International Journal of Research in Library Science (IJRLS)

ISSN: 2455-104X

DOI: 10.26761/IJRLS.12.2.2026.2089

Volume 12, Issue 2 (April-June) 2026, Page: 14-21, Paper ID: IJRLS-2089

Scientometric Analysis of Global Research Trends in Gastroenteropancreatic Neuroendocrine Tumors (GEP-NETs)

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ABSTRACT

The study presents a comprehensive scientometric analysis of global research on Gastroenteropancreatic Neuroendocrine Tumors (GEP-NETs) based on 3,054 publications indexed in the Web of Science database from 1989 to 2025. The analysis explores key bibliometric indicators, including year-wise publication trends, document types, institutional and country contributions, language distribution, funding agencies, and subject areas. Results show a consistent upward trend in publication output, peaking in 2024 with 205 records. Articles formed the dominant document type (51.21%), followed by meeting abstracts (21.25%) and review articles (19.91%). The Free University of Berlin emerged as the most productive institution, while the United States led Country-wise contributions with 824 records. English was the predominant language (96.86%) of publications. Major funding support came from U.S.-based agencies such as the Department of Health and Human Services and NIH, along with industry sponsors like IPSEN and Novartis. Oncology (32.92%) and Endocrinology & Metabolism (24.50%) were the leading research domains, highlighting the interdisciplinary nature of GEP-NET studies. The findings provide valuable insights into the evolution and focus areas of GEP-NET research, supporting future academic and clinical directions in this growing field.

KEYWORDS: Scientometric analysis, neuroendocrine tumors, GEP-NETs, Gastroenteropancreatic Neuroendocrine Tumors, Research trends, Web of Science

1. INTRODUCTION

Neuroendocrine cells in the pancreas and gastrointestinal system give rise to a diverse group of neoplasm known as Gastroenteropancreatic neuroendocrine tumors (GEP-NETs). GEP-NETs are a subgroup of neuroendocrine neoplasm (NENs) that differ in their clinical presentations, hormone secretion profiles, and biological behavior. These tumors range from mild to extremely malignant forms and can be either non-functional or functional (Secreting hormones). The stomach, pancreas, rectum and small intestine are the most often occurring main sites (Lawrence et al., 2011; WHO, 2022).

GEP-NETs were once thought to be uncommon, but in recent decades, their incidence and prevalence have grown dramatically, partly as a result of improved diagnostic methods, increasing clinical awareness, and advancements in imaging and endoscopic screening (Dasari et al., 2017). Nevertheless, there are still issues with proper categorization and early identification. In order to identify well-differentiated tumors (NET G1-G3) from poorly differentiated neuroendocrine carcinomas (NECs), the World Health Organization (WHO) uses differentiation and proliferation indices to classify GEP-NETs (WHO, 2022).

Research on GEP-NETs has increased in size and scope across fields like cancer, pathology, molecular biology, radiology, and nuclear medicine due to their increasing therapeutic significance. Systematically assessing the amount, patterns, and thematic development of research in this discipline is becoming more and more crucial as it develops. Scientometrics, a quantitative technique for evaluating the dynamics, structure, and significance of scientific research based on bibliographic data, is a potent instrument for this kind of analysis. This paper aims to fill the gap by providing a comprehensive scientometric analysis of GEP-NET related publications, using Web of Science database. The study maps global research productivity, year-wise analysis, institutions, language wise analysis and emerging topics using bibliometric tools like Bib Excel. The study aims to guide future research orientations and inform strategic decisions in neuroendocrine tumor research by identifying publishing trends and intellectual structures in these fields.

2. LITERATURE REVIEW

Ignacio B.M.J et al. (2025) conducted a retrospective descriptive study over a ten-year period to characterize the clinical profile, treatment outcomes, and survival of patients diagnosed with Gastroenteropancreatic neuroendocrine tumors (GEP-NETs). Their findings support existing literature highlighting the rarity and heterogeneity of GEP-NETs, with prognosis heavily influenced by histological grade and tumor extent. Among 134 diagnosed cases between 2014 and 2024, the pancreas was the most common tumor origin (52%), followed by the Jejunum-ileum (23%), and distant metastases were present in 24% at diagnosis-most frequently in the liver, peritoneum, or multiple sites. The study also noted that most tumors were non-functional and sporadic, with only 27 being functional and 10 associated with genetic syndromes such as MEN1 and NF1. Treatment approaches varied, including surgery, somatostatin analogues, targeted therapies, chemotherapy, and peptide receptor radionuclide therapy (PRRT) with lutetium. Despite the metastatic burden, survival outcomes were favorable, with a mean survival of six years and 74% of patients alive at last follow-up, suggesting that early detection and multidisciplinary care significantly enhance prognosis. The reported incidence and prevalence were higher than previously documented, likely reflecting improved diagnostic capabilities, a trend also observed in other recent population-based studies.

