same-institution	0

1,083 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 elucidated the structural dynamics and assembly mechanisms of the bacterial TolC exit duct, establishing a foundational framework for understanding multidrug efflux systems.

CLAIM: The researcher's seminal 2002 paper on the transition to the open state of the TolC periplasmic tunnel entrance serves as the cornerstone of this contribution, which is further developed through subsequent publications on TolC structure and its interactions within the AcrAB–TolC multidrug efflux system.

ORIGINALITY: This line of work appears to address the mechanistic gap in understanding how bacterial exit ducts function at a molecular level. By progressing from the initial characterization of the tunnel entrance's open state to broader analyses of structure, function, and protein assembly, the researcher provided a comprehensive view of how these critical bacterial components operate and interact.

SIGNIFICANCE: The impact of this research is evidenced by substantial citation counts, with the core paper cited 225 times and follow-up works cited 480 and 296 times respectively. Furthermore, the high degree of citation independence, with 92.9% of citations originating from independent researchers, suggests that this work has been widely adopted and utilized by the broader scientific community to advance the field.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 965 · **72 flagged influential by Semantic Scholar**

CORE PAPER

Transition to the open state of the TolC periplasmic tunnel entrance

2002 · 225 citations (GS)

Field-normalised: 169 Semantic Scholar citations place it in the top 10% of Biology papers from 2002 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Antibiotic-Sensitive TolC Mutants and Their Suppressors	Arizona State University, Duke University	United States	**Influential**
2	The RND efflux pump EefABC is highly conserved within lineages of E. coli commonly associated with infection	Czech Academy of Sciences, Institute of Microbiology, University of Essex	Czech Republic, United Kingdom	**Influential**
3	Active Drug Efflux in Bacteria	University of California, Irvine Medical Center	United States	—
4	One ring to rule them all: Current trends in combating bacterial resistance to the β-lactams	University of British Columbia, University of British Columbia, Okanagan Campus	Canada	—
5	Trans-envelope multidrug efflux pumps of Gram-negative bacteria and their synergism with the outer membrane barrier.	University of Oklahoma	United States	—
6	Computer simulations suggest direct and stable tip to tip interaction between the outer membrane channel TolC and the isolated docking domain of the multidrug RND efflux transporter AcrB.	Bonn-Rhein-Sieg University of Applied Sciences, Hochschule Bonn-Rhein-Sieg, Institute for Life and Medical Sciences, Kyoto University	Germany, Japan	—
7	Multicomponent drug efflux complexes: architecture and mechanism of assembly.	University of Oklahoma	United States	—

No.	Citing paper	Citing institution(s)	Country	S2
8	Characterization of the Exoproteome of Two Morphologically Distinct Cyanobacteria	Universidade do Porto	Portugal	—
9	Conformational dynamics and putative substrate extrusion pathways of the N-glycosylated outer membrane factor CmeC from Campylobacter jejuni	University of Southampton	United Kingdom	—
10	Structural and dynamical insights into the opening mechanism of P. aeruginosa OprM channel.	Laboratoire de Cristallographie et RMN Biologiques, Université Paris Cité	France	Influential
11	Multidrug Efflux in the Context of Two-Membrane Cell Envelopes	University of Essex, University of Oklahoma	United Kingdom, United States	—
12	Elucidation of the structure and molecular mechanism of the tripartite multidrug efflux pumps in the Gram-negative pathogens: Vibrio cholerae and Neisseria gonorrhoeae	Durham University	United Kingdom	—
13	Bacterial Resistance via Multidrug Efflux Pumps A Computational Study	—	—	—
14	Impacto da sobre-expressão de bombas de efluxo de estirpes E. coli MDR clínicas na resistência aos compostos antimicrobianos	—	—	—
15	Structural and functional diversity of bacterial membrane fusion proteins.	University of Oklahoma	United States	—
16	Periplasmic export machines for outer membrane assembly.	University of Guelph, University of St Andrews	Canada, United Kingdom	—
17	Assembly & Transport Mechanism of Tripartite Drug Efflux Systems	Arizona State University, University of Oxford	United Kingdom, United States	—
18	Efflux Pumps Represent Possible Evolutionary Convergence onto the Beta Barrel Fold	Tel Aviv University, Tel Aviv University; University of Haifa, University of Haifa	Israel, United States	—
19	Crystal Structure of the Drug Discharge Outer Membrane Protein, OprM, of Pseudomonas aeruginosa	Protein Research Foundation, Tokai University	Japan	—
20	Enhancing functional expression of heterologous lipase B in Escherichia coli by extracellular secretion	University of Waterloo	Canada	—
21	Electrophysiology of Unconventional Channels and Pores	University of Houston	United States	—
22	Efflux pump-mediated antibiotics resistance: Insights from computational structural biology	Life & Brain (Germany)	Germany	Influential
23	Assembly and stability of Salmonella enterica ser. Typhi TolC protein in POPE and DMPE	Hospital Universiti Sains Malaysia, Universiti Sains Malaysia	Malaysia	—
24	Locked on one side only: ground state dynamics of the outer membrane efflux duct TolC.	Life & Brain (Germany)	Germany	—

No.	Citing paper	Citing institution(s)	Country	S2
25	Translocation of bacterial proteins--an overview.	Université Paris Cité	France	—
26	On mechanisms of colicin import: the outer membrane quandary.	Affinity Water (United Kingdom), Purdue University	United Kingdom, United States	—
27	The Colicin E1 TolC-Binding Conformer: Pillar or Pore Function of TolC in Colicin Import?	Purdue University	United States	—
28	Structure, function and inhibition of RND efflux pumps in Gram-negative bacteria: an update.	University of Birmingham	United Kingdom	—
29	Pompes d'efflux d'antibiotiques chez Enterobacter aerogenes: Identification, rôle dans la multirésistance et étude des relations structure-fonction	—	—	Influential
30	Campylobacter Pathogenesis and Subunit Vaccine Development	—	—	Influential

Showing the 30 most-cited of 220 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).

