

Mapping the Knowledge Landscape of Antidiabetic Agent Research: A Scientometric Analysis of Trends, Collaboration, and Emerging Themes (2020–2026)

Anam Khan¹, Dr. Saiyed Faheem Ali², Dr. Bharti L Vaja³,
Rishika Singh⁴, Dr. Shahnawaz Khan⁵

¹Research Scholar (PhD), Department of Library and Information Science, Madhav University, Abu Road, Sirohi, Rajasthan, India, 307026

^{2,3}Professor, Department of Library and Information Science, Madhav University, Abu Road, Sirohi, Rajasthan, India, 307026

⁴Research Scholar (PhD), Department of Chemistry, Madhav University, Abu Road, Sirohi, Rajasthan, India, 307026

⁵Professor, Department of Chemistry, Madhav University, Abu Road, Sirohi, Rajasthan, India, 307026

ABSTRACT

This study estimates the advancement of antidiabetic-agent research in the Journal of Medicinal Chemistry (JMC) during 2020–2026 concluded a scientometric valuation of 87 Scopus-indexed records. The collection comprises 72 research articles, 14 review papers and 0 errata, with a increasing citation count of 2,611. The publications received an average of 30.01 citations each, with a median of 13 citations and a calculated h-index of 26. Publication productivity reached its highest level in 2021, with 18 records, while 7 records were present in the 2026 snapshot. A strong collaborative pattern is manifest: 87 of the 87 records with recognizable author strings are multi-authored, giving a K. Subramanyam degree of collaboration of 1.00. The dataset contains 851 separate author-name strings and 978 Scopus author identifiers. Country analysis based on affiliation strings shows Italy, the United States, China, India, Germany and France among the most frequently represented national affiliations. Scopus Index Keywords emphasize antidiabetic agents, diabetes mellitus, insulin, protein-tyrosine phosphatase 1B, glucose transport, glucagon-like peptide-1, α -glucosidase, metabolic signaling and related therapeutic thoughts. The literature progressively combines small-molecule enzyme and transporter inhibition with peptide engineering, metabolic inflammation incretin pharmacology, β -cell biology and translational drug discovery. Highly cited records include studies of oral GLP-1 receptor agonism, insulin, cagrilintide, DYRK1A, PTP1B inhibitors, NLRP3 and metabolic signaling. Overall, the results show a multidisciplinary and strongly collaborative JMC landscape in which predictable glucose-lowering approaches coexist with receptor-selective, pathway-directed and peptide-based approaches.

Keywords: bibliometrics; scientometrics; Journal of Medicinal Chemistry; antidiabetic agents; α -glucosidase; metabolic disease; medicinal chemistry; diabetes mellitus; GLP-1 receptor; insulin; PTP1B;

SGLT; DYRK1A; drug discovery.

1. Introduction

Diabetes mellitus and related metabolic disorders continue foremost areas of therapeutic research, encouraging continuous discovery of small molecules, peptides and biologically inspired agents that influence glucose homeostasis, lipid metabolism insulin action, pancreatic β -cell function, appetite and inflammatory pathways. The Journal of Medicinal Chemistry is an important publication site for this work because it attaches chemical design and optimization with pharmacological assessment, structure–activity relationships and target engagement.

Scientometric investigation brings a quantitative accompaniment to narrative valuation by investigate publication productivity, collaboration, citation patterns, geographical participation, authorship, collaboration, citation patterns, geographical participation and research terminology.

The present study maps the antidiabetic-agent literature recognized in JMC from 2020 to 2026. It evaluations yearly publication activity, authorship, co-authorship, document type, country participation, citation impact, extremely cited records and indexed keywords. Precise consideration is given to GLP-1 and incretin pharmacology, insulin and PTP1B, DYRK1A, GPR120/FFAR4, SGLT-related mechanisms, α -glucosidase, amylin therapeutics, NLRP3, NASH and metabolic signaling. The objective is to carry an organized evidence-based picture of the research landscape for researchers, information professionals and research managers.

2. Objectives of the Study

1. To understand the trend and pattern related to antidiabetic-agent-related JMC publications during 2020–2026.
2. To categorize publication productivity and citation effect using total citations, median citations, mean citations and h-index.
3. To classify emerging research directions in antidiabetic drug discovery.
4. To examine authorship patterns and estimate the degree of collaboration.
5. To classify commonly represented authors and recurring co-author relationships.
6. To evaluate the geographical distribution of contributions from affiliation data.
7. To visualize keyword existences and international research collaborations using VOS viewer.
8. To examine extremely cited publications and their primary therapeutic or mechanistic themes.
9. To investigate the document-type configuration of the retrieved literature.