Mukherjee et al. (2025) provide a comprehensive review of the evolving landscape of Gastroenteropancreatic neuroendocrine neoplasm (GEP-NENs), highlighting the increasing complexity in their classification, treatment, and molecular characterization in the era of precision oncology. Their findings emphasize the value of multi-omics, AI-based diagnostics, and digital pathology in overcoming the limitations of conventional methods such Ki-67 scoring and histopathology. They stress the urgent need for more reproducible grading strategies and personalized treatment protocols, especially for high-grade and metastatic tumors. In line with these molecular insights, Martinez et al. (2025) conducted a retrospective study of 134 GEP-NET patients over a ten-year period, observing high proportion

of pancreatic tumors (52%), frequent liver metastases, and relatively long survival even in metastatic cases, with a mean post-diagnosis survival of six years. The study supports the clinical relevance of early diagnosis and multidisciplinary management, while also underscoring the heterogeneity of these tumors in terms of function, grade, and therapeutic response. Together, these works reflect a shift in GEP-NEN research toward a more integrated, precision-based approach that combines traditional clinical practices with advanced molecular profiling for improved patient outcomes.

Wu et al. (2024) conducted a pioneering bibliometric analysis to visualize global research trends in Gastroenteropancreatic neuroendocrine tumors (GEP-NETs) from 2000-2023, addressing the lack of systematic evaluations in this growing field. Analyzing 1,140 English-language publications from Web of Science Core collection, the study identified a consistent rise in GEP-NET research over the past two decades. The United States led in publication volume, with significant contributions from institutions like Erasmus University Rotterdam and influential authors such as De Herder WW. Neuroendocrinology emerged as the most productive journal, and Dasari A.'s work was the frequently cited, through keyword co-occurrence and cluster analysis using Cite space and VOSviewer, the study identified five major research hotspots, with growing attention to peptide receptor radionuclide therapy (PRRT) and immunotherapy evidenced by burst terms like "Lu 177 dotatate" and "Carcinoid tumors". The findings offer a valuable quantitative roadmap of the intellectual structure, leading contributors, and emerging directions in GEP-NET research, aiding future investigations and multidisciplinary collaboration in this evolving oncological domain.

3. OBJECTIVES OF THE STUDY

The major goal of this study is to conduct a complete Scientometric analysis of global research on Gastroenteropancreatic Neuroendocrine Tumors (GEP-NETs) from 1989 – 2025, utilizing data from the Web of Science database.

- ✓ To determine trends in research publication over the past three and half decades by examining the increase of publications on GEP-NETs year over year.
- ✓ To classify the published literature by document type and evaluate its contribution to the corpus of GEP-NET research.
- ✓ To assess the publishing output and collaborative influence of the most prolific institutions involved in GEP-NET research.
- ✓ To identify the most common languages utilized in the dissemination of GEP-NETs research by looking at the language distribution of publications.
- ✓ To assess the contributions made by funding agencies and their function in advancing GEP-NET research in advancing GEP-NET research in different institutions and geographical areas.

4. STATEMENT OF THE PROBLEM

The purpose of this paper is to study the research productivity of Gastroenteropancreatic Neuroendocrine tumors during the year 1989-2025. The study aims to find out the growth of publication from 1989-2025 and the trends involved in the publications of Gastroenteropancreatic Neuroendocrine tumors in terms of Year wise publication, funding agencies, type of documents, document type.