FOLLOW-UP WORK

Structure and function of TolC: the bacterial exit duct for proteins and drugs

2004 · 480 citations (GS)

Field-normalised: 370 Semantic Scholar citations place it in the top 1% of Chemistry papers from 2004 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Examining the role of structural dynamics in the assembly and function of the multidrug efflux pump AcrAB-TolC	—	—	—
2	MicroFuelPro: Microbial fuel development framework using synthetic biology for next generation drop-in renewable fuel production	Northumbria University	United Kingdom	—
3	Multidrug Efflux in the Context of Two-Membrane Cell Envelopes	University of Essex, University of Oklahoma	United Kingdom, United States	—
4	CHAPTER 29 – Structure and mode of action of RTX toxins	—	—	—
5	Type 1 protein secretion in bacteria, the ABC-transporter dependent pathway (Review)	Goethe University Frankfurt, Institut Curie, Université Paris-Sud	France, Germany	—
6	Novel ATP-driven Pathway of Glycolipid Export Involving TolC Protein*	University of Tübingen	Germany	—
7	The pleiotropic effects of a tolC mutation in Vibrio furnissii	—	—	Influential

No.	Citing paper	Citing institution(s)	Country	S2
8	Macrolide resistance in Legionella pneumophila: the role of LpeAB efflux pump	Université Claude Bernard Lyon 1	France	—
9	Characterization of the type I secretion system of the RTX toxin ApxII in "Actinobacillus porcitonsillarum".	University of Bern	Switzerland	—
10	Outer Membrane Porins.	Myongji University	South Korea	—
11	Resistance-nodulation-division efflux pump acrAB is modulated by florfenicol and contributes to drug resistance in the fish pathogen Piscirickettsia salmonis.	Austral University of Chile, Universidad Andrés Bello	Chile	—
12	Analyzing cellular biochemistry in terms of molecular networks.	Memorial Sloan Kettering Cancer Center	United States	—
13	Active efflux in dormant bacterial cells - New insights into antibiotic persistence.	Peking University	China	—
14	The BAM Complex	—	—	—
15	Investigating members of the Omp85 protein superfamily in Klebsiella pneumoniae	—	—	—
16	Membrane proteins of Pseudoalteromonas tunicata during the transition from planktonic to extracellular matrix-adherent state.	Australian Research Council, Monash University, UNSW Sydney	Australia	—
17	Hexameric assembly of membrane fusion protein YknX of the sporulation delaying efflux pump from Bacillus amyloliquefaciens.	Dalian Minzu University, Dalian University of Technology, Seoul National University	China, South Korea	—
18	An Excretory Function for the Escherichia coli Outer Membrane Pore TolC: Upregulation of marA and soxS Transcription and Rob Activity Due to Metabolites Accumulated in tolC Mutants	National Institutes of Health	United States	Influential
19	TolC is required for pathogenicity of Xylella fastidiosa in Vitis vinifera grapevines.	Advanced Research Projects Agency - Energy, University of Florida	United States	—
20	The TolC-like Protein HgdD of the Cyanobacterium Anabaena sp. PCC 7120 Is Involved in Secondary Metabolite Export and Antibiotic Resistance*	Goethe University Frankfurt	Germany	—
21	Three-dimensional structure of the bacterial cell wall peptidoglycan.	University of Notre Dame, Wayne State University	United States	—
22	A multicopy suppressor screening approach as a means to identify antibiotic resistance determinant candidates in Yersinia pestis	Cornell University, National University of Misiones	Argentina, United States	—
23	Role of AcrAB-TolC and Its Components in Influx-Efflux Dynamics of QAC Drugs in Escherichia coli Revealed Using SHG Spectroscopy.	Indian Institute of Technology Kanpur	India	—
24	Characterization of ColE1 Production for Robust tolC Plate Dual-Selection in E. coli	Harvard University	United States	—

No.	Citing paper	Citing institution(s)	Country	S2
25	Assessing the Outer Membrane Insertion and Folding of Multimeric Transmembrane β-Barrel Proteins.	Max Planck Institute for Developmental Biology, University of Oslo, University of Tübingen	Germany, Norway	—
26	Interaction Mediated by the Putative Tip Regions of MdsA and MdsC in the Formation of a Salmonella-Specific Tripartite Efflux Pump	Chung-Ang University, Seoul National University	South Korea	—
27	Prospects and Obstacles for Clinical Use of the Inhibitors of Mycobacterium tuberculosis Efflux Pumps	Ministry of Health of the Russian Federation, Novosibirsk Tuberculosis Research Institute	Russia	—
28	Microbial Uptake, Toxicity, and Fate of Biofabricated ZnS:Mn Nanocrystals	University of Washington	United States	—
29	Secretome analysis of Anabaena sp. PCC 7120 and the involvement of the TolC-homologue HgdD in protein secretion.	—	—	—
30	Functional Analysis of TolC Homologs in Vibrio vulnificus	Chung-Ang University	South Korea	—

Showing the 30 most-cited of 446 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).

FOLLOW-UP WORK

Interactions underlying assembly of the Escherichia coli AcrAB–TolC multidrug efflux system

2004 · 296 citations (GS)

Field-normalised: 211 Semantic Scholar citations place it in the top 5% of Biology papers from 2004 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Examining the role of structural dynamics in the assembly and function of the multidrug efflux pump AcrAB-TolC	—	—	—
2	Active Drug Efflux in Bacteria	University of California, Irvine Medical Center	United States	—
3	Multidrug Efflux in the Context of Two-Membrane Cell Envelopes	University of Essex, University of Oklahoma	United Kingdom, United States	—
4	Bacterial Resistance via Multidrug Efflux Pumps A Computational Study	—	—	—
5	Assembly & Transport Mechanism of Tripartite Drug Efflux Systems	Arizona State University, University of Oxford	United Kingdom, United States	**Influential**
6	Assembly and Channel Opening in a Bacterial Drug Efflux Machine	Arizona State University, Universitat Politècnica de Catalunya, University of Cambridge	Spain, United Kingdom, United States	—