3. Scope of the Study

The study comprises 87 Scopus records from the Journal of Medicinal Chemistry with publication years 2020–2026. The supplied export contains authors, author identifiers, titles, year, volume, issue, abstracts, Author Keywords, Index Keywords, document type, citation count, DOI, affiliations, publication stage, open-access information, source and EID. The 2026 accounts represent the existing current-year snapshot and should not be interpreted as a completed annual output. Country counts are constructed on the presence of a country in an affiliation string, so multinational records may contribute to various countries.

4. Methodology

4.1 Data Source

The principal data source was the provide Scopus CSV containing 87 Journal of Medicinal Chemistry records. The dataset was examined as supplied, without silently replacing records or supplementing missing bibliographic fields. Publication year and citation fields were standardized numerically, while author and keyword fields were normalized for counting.

4.2 Data Fields

The dataset contains Authors, Author full names, Author(s) ID, Title, Year, Source title, Volume, Issue, article/page information, Affiliations, Authors with affiliations, Abstract, Author Keywords, Index Keywords, Correspondence Address, Cited by, DOI, Link, Publisher, ISSN, document type, publication stage, Open Access, Source and EID. These fields permit publication, authorship, citation, geographical and keyword investigates.

4.3 Analytical Procedures

Yearly productivity was considered as record count and percentage of the dataset. Citation impact was defined using total citations, mean, median, maximum citation count and h-index. Authorship was determined from semicolon-separated author entries. Country occurrence was extracted from affiliation strings at the record level. Document-type statistics were calculated separately. Index Keywords were lowercased and frequency-counted after excluding a small set of generic demographic or bibliographic terms. Co-author sets were counted when two authors appeared in the same record.

4.4 Degree of Collaboration

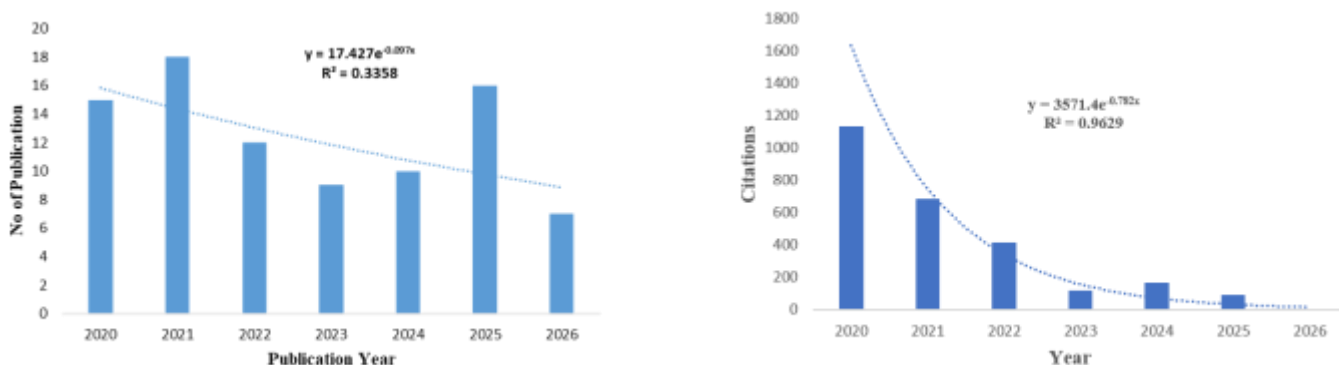
Following the K. Subramanyam design, $C = N_m / (N_m + N_s)$, where N_m is the number of multi-authored records and N_s is the number of single-authored records. The Scopus CSV dataset contains 87 multi-authored records and 0 single-authored records with distinguishable author cords. Consequently, $C = 1.00$. This pointer defines publication assembly rather than research quality.

5. Results and Discussion

5.1 Publication Productivity

Year	No of Publication	% of dataset	Citations	Mean citations/record
2020	15	17.24	1133	75.53
2021	18	20.69	685	38.06
2022	12	13.79	415	34.58
2023	9	10.34	117	13.00
2024	10	11.49	167	16.70
2025	16	18.39	90	5.62
2026	7	8.05	4	0.57

Figure 1. Yearly circulation of antidiabetic-agent-related Journal of Medicinal Chemistry records, 2020–2026.