5. METHODOLOGY

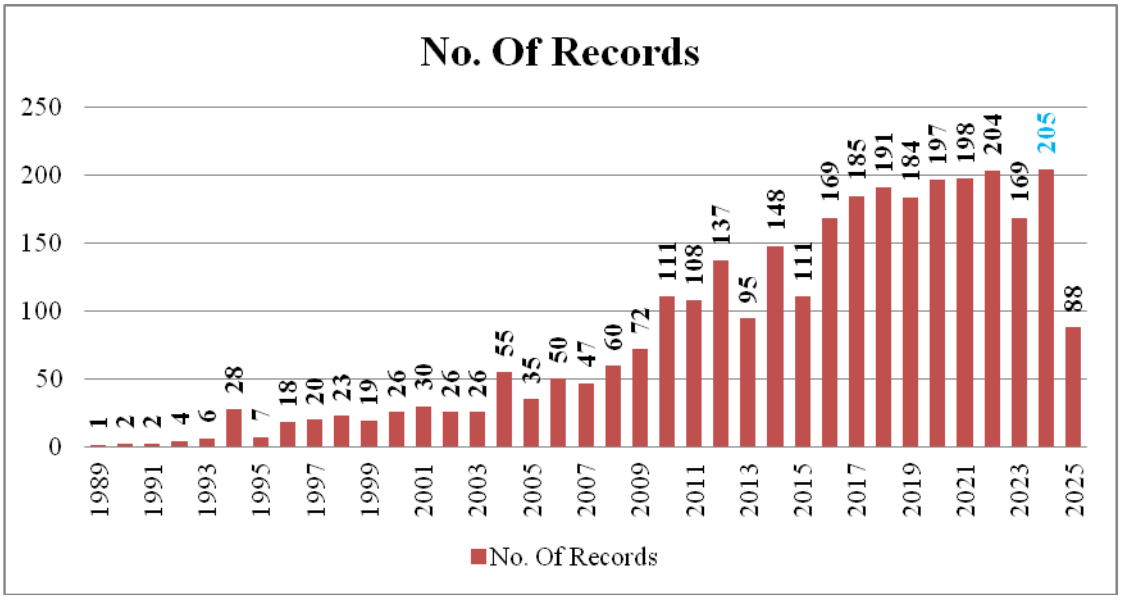
The data for this study were collected from the Web of Science database bibliographic database for the period 1989 to 2025. To retrieve relevant publications, a comprehensive search strategy was applied using the topic field with appropriate keyword such as "Gastroenteropancreatic Neuroendocrine Tumors", "GEP-NETs", and "Neuroendocrine Neoplasm". The analysis was carried out in line with the study objectives, focusing on year-wise growth, document type, and institutional contributions. The findings retrieved from this analysis offer valuable insights into the global research landscape on GEP-NETs.

6. DATA ANALYSIS AND INTERPRETATION

6.1. Growth of Publication

Figure 1 shows the publication trend on GEP-NETs from 1989-2025 shows a steady rise, with minimal output until 2002, followed by significant growth from 2009 onward. Peak productivity occurred between 2016 and 2024, reaching 205 publications in 2024. A slight decline in 2025 is likely due to incomplete indexing. Overall the data reflects growing and sustained research interest in GEP-NETs.

Figure 1: Year-wise growth of publications



6.2 Distributions of publications according to type

Table 1 shows the analysis of document types research articles constitute the majority of publications on GEP-NETs, accounting for 51.21% (1,564 of 3054 records), indicating that original research dominates this field. This is followed by meeting abstracts (21.25%) and review articles (19.91%), reflecting active academic discourse and growing interest in synthesizing existing knowledge. Other formats like proceeding papers, editorials, and early access articles contribute marginally, while book review and news items are minimal. Overall, the data highlights a strong focus on empirical research and scholarly communication within the GEP-NET research community.

Table 1: Distribution of research output according to their type

S. No	Document type	No. of. Records	% of 3054
1	Article	1564	51.21%
2	Meeting Abstract	649	21.25%
3	Review Article	608	19.91%
4	Proceeding Paper	110	3.60%
5	Editorial Material	58	1.90%
6	Early Access	28	0.92%
7	Letter	15	0.49%
8	Book Chapters	12	0.39%
9	Correction	7	0.23%
10	News Item	2	0.07%
11	Book Review	1	0.03%
Total		**3,054**	**100.00**

6.3 Top most Productive Institutions in GEP-NETs

Table 2 shows that the Free University of Berlin leads GEP-NET research output with 177 publications (5.80%), followed closely by Humboldt University of Berlin (5.57%), Berlin Institute of Health (5.53%), and **Charité – Universitätsmedizin Berlin (5.53%),** indicating that Berlin-based institutions are major contributors to the field. Notably, Erasmus University Rotterdam and Erasmus MC from the Netherlands also feature prominently, together contributing over 10% of the total output.