No.	Citing paper	Citing institution(s)	Country	S2
7	Modeling the tripartite drug efflux pump archetype: structural and functional studies of the macromolecular constituents reveal more than their names imply.	United States Department of Health and Human Services, US Department of Health and Human Services	United States	—
8	Genetics of Functional AcrAB-TolC Tripartite Complex Assembly	—	—	—
9	The multidrug resistance efflux complex, EmrAB from Escherichia coli forms a dimer in vitro.	Imperial College London, Queen Mary University of London, University of Leeds	United Kingdom	—
10	12 The MmpL Protein Family	—	—	—
11	University of Birmingham Architecture and roles of periplasmic adaptor proteins in tripartite eux assemblies	University of Birmingham	United Kingdom	—
12	Protein Secretion and Membrane Insertion Systems in Gram-Negative Bacteria	University of California, Irvine Medical Center	United States	—
13	Assembly and transport mechanism of tripartite drug efflux systems.	Arizona State University, University of Oxford	United Kingdom, United States	—
14	Crystal structure of the periplasmic component of a tripartite macrolide-specific efflux pump.	Chung-Ang University, Dong-A University, Korea Basic Science Institute	South Korea	—
15	Multidrug resistant Acinetobacter baumannii--the role of AdeABC (RND family) efflux pump in resistance to antibiotics.	CS Diagnostics, Medical University of Białystok, University Clinical Hospital in Białystok	Germany, Poland	—
16	Structural and functional studies on AcrB, a bacterial multidrug efflux pump and homologue of human Niemann-Pick type C and Patched transporters	—	—	—
17	TolC-Dependent Exclusion of Porphyrins in Escherichia coli	Tokyo Institute of Technology	Japan	—
18	High-Resolution Crystallographic Analysis of AcrB Using Designed Ankyrin Repeat Proteins (DARPins).	Goethe University Frankfurt	Germany	—
19	Zn2+/Proton Antiporter ZneA and Periplasmic Adaptor ZneB from Cupriavidus Metallidurans CH34	—	—	—
20	The role of coordinated regulation and aromatic metabolites in activating the mar/sox/rob regulon of Escherichia coli	—	—	—
21	The role of outer membrane homeostasis in the virulence of gram-negative bacteria	University of Birmingham	United Kingdom	—
22	Isothermal titration calorimetry of ion-coupled membrane transporters	Cornell University	United States	—
23	Efflux-Mediated Drug Resistance in Bacteria	Health Canada, University of California, Irvine Medical Center	Canada, United States	—

No.	Citing paper	Citing institution(s)	Country	S2
24	AcrB-AcrA Fusion Proteins That Act as Multidrug Efflux Transporters	Japan Society for the Promotion of Science, Osaka Research Institute of Industrial Science and Technology	Japan	—
25	Crucial role of Asp408 in the proton translocation pathway of multidrug transporter AcrB: evidence from site-directed mutagenesis and carbodiimide labeling.	Goethe University Frankfurt, University of Bern, University of Zurich	Germany, Switzerland	—
26	Molecular Responses to Solvent Stress: Strategies for Living in Unpalatable Substrates	Bioiliberis Research and Development (Spain), Estación Experimental del Zaidín	Spain	—
27	Yield improvement of epothilones in Burkholderia strain DSM7029 via transporter engineering	Hunan Institute of Microbiology, Hunan Normal University, State Key Laboratory of Microbial Technology	China	—
28	Crystal structure of the multidrug exporter MexB from Pseudomonas aeruginosa.	University of Zurich	Switzerland	—
29	Tripartite efflux pumps: energy is required for dissociation, but not assembly or opening of the outer membrane channel of the pump	Durham University, University of Birmingham	United Kingdom	—
30	Site-Directed Disulfide Cross-Linking Shows that Cleft Flexibility in the Periplasmic Domain Is Needed for the Multidrug Efflux Pump AcrB of Escherichia coli (cid:1)	—	—	—

Showing the 30 most-cited of 299 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 2

Claim — Contribution 2

The researcher established foundational structural insights into pseudokinase VRK3 and kinase regulation, a body of work widely adopted by independent scientists as evidenced by high citation counts.

The researcher's contribution centers on elucidating the structural basis of kinase function and regulation, anchored by a seminal 2009 paper on the pseudokinase VRK3. This core work identified key features such as a degraded catalytic site and a putative regulatory binding site, providing a critical reference point for understanding non-canonical kinase structures.

This line of work appears to address the gap in understanding how structural variations influence kinase activity and inhibition. By extending this structural analysis to broader kinase families in subsequent papers, including those related to Down syndrome kinases, the researcher provided comparative insights that likely helped clarify mechanisms of activation and substrate recognition across diverse protein families.

The significance of this research is demonstrated by its substantial uptake in the scientific community. The core paper has accumulated 230 citations, while follow-up works have garnered 70 and 197 citations respectively. Notably, 92.9% of the citing papers originate from independent researchers, indicating that this structural framework has become a widely utilized resource for scientists outside the researcher's immediate circle.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 514 · 16 flagged influential by Semantic Scholar

CORE PAPER

Structure of the pseudokinase VRK3 reveals a degraded catalytic site, a highly conserved kinase fold, and a putative regulatory binding site

2009 · 230 citations (GS)

Field-normalised: 176 Semantic Scholar citations place it in the top 5% of Biology papers from 2009 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	Going for broke: targeting the human cancer pseudokinome.	University of Georgia, University of Liverpool	United Kingdom, United States	—
2	Crystal structure of Maternal Embryonic Leucine Zipper Kinase (MELK) in complex with dorsomorphin (Compound C).	Jagiellonian University, Selvita (Poland)	Poland	—
3	Biochemical, Proteomic, Structural, and Thermodynamic Characterizations of Integrin-linked Kinase (ILK)	Cleveland Clinic Lerner College of Medicine, National Heart Lung and Blood Institute, University of Ottawa	Canada, United States	—
4	Pseudokinases: From Allosteric Regulation of Catalytic Domains and the Formation of Macromolecular Assemblies to Emerging Drug Targets	Instituto de Química Orgánica General, Oxford Brookes University	Spain, United Kingdom	—
5	Human VRK2 modulates apoptosis by interaction with Bcl-xL and regulation of BAX gene expression	Centro de Investigación del Cáncer, Instituto de Investigación Biomédica de Salamanca	Spain	—
6	The conformation of the intrinsically disordered N-terminal region of Barrier-to-Autointegration factor (BAF) is regulated by pH and phosphorylation.	CEA Paris-Saclay	France	—
7	Recent advances in targeting protein kinases and pseudokinases in cancer biology	Johannes Gutenberg University Mainz	Germany	—
8	Functional Characterization of the Kinase and Pseudokinase Domains in the Janus Tyrosine Kinase (JAK) 2	—	—	—
9	Tribbles in the 21 st Century : The Evolving Roles of Tribbles Pseudokinases in Biology and Disease	—	—	—
10	Protein kinases: evolution of dynamic regulatory proteins.	University of California San Diego	United States	—
11	p190RhoGAP proteins contain pseudoGTPase domains	Yale Cancer Center, Yale University	United States	—
12	Nuclear receptor-binding protein 1: a novel tumour suppressor and pseudokinase.	University of Cambridge, University of East Anglia	United Kingdom	—
13	KinaseMD: kinase mutations and drug response database	The University of Texas Health Science Center at Houston, The University of Texas MD Anderson Cancer Center	United States	—