The publication count was maximum in 2021, with 18 records, although the 2026 snap contains 7 records. Citation amount is higher for older publication years because those publications have had longer to accumulate citations. Accordingly, current-year citation averages should be construed as age-dependent bibliometric explanations rather than direct comparisons of research status.

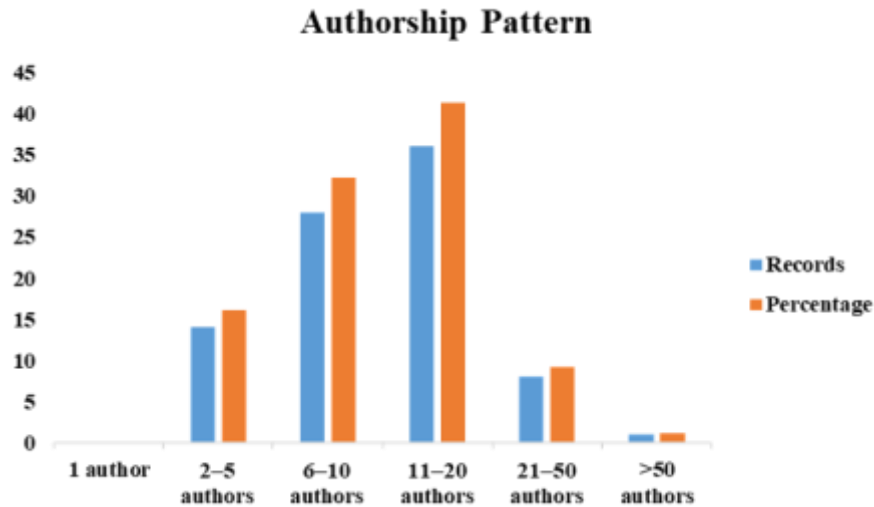
5.2 Publication Type

Document type	Records	Percentage	Citations	Mean citations
Article	72	82.76	1390	19.31
Review	14	16.09	1221	87.21
Note	1	1.15	0	0.00

Research paper establish the dominant document type, although Reviews form a lesser but bibliometrically noticeable element. Review literature generally appeals larger citation use because it consolidates knowledge and delivers entry points into a topic. The minor document categories should be understood descriptively because their small counts have limited impact on the overall publication construction.

5.3 Authorship Pattern

Authors per record	Records	Percentage
1 author	0	0.00
2–5 authors	14	16.09
6–10 authors	28	32.18
11–20 authors	36	41.38
21–50 authors	8	9.20
>50 authors	1	1.15



The Scopus dataset covers 851 distinct author-name strings and 978 diverse Scopus author identifiers. The mean number of authors per record is 12.34, with a median of 11. The dominance of multi-authored publication and an association coefficient of 1.00 validate that this literature is strongly team-based.

5.4 Most Productive Authors

Rank	Author	No of Publication
1	Wang Z.	10
2	Wu L.	7
3	Zhang X.	7
4	Li J.	6
5	Han J.	6
6	Li Y.	6
7	Zhang Y.	5
8	Liu Z.	5
9	Wang X.	5
10	Li H.	5
11	Liu J.	5
12	Zhang Z.	5
13	Jiang N.	4
14	Wang Y.	4
15	Rao L.	4