Table 2 Details of Institutions that enhanced research related to GEP-NETs

S. No	Institutions/ Organizations	No. Of Records	% of 3054
	Free University of Berlin	177	5.796%
	Humboldt University of Berlin	170	5.566%
	Berlin Institute of Health	169	5.534%
	Charité Universitätsmedizin Berlin	169	5.534%
	Erasmus University Rotterdam	157	5.141%
	Erasmus MC	150	4.912%
	University of London	121	3.962%
	Uppsala University	106	3.471%
	Assistance Publique Hopitaux Paris Aphip	105	3.438%
	University of Texas System	104	3.405%

6.4 Language-wise analysis of Articles

Table 3 shows a clear dominance of English, which accounts for 96.86% (2,955 out of 3504) of all publications on GEP-NETs, reaffirming its role as the global language of scientific communication. Other languages such as

German (2.29%) and French (0.72%) contribute marginally, while Spanish, Italian, Portuguese, and Serbian each account for less that 0.15%.

This highlights the international nature of GEP-NET research and its strong alignment with English-language academic publishing standards.

Table 3: Language-wise analysis of Articles

S. No	Language	No. Of Records	% of 3054
1	English	2955	96.857%
2	German	70	2.292%
3	French	22	0.720%
4	Spanish	4	0.131%
5	Italian	1	0.033%
6	Portuguese	1	0.033%
7	Serbian	1	0.033%
Total		**3054**	**100%**

6.5 Country-wise Distribution of Articles

Table 4 indicates that the United States leads GEP-NET research with 824 publications, reflecting its strong research infrastructure and clinical focus in oncology. Germany (512) and Italy (509) follow closely, highlighting Europe's significant contribution to the field. Other prominent contributors include France (269), England (245), and the Netherlands (215). Notably, China (197) shows rising research activity, indicating growing global engagement. Countries like Spain (184), Switzerland (161) and Sweden (151) also demonstrate active involvement. The data reveals that GEP-NET research is predominantly driven by developed countries, with strong representation from both North America and Europe.

Table 4: Country-wise Distribution of Articles

S. No	Countries	No. Of Records	% of 3054
1	USA	824	26.98%
2	Germany	512	16.76%
3	Italy	509	16.67%
4	France	269	8.81%
5	England	245	8.02%
6	Netherlands	215	7.04%
7	Peoples R China	197	6.45%
8	Spain	184	6.02%
9	Switzerland	161	5.27%
10	Sweden	151	4.94%

6.6 Productivity of Funding Agencies

Table 5 reveals that the United States Department of Health and Human Services (3.93%) and the National Institutes of Health (NIH), USA (3.90%) are the top funding bodies supporting GEP-NET research, underlining the U.S. government's strong investment in the field. The diverse funding landscapes highlight robust global support for GEP-NET research, driven by both public institutions and private sector stakeholders.

Table 5: Details of Funding Agency for research related to GEP-NETs

S. No	Funding Agencies	No. of Records	% of 3054
1	United States Department of Health Human Services	120	3.93%
2	National Institutes of Health NIH USA	119	3.90%
3	IPSEN	99	3.24%
4	Novartis	84	2.75%
5	NIH National Cancer Institute NCI	61	2.00%
6	National Natural Science Foundation of China NSFC	53	1.74%
7	PFIZER	31	1.02%
8	Fondazione Airc Per la Ricerca Sul Cancro	21	0.69%
9	German Research Foundations DFG	23	0.75%
10	Ministry of Education Culture Sports Science and Technology Japan Mext	17	0.56%

6.7 Research area-wise distribution of publications

Table 6 shows that oncology dominates GEP-NET research with 32.29% (987 records), reflecting the tumor-specific nature of the topic. This is followed by Endocrinology & Metabolism (24.50%), aligning with the hormonal activity characteristic of neuroendocrine tumors. Other major fields include Radiology, Nuclear Medicine, Medical imaging (14.72%) and Gastroenterology & Hepatology (12.89%), highlighting the multidisciplinary diagnostic and clinical approaches involved. Contributions from Neuroscience (!1.97%), Surgery (7.95%), and pathology (5.92%) further underscore the integrates nature of GEP-NET management. The data confirms that GEP-NET research spans a wide range of medical and biological disciplines, reflecting its complex and interdisciplinary nature.