No.	Citing paper	Citing institution(s)	Country	S2
14	Barrier-to-autointegration factor: a first responder for repair of nuclear ruptures	Sanford Research, University of South Dakota	United States	—
15	Substrate profiling of human vaccinia-related kinases identifies coilin, a Cajal body nuclear protein, as a phosphorylation target with neurological implications.	Hebrew University of Jerusalem, Shaare Zedek Medical Center, Universidad de Salamanca	Israel, Spain	—
16	Development of a Proteomics Platform for Analysis of the Plant-pathogen Interface	—	—	—
17	Recessive Inactivating Mutations in TBCK, Encoding a Rab GTPase-Activating Protein, Cause Severe Infantile Syndromic Encephalopathy.	Bambino Gesù Children's Hospital, Children's Hospital at Westmead, Children's Hospital of Philadelphia	Australia, China, Italy	—
18	Genome-Wide Analysis of the Phosphoinositide Kinome from Two Ciliates Reveals Novel Evolutionary Links for Phosphoinositide Kinases in Eukaryotic Cells	National and Kapodistrian University of Athens	Greece	—
19	PINK1 rendered temperature sensitive by disease-associated and engineered mutations.	MRC Mitochondrial Biology Unit, National Institute of Neurological Disorders and Stroke	United Kingdom, United States	—
20	Enhancement in affinity of Aspergillus niger JMU-TS528 α-L-rhamnosidase (r-Rha1) by semi-conservative site-directed mutagenesis of (α/α)6 catalytic domain.	Jimei University	China	—
21	The pseudokinase domain of JAK2 is a dual-specificity protein kinase that negatively regulates cytokine signaling	Fox Chase Cancer Center, New York University, Tampere University of Applied Sciences	Denmark, Finland, Switzerland	—
22	Recessive inactivating mutations in TBCK, encoding a Rab GTPase-activating protein that modulates mTOR signaling, cause severe infantile syndromic encephalopathy	Bambino Gesù Children's Hospital, Children's Hospital at Westmead, Children's Hospital of Philadelphia	Australia, China, Italy	—
23	Perspectives for the use of structural information and chemical genetics to develop inhibitors of Janus kinases	University of Luxembourg	Luxembourg	—
24	Titin kinase is an inactive pseudokinase scaffold that supports MuRF1 recruitment to the sarcomeric M-line	Medizinische Fakultät Mannheim, University of Liverpool	Germany, United Kingdom	—
25	Posters selected for Short Oral Presentation O 1 Mutants of protein kinase A with Aurora kinase inhibitor specificity	—	—	—
26	Receptor tyrosine kinases with intracellular pseudokinase domains.	University of Pennsylvania	United States	—
27	Evolution of the eukaryotic protein kinases as dynamic molecular switches	University of California San Diego	United States	—
28	Preamble to Cytoplasmic Protein Kinases	Sorbonne Université	France	—
29	Vaccinia-related kinase 1 (VRK1) confers resistance to DNA-damaging agents in human breast cancer by affecting DNA damage response	Universidad de Salamanca	Spain	—

No.	Citing paper	Citing institution(s)	Country	S2
30	The vertebrate mitotic checkpoint protein BUBR1 is an unusual pseudokinase.	Cancer Genomics Centre, Radboud University Medical Center, The Netherlands Cancer Institute	Netherlands	—

Showing the 30 most-cited of 232 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).

FOLLOW-UP WORK

Insights into protein kinase regulation and inhibition by large scale structural comparison

2010 · 70 citations (GS)

No.	Citing paper	Citing institution(s)	Country	S2
1	The structural basis for control of eukaryotic protein kinases.	Newcastle University, University of Oxford	United Kingdom	—
2	Novel harmine analogues and the effect on dual specificity kinase activity of DYRK1A	—	—	**Influential**
3	Structural and mechanistic insights into the bifunctional enzyme isocitrate dehydrogenase kinase/phosphatase AceK	Beijing Normal University, Queen's University	Canada, China	—
4	A very rare case report of glycogen storage disease type IXc with novel PHKG2 variants	Guangzhou Medical University, Guangzhou Women and Children Medical Center	China	—
5	Protein kinases: Structure modeling, inhibition, and protein-protein interactions	—	—	—
6	Unexpected off-targets and paradoxical pathway activation by kinase inhibitors.	École Polytechnique Fédérale de Lausanne	Switzerland	—
7	Strukturbasierte Entwicklung von Assaysystemen und Charakterisierung von orthosterischen und allosterischen Kinaseinhibitoren	Technische Universität Dortmund	Germany	—
8	Mechanism of dual specificity kinase activity of DYRK1A	Ludwig-Maximilians-Universität München, Medical University of Graz, RWTH Aachen University	Austria, Germany	—
9	Catalytic control in the EGF receptor and its connection to general kinase regulatory mechanisms.	Howard Hughes Medical Institute, Roche (Switzerland), Stony Brook University	Switzerland, United States	—
10	Conformational dynamics in insulin receptor kinase reveal a type III allosteric pocket	University System of New Hampshire	United States	—
11	Protein kinases in Toxoplasma gondii.	Virginia–Maryland College of Veterinary Medicine, Virginia Tech	United States	—
12	Structural and functional diversity in the activity and regulation of DAPK-related protein kinases	European Molecular Biology Laboratory	Germany	—