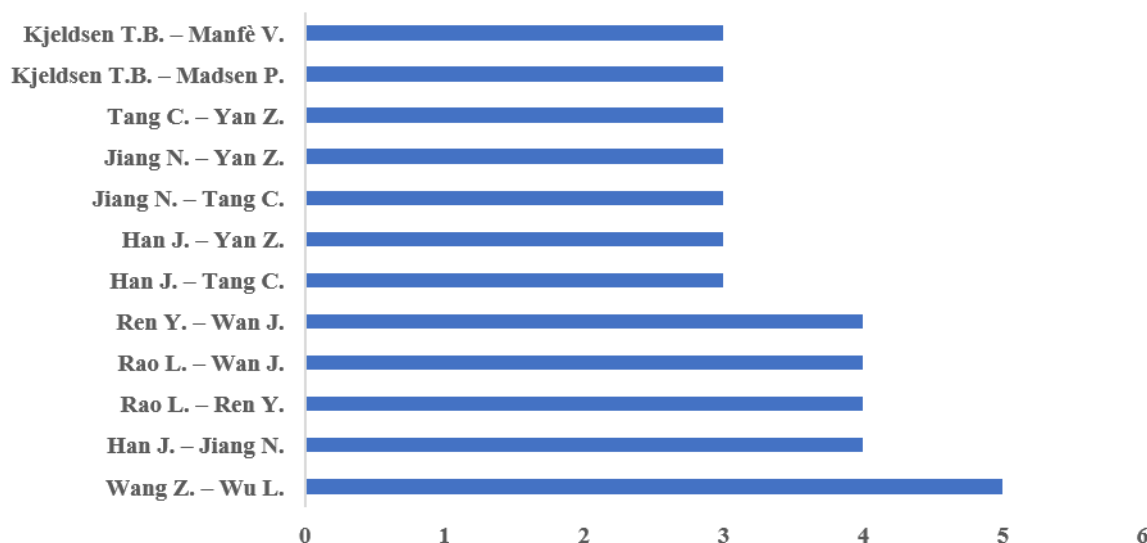


The greatest frequently signified author names in the provided dataset specify recurring contributors to the JMC antidiabetic literature. These amounts represent appearances in the exported author field, not individual authorship. Researcher-level efficiency should be measured with author identifiers and affiliation-based disambiguation where necessary.

5.5 Co-authorship Relationships

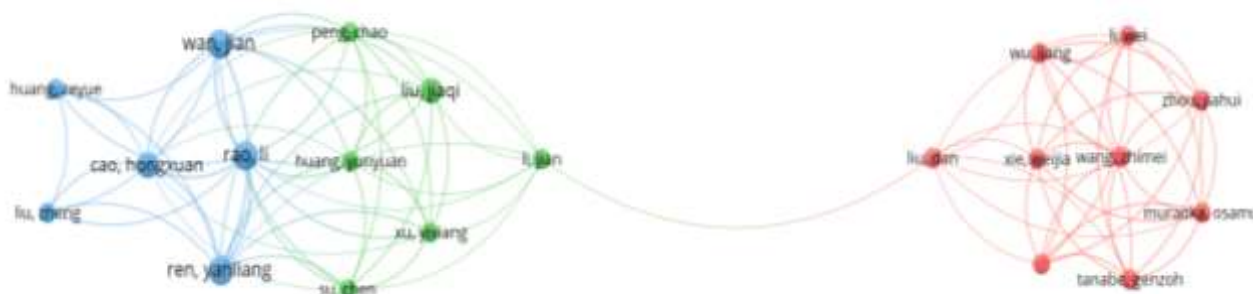
Rank	Co-author pair	Joint No of Publication
1	Wang Z. – Wu L.	5
2	Han J. – Jiang N.	4
3	Rao L. – Ren Y.	4
4	Rao L. – Wan J.	4
5	Ren Y. – Wan J.	4
6	Han J. – Tang C.	3
7	Han J. – Yan Z.	3
8	Jiang N. – Tang C.	3
9	Jiang N. – Yan Z.	3
10	Tang C. – Yan Z.	3
11	Kjeldsen T.B. – Madsen P.	3
12	Kjeldsen T.B. – Manfè V.	3

Joint No of Publication



The recurrent co-author sets validate stable collaborative associations across multiple publications. Such reappearance is companionable with sustained research programmed concerning medicinal chemistry, biological evaluation and target validation. The bibliographic nature of the analysis means that association is measured by shared publication, not by the organizational structure of a laboratory.