Table 6: Research area-wise distribution of publications

S. No	Research Areas	No. Of Records	% of 3054
1	Oncology	987	32.29%
2	Endocrinology Metabolism	749	24.50%
3	Radiology Nuclear Medicine Medical Imaging	450	14.72%
4	Gastroenterology Hepatology	394	12.89%
5	Neuroscience Neurology	366	11.97%
6	Surgery	243	7.95%
7	Pathology	181	5.92%
8	General Internal Medicine	137	4.48%
9	Cell Biology	94	3.06%
10	Research Experimental Medicine	94	2.94%

CONCLUSION

The scientometric analysis of GEP-NET research from 1989 to 2025 reveals a substantial and sustained growth in global scholarly attention. The dominance of original research articles and the involvement of top-tier institutions and countries underscore the scientific maturity and collaborative nature of this domain. English remains the universal language of scientific communication in this field, and U.S. governmental and pharmaceutical agencies play a pivotal role in funding. The study also highlights the multidisciplinary focus of GEP-NET research, with significant contributions from oncology, endocrinology, imaging, and gastrointestinal landscape of GEP-NET literature, offering a foundational reference for researchers, policymakers, and clinicians to identify research gaps, prioritize future investigations, and foster international collaboration.

REFERENCES

[1] Dasari, A., Shen, C., Halperin, D., Zhao, B., Zhou, S., Xu, Y., ... & Yao, J. C. (2017). Trends in the incidence, prevalence, and survival outcomes in patients with neuroendocrine tumors in the United States. *JAMA oncology*, *3*(10), 1335-1342.

[2] Lawrence, B., Gustafsson, B. I., Chan, A., Svejda, B., Kidd, M., & Modlin, I. M. (2011). The epidemiology of gastroenteropancreatic neuroendocrine tumors. *Endocrinology and Metabolism Clinics*, *40*(1), 1-18.

[3] Pölcher, M. (2019). Endometriumkarzinom: Sentinel-Lymphonodektomie gewinnt an BedeutungWissenstransfer zu Tortorella L, Casarin J, Multinu F, et al.: Sentinel lymph node biopsy with cervical injection of indocyanine green in apparent early-stage endometrial cancer: predictors of unsuccessful mapping. Gynecol Oncol. 2019 Oct; 155 (1): 34-38. *Kompass Onkologie*, *6*(4), 220-221.

[4] Yao, J. C., Hassan, M., Phan, A., Dagohoy, C., Leary, C., Mares, J. E., ... & Evans, D. B. (2008). One hundred years after "carcinoid": epidemiology of and prognostic factors for neuroendocrine tumors in 35,825 cases in the United States. *Journal of clinical oncology*, *26*(18), 3063-3072.

[5] World Health Organization (WHO). (2022). *WHO Classification of Tumours: Digestive System Tumours* (5th ed.). International Agency for Research on Cancer.

[6] Yao, J. C., Hassan, M., Phan, A., Dagohoy, C., Leary, C., Mares, J. E., ... & Evans, D. B. (2008). *One hundred years after "carcinoid": epidemiology of and prognostic factors for neuroendocrine tumors in 35,825 cases in the United States*. Journal of Clinical Oncology, 26(18), 3063–3072. https://doi.org/10.1200/JCO.2007.15.4377

[7] Ignacio, B. M. J., Gomez, S. R., Theillac, B., Niddam, S. R., Caviedes, S. E., Laura, V. L. M., & Blanco, C. (2025, May). Gastroenteropancreatic neuroendocrine tumours (GEP-NETs): clinical profile, treatment and 10-year survival. In *Endocrine Abstracts* (Vol. 110). Bioscientifica.

[8] Wu, L., Wang, T., Jiang, S., Zhang, J., Zhang, M., Gao, H., ... & Yang, J. (2025). Global research trends in gastroenteropancreatic neuroendocrine tumors: a bibliometric analysis from 2000 to 2023. *Frontiers in Oncology*, *15*, 1515893.

[9] Mukherjee, S. B., Shanker, R. M., Madigan, J. P., & Sadowski, S. M. (2025). The Evolving Landscape of GEP-NENs in the Era of Precision Oncology: Molecular Insights into Tumor Heterogeneity. *Cancers*, *17*(13), 2080.