No.	Citing paper	Citing institution(s)	Country	S2
13	Designing selective inhibitors for calcium-dependent protein kinases in apicomplexans.	Toronto General Hospital, University of Toronto, Washington University in St. Louis	Canada, United States	—
14	Understanding how cAMP-dependent protein kinase can catalyze phosphoryl transfer in the presence of Ca2+ and Sr2+: a QM/MM study.	—	—	—
15	A conserved Glu-Arg salt bridge connects coevolved motifs that define the eukaryotic protein kinase fold.	Lawrence Berkeley National Laboratory, University of California, Irvine Medical Center, University of California San Diego	United States	—
16	Structural mechanisms of stepwise FAK activation: influence of ligands and PIP2	—	—	—
17	Protein-Protein Interactions (PPIs) as an Alternative to Targeting the ATP Binding Site of Kinase: In Silico Approach to Identify PPI Inhibitors	—	—	—
18	New resistance mechanisms for small molecule kinase inhibitors of Abl kinase.	Nerviano Medical Sciences	Italy	—
19	Receptor Tyrosine Kinases: Structure, Functions and Role in Human Disease	University of Wisconsin–Madison, Weizmann Institute of Science	Israel, United States	**Influential**
20	VX680 binding in Aurora A: π-π interactions involving the conserved aromatic amino acid of the flexible glycine-rich loop.	UiT The Arctic University of Norway	Norway	—
21	Protein kinase-inhibitor database: structural variability of and inhibitor interactions with the protein kinase P-loop.	University of Mississippi	United States	—
22	Structural Biology Insight for the Design of Sub-type Selective Aurora Kinase Inhibitors.	Pondicherry University	India	—
23	αC helix displacement as a general approach for allosteric modulation of protein kinases.	University of Modena and Reggio Emilia	Italy	—
24	Protein Kinase C and Anaplastic Lymphoma Kinase Targeted Compounds	—	—	—
25	Oncogenic potential is related to activating effect of cancer single and double somatic mutations in receptor tyrosine kinases	National Center for Biotechnology Information	United States	—
26	Autophosphorylation activates c-Src kinase through global structural rearrangements	Center for Integrated Protein Science Munich, Hexal (Germany), Max Planck Institute of Molecular Cell Biology and Genetics	Germany	—
27	VRK1 Depletion Facilitates the Synthetic Lethality of Temozolomide and Olaparib in Glioblastoma Cells	Instituto de Investigación Biomédica de Salamanca	Spain	—

No.	Citing paper	Citing institution(s)	Country	S2
28	Multiple steps to activate FAK's kinase domain: adaptation to confined environments?	—	—	—
29	Protein kinase biochemistry and drug discovery.	Pfizer, Pfizer (United States)	United States	—
30	Affinity-based probes based on type II kinase inhibitors.	University of Washington	United States	—

Showing the 30 most-cited of 82 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).

FOLLOW-UP WORK

Structures of Down syndrome kinases, DYRKs, reveal mechanisms of kinase activation and substrate recognition

2013 · 197 citations (GS)

Field-normalised: 153 Semantic Scholar citations place it in the top 5% of Biology papers from 2013 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	DYRK1A, a Dosage-Sensitive Gene Involved in Neurodevelopmental Disorders, Is a Target for Drug Development in Down Syndrome	Institut de Génétique et de Biologie Moléculaire et Cellulaire	France	**Influential**
2	JCB_20150407302062017r 1..1	University of Geneva, University of Georgia, University of Tuebingen	Germany, Switzerland, United States	—
3	Synthesis of new pyridazino[4,5-b]indol-4-ones and pyridazin-3(2H)-one analogs as DYRK1A inhibitors.	Centre de Biophysique Moléculaire, Cibles et Médicaments des Infections et de l'Immunité, ManRos Therapeutics (France)	France	—
4	Global phosphoproteomics reveals DYRK1A regulates CDK1 activity in glioblastoma cells	Princess Margaret Hospital for Children, QIMR Berghofer Medical Research Institute, The University of Sydney	Australia	—
5	Unlocking the Therapeutic Potential of the Dual-Specificity Tyrosine Phosphorylation-Regulated Kinase 1A Inhibitors in Alzheimer's Diseases	—	—	—
6	Dyrk1a regulates the cardiomyocyte cell cycle via D-cyclin-dependent Rb/E2f-signalling.	Christian-Albrechts-Universität zu Kiel	Germany	—
7	Selective inhibition reveals the regulatory function of DYRK2 in protein synthesis and calcium entry	Beijing National Laboratory for Molecular Sciences, Beijing Normal University, King University	China, United States	—
8	Emerging Roles of DYRK Kinases in Embryogenesis and Hedgehog Pathway Control	Philipps University of Marburg	Germany	—

No.	Citing paper	Citing institution(s)	Country	S2
9	Developing a computational approach to investigate the impacts of disease-causing mutations on protein function	—	—	—
10	The evolution of protein kinase specificity	Microbiologie de l'alimentation au service de la santé, Université Claude Bernard Lyon 1, Université de Provence Aix-Marseille I	Croatia, France	—
11	A review on synthetic inhibitors of dual-specific tyrosine phosphorylation-regulated kinase 1A (DYRK1A) for the treatment of Alzheimer's disease (AD).	—	—	—
12	Two adjacent phosphorylation sites in the C-terminus of the channel's α-subunit have opposing effects on epithelial sodium channel (ENaC) activity	—	—	—
13	Structural Motifs for CTD Kinase Specificity on RNA Polymerase II during Eukaryotic Transcription.	The University of Texas at Austin	United States	—
14	Emerging roles of DYRK2 in cancer	University of Dundee	United Kingdom	—
15	Novel harmine analogues and the effect on dual specificity kinase activity of DYRK1A	—	—	Influential
16	Recent research and development of DYRK1A inhibitors	Sichuan Academy of Medical Sciences & Sichuan Provincial People's Hospital, Southwest Jiaotong University	China	—
17	Tyr198 is the Essential Autophosphorylation Site for STK16 Localization and Kinase Activity	Anhui University, High Magnetic Field Laboratory, University of Science and Technology of China	China	—
18	Design, Synthesis, Molecular Docking Study and Anti-Hepatocellular Carcinoma Evaluation of Some New Bis-Triazolothiadiazines.	Ahvaz Jundishapur University of Medical Sciences, Islamic university of Madinah, Shiraz University of Medical Sciences	Iran	—
19	Ancient drug curcumin impedes 26S proteasome activity by direct inhibition of dual-specificity tyrosine-regulated kinase 2	Peking University, University of California San Diego, University of Iowa	China, United States	—
20	Crystal Structure of Human Dual-Specificity Tyrosine-Regulated Kinase 3 Reveals New Structural Features and Insights into its Autophosphorylation.	Asan Medical Center, Osong Medical Innovation Foundation, Yonsei University	South Korea	—
21	Développement de nouvelles approches protéo-chimiométriques appliquées à l'étude des interactions et de la sélectivité des inhibiteurs de kinases. (Development of new proteo-chemometric approaches applied to the study of the interaction and the selectivity of kinase inhibitors)	—	—	—