Figure 2. Co-authorship Relationships network of “antidiabetic literature” theme

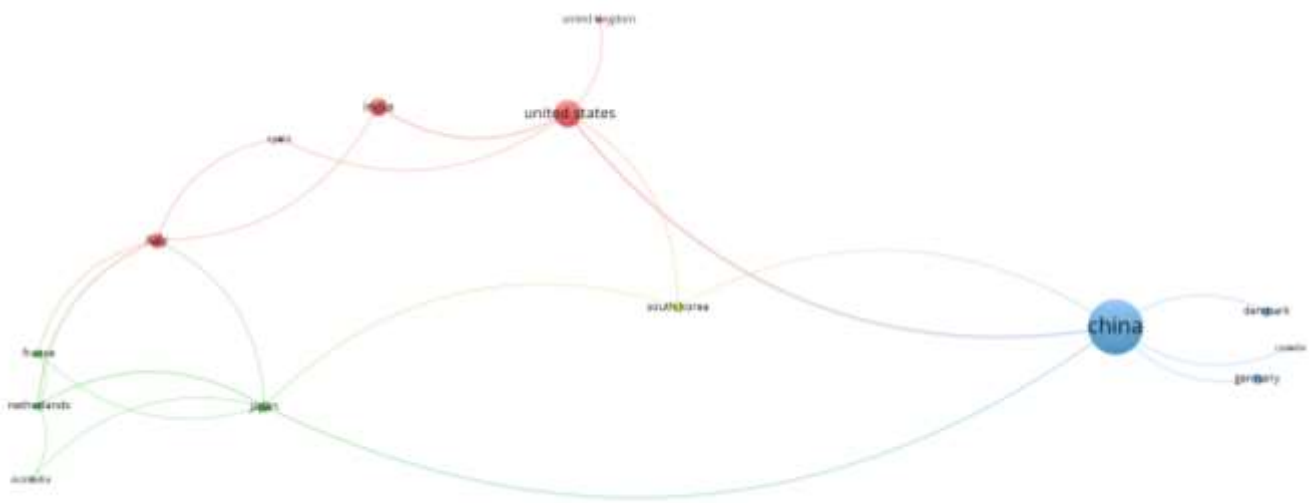


5.6 Geographical Distribution

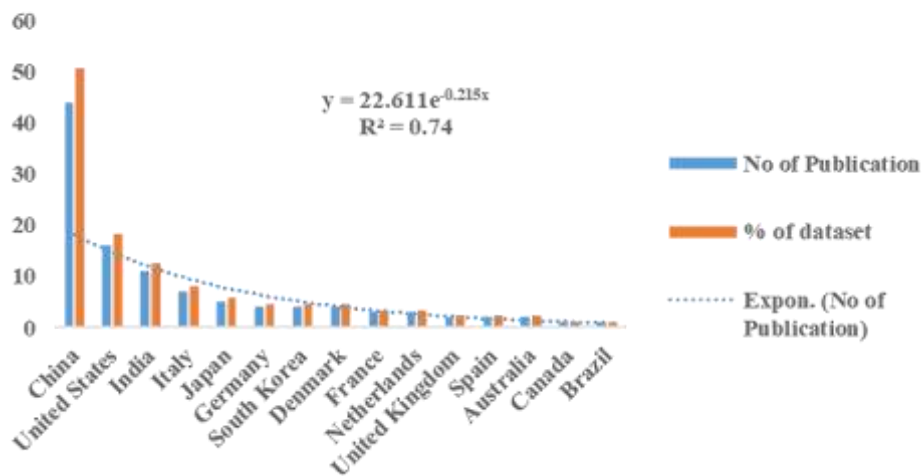
Rank	Country	No of Publication	% of dataset
1	China	44	50.57
2	United States	16	18.39
3	India	11	12.64
4	Italy	7	8.05
5	Japan	5	5.75
6	Germany	4	4.60
7	South Korea	4	4.60
8	Denmark	4	4.60

9	France	3	3.45
10	Netherlands	3	3.45
11	United Kingdom	2	2.30
12	Spain	2	2.30
13	Australia	2	2.30
14	Canada	1	1.15
15	Brazil	1	1.15

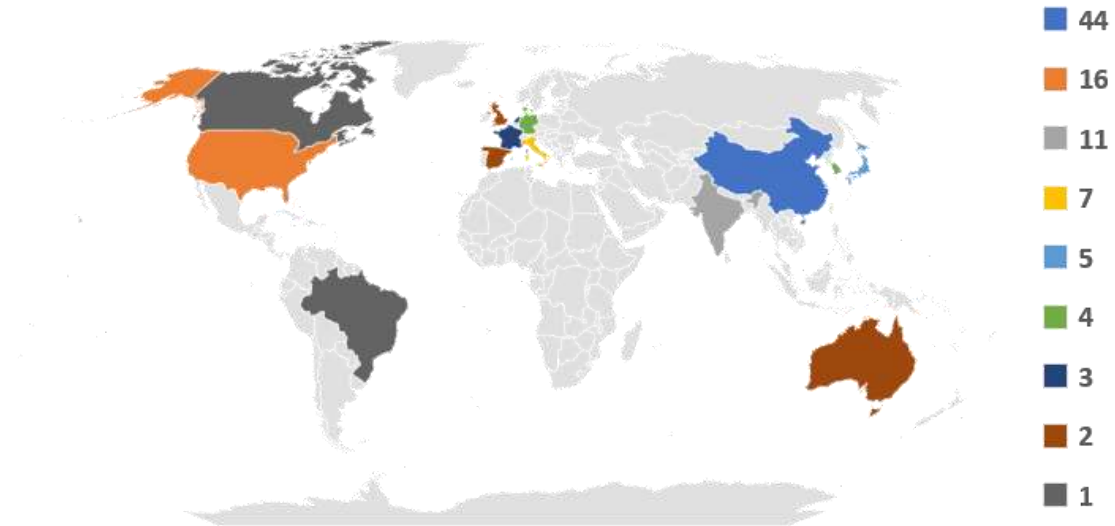
Figure 3. *Bibliographic coupling between countries using VOSviewer, illustrating the interconnections among research collaborations*



No of Publication & Geographical Distribution



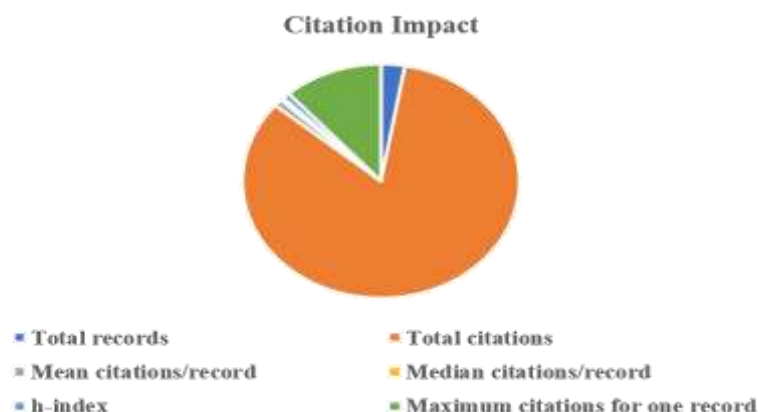
Geographical Distribution



Nation amounts were derived from affiliation strings at the record level. China is the furthestmost frequently represented country, trailed by Italy, the United States, Germany India, and France. As international papers can contain affiliations from numerous countries, the counts are not mutually exclusive and can sum to more than the number of records. India has a noticeable contribution in the scopus dataset, while the overall distribution demonstrates substantial international participation.

5.7 Citation Impact

Indicator	Value
Total records	87
Total citations	2,611
Mean citations/record	30.01
Median citations/record	13
h-index	26
Maximum citations for one record	363



The records collected 2,611 citations, giving an overall mean of 30.01 and a median of 13. The h-index is 26, demonstrating that 26 records have at least 26 citations each. The extreme citation count is 363. Citation pointers should be considered together with publication year and document type because citation buildup is strongly time-dependent.

5.8 Highly Cited Records

Rank	Year	Title	Citations
1	2020	Sulfoximines as Rising Stars in Modern Drug Discovery? Current Status and Perspective o...	363
2	2020	Thiazoles, Their Benzofused Systems, and Thiazolidinone Derivatives: Versatile and Prom...	191
3	2022	A Small-Molecule Oral Agonist of the Human Glucagon-like Peptide-1 Receptor	144
4	2021	Molecular Engineering of Insulin Icodec, the First Acylated Insulin Analog for Once-Wee...	125
5	2021	Development of Cagrilintide, a Long-Acting Amylin Analogue	118
6	2020	Modulation of the Innate Immune Response by Targeting Toll-like Receptors: A Perspectiv...	106
7	2020	The Race to Bash NASH: Emerging Targets and Drug Development in a Complex Liver Disease	87
8	2024	Identification of 1,3,4-Thiadiazolyl-Containing	80