No.	Citing paper	Citing institution(s)	Country	S2
22	Molecular mechanisms involved in the cerebral cortex development and their implications in neurodevelopmental disorders	—	—	—
23	Identification of Plant Homologues of Dual Specificity Yak1-Related Kinases	Institute of Food Biotechnology and Genomics, Taras Shevchenko National University of Kyiv	Ukraine	—
24	Functions of SRPK, CLK and DYRK kinases in stem cells, development, and human developmental disorders	MRC Protein Phosphorylation and Ubiquitylation Unit	United Kingdom	—
25	Insights from the protein interaction Universe of the multifunctional “Goldilocks” kinase DYRK1A	VCU Massey Comprehensive Cancer Center, Virginia Commonwealth University, Virginia State University	United States	—
26	The dual fate of DYRK2 in cancer: balancing the light and dark side of tumorigenesis	University of Córdoba	Spain	—
27	Multiple functions of DYRK2 in cancer and tissue development	Jikei University School of Medicine	Japan	—
28	Correlation between tight binding of inhibitors and their target selectivity toward the non-native state in the DYRK family of kinases.	Shinshu University	Japan	—
29	Mirk/Dyrk1B Kinase Inhibitors in Targeted Cancer Therapy	National and Kapodistrian University of Athens, Pasteur Hellenic Institute	Greece	—
30	DYRK1A and Parkinson’s disease, facts and hypotheses	—	—	—

Showing the 30 most-cited of 200 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 established a foundational framework for distinguishing class differences among p21-activated kinases, subsequently extending this analysis to target group II PAKs in cancer metastasis.

CLAIM: The researcher’s contribution centers on elucidating the structural and functional distinctions within the p21-activated kinase family, anchored by the seminal 2008 paper "UnPAKing the class differences among p21-activated kinases." This work serves as the primary reference point for understanding kinase classification in this domain.

ORIGINALITY: The titles suggest a strategic progression from broad classification to specific therapeutic application. By first defining class differences, the researcher created a logical basis for the 2009 follow-up, "Targeting group II PAKs in cancer and metastasis." This indicates a novel approach to translating mechanistic insights into targeted oncology strategies, moving beyond general characterization to specific group II interventions.

SIGNIFICANCE: The core paper has accumulated 165 citations, while the follow-up has garnered 101 citations, indicating sustained scholarly interest. Crucially, 92.9% of the scholar's total citing papers originate from independent researchers, demonstrating that this line of work has been widely adopted and validated by the broader scientific community rather than relying on self-citation or institutional bias.

INDEPENDENT CITATIONS FOR THIS CONTRIBUTION: 285 · **18 flagged influential by Semantic Scholar**

CORE PAPER

UnPAKing the class differences among p21-activated kinases

2008 · 165 citations (GS)

Field-normalised: 123 Semantic Scholar citations place it in the top 10% of Biology papers from 2008 indexed by Semantic Scholar, by citation count.

No.	Citing paper	Citing institution(s)	Country	S2
1	The role of PAK4 in pancreatic cancer	University of South Alabama	United States	—
2	Signaling, Regulation, and Specificity of the Type II p21-activated Kinases*	Sacred Heart University, Yale School of Medicine	United States	—
3	THE ROLE OF PAK4 IN TUMORIGENESIS IN VIVO By	—	—	—
4	Reduced expression of p21-activated protein kinase 1 correlates with poor histological differentiation in pancreatic cancer	Guangzhou Medical University Cancer Hospital, Sun Yat-sen University Cancer Center	China	—
5	Drug discovery targeting p21-activated kinase 4 (PAK4): a patent review	Shenyang Pharmaceutical University	China	—
6	P21-activated kinase 4--not just one of the PAK.	King's College London	United Kingdom	—
7	PAK family kinases	—	—	—
8	A functional requirement for PAK1 binding to the KH(2) domain of the fragile X protein-related FXR1.	Experimental Drug Development Centre, Institute of Medical Biology, National Neuroscience Institute	Singapore, United Kingdom	—
9	PAK4–6 in cancer and neuronal development	Rutgers, The State University of New Jersey	United States	—
10	Targeted genetic dependency screen facilitates identification of actionable mutations in FGFR4, MAP3K9, and PAK5 in lung cancer	Cancer Research UK Manchester Institute, National Cancer Institute, The University of Manchester	United Kingdom, United States	—
11	Genomic analysis of a girl with incontinentia pigmenti but without NEMO mutation	KFSHRC, King Khaled Eye Specialist Hospital, King Saud University	Saudi Arabia	—
12	Molecular and Transcriptional Signatures for ErbB2-Induced Invasion	Danish Cancer Society, University of Copenhagen	Denmark	—
13	Prostate-derived Sterile 20-like Kinases (PSKs/TAOKs) Phosphorylate Tau Protein and Are Activated in Tangle-bearing Neurons in Alzheimer Disease*	King's College Hospital, King's College London, Medical Research Council	Croatia, United Kingdom	—
14	Identification of PAK4 as a putative target gene for amplification within 19q13.12-q13.2 in oral squamous-cell carcinoma	Graduate School USA, National Defense Medical College, Okayama University	Japan, United States	—