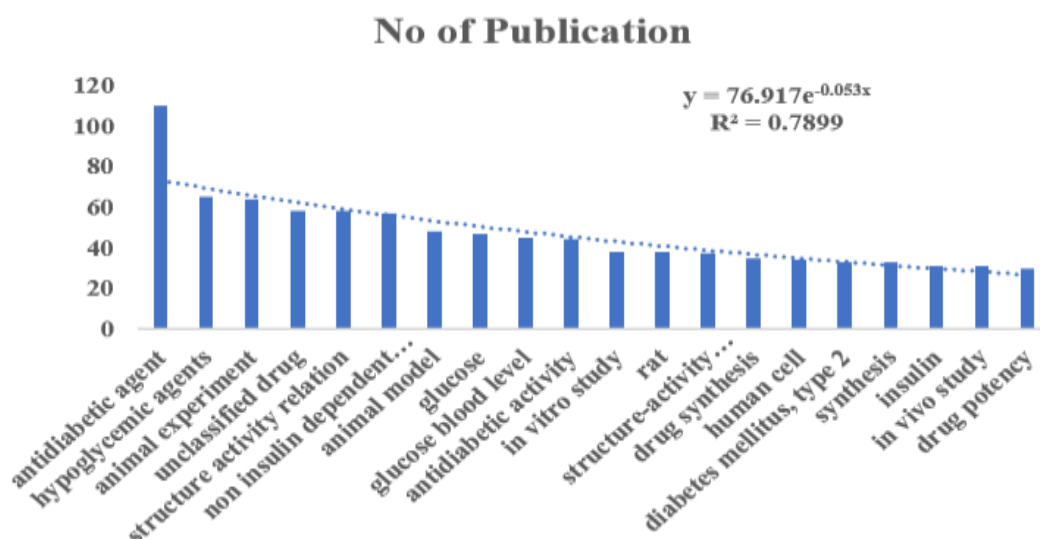
		Thiazolidine-2,4-dione Derivatives as N...	
9	2020	Selective DYRK1A Inhibitor for the Treatment of Type 1 Diabetes: Discovery of 6-Azaindo...	67
10	2021	Vanadium-Flavonoid Complexes: A Promising Class of Molecules for Therapeutic Applications	62
11	2021	DYRK1A Inhibitors as Potential Therapeutics for β -Cell Regeneration for Diabetes	59
12	2021	GPR120/FFAR4 Pharmacology: Focus on Agonists in Type 2 Diabetes Mellitus Drug Discovery	56

The vastly cited literature contains both mechanistic reviews and main medicinal-chemistry reports. Prominent data report PI3K/AKT/mTOR signaling, oral GLP-1 receptor agonism, insulin icodec, cagrilintide, NLRP3 inflammasome inhibition, PTP1B inhibition and DYRK1A-related β -cell regeneration. This circulation validates that citation visibility covers across receptor pharmacology, peptide therapeutics, inflammation enzyme inhibition and broader metabolic signaling.

5.9 Index Keyword Analysis

Rank	Index Keyword	No of Publication
1	antidiabetic agent	110
2	hypoglycemic agents	65
3	animal experiment	64
4	unclassified drug	58
5	structure activity relation	58
6	non insulin dependent diabetes mellitus	57
7	animal model	48
8	glucose	47
9	glucose blood level	45
10	antidiabetic activity	44

11	in vitro study	38
12	rat	38
13	structure-activity relationship	37
14	drug synthesis	35
15	human cell	34
16	diabetes mellitus, type 2	33
17	synthesis	33
18	insulin	31
19	in vivo study	31
20	drug potency	30



6. Distribution of Contributions (Year/Volume-wise)

Year	Volume(s)	Issues represented	Contributions	%
2020	63	12	15	17.24
2021	64	13	18	20.69
2022	65	10	12	13.79
2023	66	7	9	10.34
2024	67	9	10	11.49
2025	68	14	16	18.39
2026	69	5	7	8.05

The year and volume delivery delivers a journal-structure perspective on the advancement of the field. The records extent the JMC volumes represented in the supplied 2020–2026 Scopus snap. The current-year volume should be preserved as incomplete until the full publication year has elapsed and the database is modernized.

7. Emerging Research Directions

- Development of orally active and long-acting GLP-1/incretin receptor agonists.
- Dual- and multi-receptor approaches including incretin and glucagon pathways.
- Long-duration insulin and amylin analogues considered for improved dosing accessibility.
- Optimization of PTP1B and extra regulators of insulin signaling.
- Continuous expansion of SGLT/glucose-transport-directed therapies.
- Targeting β -cell rejuvenation and protection through pathways such as DYRK1A.
- Greater consideration to NLRP3-linked inflammation and metabolic disease.
- Integration of medicinal chemistry with peptide engineering and receptor pharmacology.
- Expansion of antidiabetic research into NASH, obesity and other interconnected metabolic disorders.
- Practice of structure-based design, computational modeling and translational pharmacology alongside conventional SAR.