No.	Citing paper	Citing institution(s)	Country	S2
15	Optimization of a Dibenzodiazepine Hit to a Potent and Selective Allosteric PAK1 Inhibitor.	Novartis, Novartis Institutes for BioMedical Research	Switzerland, United States	—
16	Crystal structures of PAK2 reveal new insights into its autoinhibitory mechanism.	Beijing Advanced Sciences and Innovation Center, Institute of Biophysics, Chinese Academy of Sciences, Soochow University	China	—
17	DGCR6L, a novel PAK4 interaction protein, regulates PAK4-mediated migration of human gastric cancer cell via LIMK1.	China Medical University	China	—
18	PAK6 rescues pathogenic LRRK2-mediated ciliogenesis and centrosomal cohesion defects in a mutation-specific manner	Centre Hospitalier Universitaire de Lille, Florida Atlantic University, IRCCS Humanitas Research Hospital	France, Italy, Netherlands	—
19	The Pak4 protein kinase is required for oncogenic transformation of MDA-MB-231 breast cancer cells	Rutgers Cancer Institute, Rutgers, The State University of New Jersey	United States	—
20	Rapid, precise and reproducible binding affinity prediction : applications in drug discovery	University College London	United Kingdom	—
21	Regulation of differentiation by rhogtpases in mouse embryonic stem cells	—	—	—
22	Estrogen stimulation of cell migration involves multiple signaling pathway interactions.	University of Virginia Health System	United States	—
23	Identification of a PAK6-Mediated MDM2/p21 Axis That Modulates Survival and Cell Cycle Control of Drug-Resistant Stem/Progenitor Cells in Chronic Myeloid Leukemia	Leukemia & Lymphoma Society of Canada, Terry Fox Research Institute, The Affiliated Yongchuan Hospital of Chongqing Medical University	Canada, China	—
24	The p21-activated Kinase PAK3 Forms Heterodimers with PAK1 in Brain Implementing Trans-regulation of PAK3 Activity*	Université Paris-Sud	France	**Influential**
25	A de novo PAK1 likely pathogenic variant and a de novo terminal 1q microdeletion in a Chinese girl with global developmental delay, severe intellectual disability, and seizures	Quanzhou Women and Children's Hospital, Quzhou City People's Hospital, Second Affiliated Hospital of Fujian Medical University	China	—
26	PAK1 regulates inhibitory synaptic function via a novel mechanism mediated by endocannabinoids	Hospital for Sick Children, Southeast University	Canada, China	—
27	The molecular basis of p21-activated kinase-associated neurodevelopmental disorders: From genotype to phenotype	Biologie, Génétique et Thérapies ostéoArticulaires et Respiratoires, CEA Paris-Saclay, Centre Hospitalier Universitaire de Tours	France	—

No.	Citing paper	Citing institution(s)	Country	S2
28	The tau of MARK: a polarized view of the cytoskeleton.	Max Planck Unit for Structural Molecular Biology	Germany	—
29	Maternal pak4 expression is required for primitive myelopoiesis in zebrafish.	Eunice Kennedy Shriver National Institute of Child Health and Human Development	United States	—
30	Differential expression and phosphorylation of Pak1 and Pak2 in ovarian cancer: effects on prognosis and cell invasion	Queen Mary Hospital	Hong Kong	—

Showing the 30 most-cited of 164 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).

FOLLOW-UP WORK

Targeting group II PAKs in cancer and metastasis

2009 · 101 citations (GS)

No.	Citing paper	Citing institution(s)	Country	S2
1	Role of p21-activated kinase 1 in regulating the migration and invasion of fibroblast-like synoviocytes from rheumatoid arthritis patients.	The First Affiliated Hospital, Sun Yat-sen University	China	—
2	Signaling, Regulation, and Specificity of the Type II p21-activated Kinases*	Sacred Heart University, Yale School of Medicine	United States	—
3	PAK4 in metabolic diseases: regulation by nutrient signals and therapeutic implications	Jeonbuk National University, Jeonbuk State Institute, Korea Advanced Institute of Science and Technology	South Korea	—
4	PAK4 kinase activity and somatic mutation promote carcinoma cell motility and influence inhibitor sensitivity	King's College London	United Kingdom	—
5	Pharmacophore identification of PAK4 inhibitors	China Medical University, Sanford Burnham Prebys Medical Discovery Institute, Shenyang Pharmaceutical University	China, United States	—
6	PAK5 is auto-activated by a central domain that promotes kinase oligomerization.	Institute of Molecular and Cell Biology	Singapore	—
7	PAK4–6 in cancer and neuronal development	Rutgers, The State University of New Jersey	United States	—
8	Identification of PAK4 as a putative target gene for amplification within 19q13.12-q13.2 in oral squamous-cell carcinoma	Graduate School USA, National Defense Medical College, Okayama University	Japan, United States	—
9	The Pak4 protein kinase is required for oncogenic transformation of MDA-MB-231 breast cancer cells	Rutgers Cancer Institute, Rutgers, The State University of New Jersey	United States	—

No.	Citing paper	Citing institution(s)	Country	S2
10	Small-molecule p21-activated kinase inhibitor PF-3758309 is a potent inhibitor of oncogenic signaling and tumor growth	Odyssey House, Pfizer (United States)	United States	—
11	p21-Activated Kinases 1, 2 and 4 in Endometrial Cancers: Effects on Clinical Outcomes and Cell Proliferation	Chinese University of Hong Kong, University of Hong Kong	China, Hong Kong	—
12	The Pak 4 Protein Kinase in Breast Cancer	—	—	—
13	Regulation of P21-activated kinase-4 by progesterone and tumor necrosis factor-α in human endometrium and its increased expression in advanced-stage endometriosis.	Asan Medical Center	South Korea	—
14	The Pak4 Protein Kinase in Breast Cancer	Rutgers, The State University of New Jersey	United States	—
15	Cell Cycle and Senescence Knockdown of PAK 4 or PAK 1 Inhibits the Proliferation of Mutant KRAS Colon Cancer Cells Independently of RAF / MEK / ERK and PI 3 K / AKT Signaling	Charité - Universitätsmedizin Berlin, Duke University, George Mason University	Germany, United States	Influential
16	Knockdown of PAK4 or PAK1 Inhibits the Proliferation of Mutant KRAS Colon Cancer Cells Independently of RAF/MEK/ERK and PI3K/AKT Signaling	Granta Design	United Kingdom	Influential
17	Mechanism of Transformation and Therapeutic Targets for Hematological Neoplasms Harboring Oncogenic KIT Mutation	—	—	—
18	Identification of the PAK4 interactome reveals PAK4 phosphorylation of N-WASP and promotion of Arp2/3-dependent actin polymerization	Karolinska Institutet	Sweden	—
19	Remarkable reductions of PAKs in the brain tissues of scrapie-infected rodent possibly linked closely with neuron loss	Inner Mongolia Medical University, Mongolian National University of Medical Sciences, National Institute for Viral Disease Control and Prevention	China, Mongolia	—
20	The potential role of miRNAs 21 and 199-a in early diagnosis of hepatocellular carcinoma.	Ain Shams University, National Water Research Center, Research Institute of Ophthalmology	Egypt	—
21	CORO1C, a novel PAK4 binding protein, recruitsphospho-PAK4 at serine 99 to the leading edge and promotes the migration of gastric cancer cells	—	—	—
22	Development of small-molecule inhibitors of the group I p21-activated kinases, emerging therapeutic targets in cancer.	The Wistar Institute	United States	—
23	Targeting P21-Activated Kinase-1 for Metastatic Prostate Cancer	Atlantic Health System, Augusta University, Eugene Ap-	United States	—