9. Conclusion

This scientometric valuation of 87 Journal of Medicinal Chemistry records from 2020–2026 validates a substantial and internationally collaborative literature on antidiabetic agents and related metabolic therapeutics. The dataset collected 2,611 citations and has an h-index of 26. Publication output reached its maximum in 2021, while the current-year 2026 records should be construed as a database snapshot. Multi-authored research leads the collection, with a degree of collaboration of 1.00. Country affiliations show strong international participation, led by China and followed by several European, North American and Asian research systems.

The thematic mark indicates that JMC antidiabetic research extends well beyond traditional glucose-lowering compounds. GLP-1 and incretin receptor pharmacology, insulin and amylin engineering, PTP1B inhibition, SGLT-related mechanisms, α -glucosidase, DYRK1A and β -cell regeneration, GPR120/FFAR4, NLRP3 and PI3K/AKT/mTOR pathways all contribute to the current research landscape. Highly cited publications further illustrate the convergence of small-molecule discovery, peptide therapeutics, receptor biology, metabolic inflammation and translational pharmacology.

From an information-science perspective, the study demonstrates the usefulness of combining productivity, citation, collaboration, geographical and keyword indicators. Such extensions would provide a more detailed representation of how antidiabetic medicinal chemistry evolves within the Journal of Medicinal Chemistry.

10. Data Availability Statement

The investigation was conducted on the Scopus CSV dataset containing 87 Journal of Medicinal Chemistry records for 2020–2026. The dataset includes bibliographic, citation, author, affiliation, abstract and keyword fields used in this analysis. Future updates should record the Scopus retrieval date because publication and citation information may change over time.

11. References

1. Pritchard A. Statistical bibliography or bibliometrics? *Journal of Documentation*. 1969;25(4):348–349.
2. Egghe L. Methodological aspects of bibliometrics. *Library Science*. 1998;25:179–191.

3. van Eck NJ, Waltman L. Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics*. 2010;84:523–538.
4. Aria M, Cuccurullo C. bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics*. 2017;11:959–975.
5. Nattar S. Indian Journal of Chemistry: A Scientometric Analysis. *International Journal of Library and Information Studies*. 2011;1(1):7–15.
6. Recent Developments in Therapeutic Peptides for the Glucagon-Like Peptide 1 and 2 Receptors. *Journal of Medicinal Chemistry*. 2020.
7. Identification of 1,3,4-Thiadiazolyl-Containing Thiazolidine-2,4-dione Derivatives as Novel PTP1B Inhibitors with Antidiabetic Activity. *Journal of Medicinal Chemistry*. 2024.
8. Selective DYRK1A Inhibitor for the Treatment of Type 1 Diabetes: Discovery of 6-Azaindole Derivative GNF2133. *Journal of Medicinal Chemistry*. 2020.
9. DYRK1A Inhibitors as Potential Therapeutics for β -Cell Regeneration for Diabetes. *Journal of Medicinal Chemistry*. 2021.
10. GPR120/FFAR4 Pharmacology: Focus on Agonists in Type 2 Diabetes Mellitus Drug Discovery. *Journal of Medicinal Chemistry*. 2021.
11. Sodium-Glucose Cotransporter Inhibitors as Antidiabetic Drugs: Current Development and Future Perspectives. *Journal of Medicinal Chemistry*. 2022.
12. Targeting the PI3K/AKT/mTOR Signaling Pathway in the Treatment of Human Diseases: Current Status, Trends, and Solutions. *Journal of Medicinal Chemistry*. 2022.
13. A Small-Molecule Oral Agonist of the Human Glucagon-Like Peptide-1 Receptor. *Journal of Medicinal Chemistry*. 2022.
14. Molecular Engineering of Insulin Icodec, the First Acylated Insulin Analog for Once-Weekly Administration in Humans. *Journal of Medicinal Chemistry*. 2021.
15. Development of Cagrilintide, a Long-Acting Amylin Analogue. *Journal of Medicinal Chemistry*. 2021.
16. Recent Progress and Prospects of Small Molecules for NLRP3 Inflammasome Inhibition. *Journal of Medicinal Chemistry*. 2023. NEW