No.	Citing paper	Citing institution(s)	Country	S2
		plebaum College of Pharmacy and Health Sciences		
24	Targeting nuclear kinases in cancer: development of cell cycle kinase inhibitors.	University of Colorado Anschutz Medical Campus, University of Colorado Cancer Center	United States	—
25	An integrative genomic and transcriptomic analysis reveals molecular pathways and networks regulated by copy number aberrations in basal-like, HER2 and luminal cancers	Breast Cancer Research Foundation, Cancer Research UK, Guy's Hospital	Spain, United Kingdom, United States	—
26	P21-activated kinase 5 plays essential roles in the proliferation and tumorigenicity of human hepatocellular carcinoma	Guangdong Medical College, Second Military Medical University, Wenzhou Medical University	China	—
27	Approaches to Ras signaling modulation and treatment of Ras-dependent disorders: a patent review (2007 – present)	Milano Metropoli Development Agency	Italy	—
28	PAK5 promotes the migration and invasion of cervical cancer cells by phosphorylating SATB1	Xuzhou Medical College, Yancheng Third People's Hospital	China	—
29	P21 activated kinases	—	—	—
30	Title p 21-Activated Kinases 1 , 2 and 4 in Endometrial Cancers : Effectson Clinical Outcomes and Cell Proliferation	—	—	—

Showing the 30 most-cited of 121 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).

D. Citing-Institution Prestige & Geography

Top citing institutions

Institution	Country	World ranking	Citing papers
null	China	—	120
University of California, Irvine Medical Center	United States	—	80
University of Oxford	United Kingdom	SCImago #26 · THE 1 · QS 4	65
University of Cambridge	United Kingdom	SCImago #63 · THE =3 · QS 6	60
University of Birmingham	United Kingdom	SCImago #369 · THE =98 · QS 76	48
China Medical University	Taiwan	QS 509	39
Goethe University Frankfurt	Germany	SCImago #1013 · THE 201–250	39
University of Toronto	Canada	SCImago #39 · THE 21 · QS 29	36
University of Oklahoma	United States	SCImago #1042 · QS =664	33

Institution	Country	World ranking	Citing papers
George Washington University	United States	SCImago #832 · THE 201–250 · QS =358	30
Newcastle University	United Kingdom	THE 144 · QS 137	29
University of British Columbia	Canada	SCImago #144 · THE 45 · QS 40	28
Fudan University	China	SCImago #46 · THE 36 · QS 30	25
Rajiv Gandhi Centre for Biotechnology	India	—	25
University of California San Diego	United States	SCImago #120 · THE 47 · QS 66	23

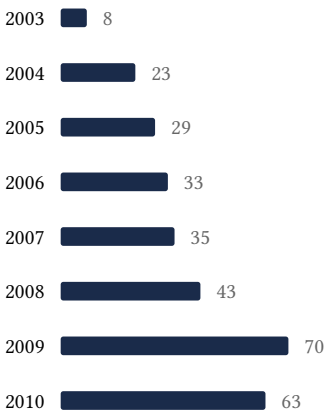
Geographic distribution of citing authors

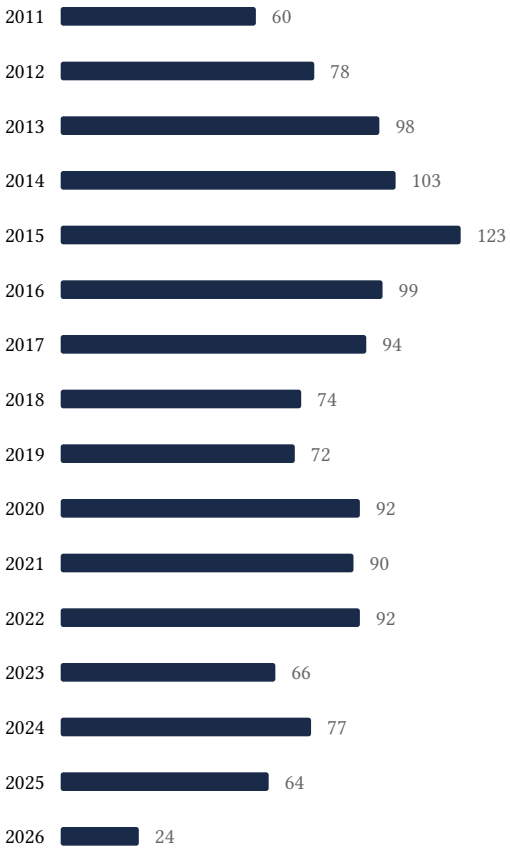
Country	Citing papers
United States	1,132
China	620
United Kingdom	433
Germany	284
France	180
Canada	179
India	155
Spain	124
Japan	111
South Korea	104
Italy	94
Australia	68

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	Transition to the open state of the TolC periplasmic tunnel entrance	965	Dhanasar — Prong 2 (well-positioned)
Contribution 2	Structure of the pseudokinase VRK3 reveals a degraded catalytic site, a highly conserved kinase fold, and a putative regulatory binding site	514	Dhanasar — Prong 2 (well-positioned)
Contribution 3	UnPAKing the class differences among p21-activated kinases	285	Dhanasar — Prong 2 (well-positioned)