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ORIGINAL ARTICLE

Global Antiviral Peptide Research: A Bibliometric Analysis from 1951 to 2022

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Abstract

Antiviral peptides (AVPs) are small molecules that inhibit the replication of viruses in living cells. AVPs are being investigated as potential alternatives to traditional antiviral drugs. The development of novel antiviral agents is of the highest concern because some traditional antiviral medications can be ineffective and lead to resistant viruses emergence. We conducted a bibliometric study on the global distribution of AVP research to comprehend the trends and patterns in the field. For this analysis, we retrieved data from the Scopus database on AVP-related publications from 1951 to 2022, including the number of publications, citations, and authors. Overall, 10,279 papers were published, with an annual average of 146 publications. The United States released the most documents, followed by China, Germany, and the United Kingdom. Since 2001, there has been a substantial increase in global publications on AVPs, with prominent themes including virology, genetics, protease inhibitors, polypeptide antimicrobial agents, and viral entry. This bibliometric analysis can be used to guide future research in this field.

Keywords: antiviral peptide; bibliometric analysis; global publications; research patterns and trends; Scopus database.

1. Introduction

An antiviral peptide (AVP) is a short chain of amino acids, the building blocks of proteins, capable of inhibiting virus replication and activity. These peptides are of interest in the field of virology and medical research as potential treatments for viral infections [1, 2] (**Supplementary Table 1**). Viruses are primary contributors to illness and death in both humans and animals, primarily due to the inherent difficulty and time-consuming nature of creating and developing new vaccines and antiviral drugs. Animals are targets of viruses, such as the rabies virus, feline herpesvirus 1 (FHV-1), feline calicivirus (FCV), feline immunodeficiency virus (FIV), feline parvovirus (CPV), feline distemper virus (CDV), and feline influenza virus (CIV) [3], and in humans, various viral infections, such as influenza, HIV, hepatitis, and COVID-19, can be fatal [4]. According to the World Health Organization (WHO), influenza causes respiratory problems leading to annual fatalities in 290.000 to 650.000 of all cases globally [5]. On the other hand, hepatitis B infection results in 900.000 deaths annually, while the number of deaths due to hepatitis C infection reaches 400.000 cases per year [6]. In addition, HIV-driven disease causes 650.000 deaths annually. Recently, the COVID-19 virus infection resulted in 1.2 million fatalities worldwide [7, 8].

Potent antiviral drugs are required to treat virus infections. Antiviral drugs commonly used for treating infection include nitazoxanide, ribavirin, remdesivir, favipiravir, naproxen, and lopinavir [9]. However, long-term treatment of antiviral medicines might have adverse effects, such as anemia, neutropenia, nerve abnormalities, insomnia, and ultimately promote virus resistance [10]. Remdesivir adverse effects include headache, nausea, and hypokalemia. Fever, diarrhea, and nausea are some of the adverse effects of ribavirin. Elevations of uric acid and diarrhea are the negative effects of favipiravir. Nitazoxanide side effects include nausea, vomit, and diarrhea [11]. Consequently, there is a heightened need for the development of novel antiviral medications, with a growing emphasis on molecules that can exhibit well-targeted efficacy while minimizing adverse side effects. The development of an antiviral compound involves diverse strategies, including bioinformatics-driven predictions, based on interaction between potential antiviral molecules and viral elements or enzymes, as well as the identification and isolation of new compounds with antiviral properties already in nature. Thanks to these approaches, many novel molecules have been identified to date, and, notably, interest in the investigation of antiviral peptides has been growing within the field. Non-toxic natural antiviral peptides have been isolated from other existing larger peptides, such as Lantus and Lupron, which are authorized to treat diabetes and prostate cancer [12]. Peptides are selected because of their simplicity of synthesis, high target specificity, and low toxicity. Additionally, peptides can interact with other peptidases within the body, inhibiting their accumulation and potentially disrupting physiological functions [2, 13, 14].

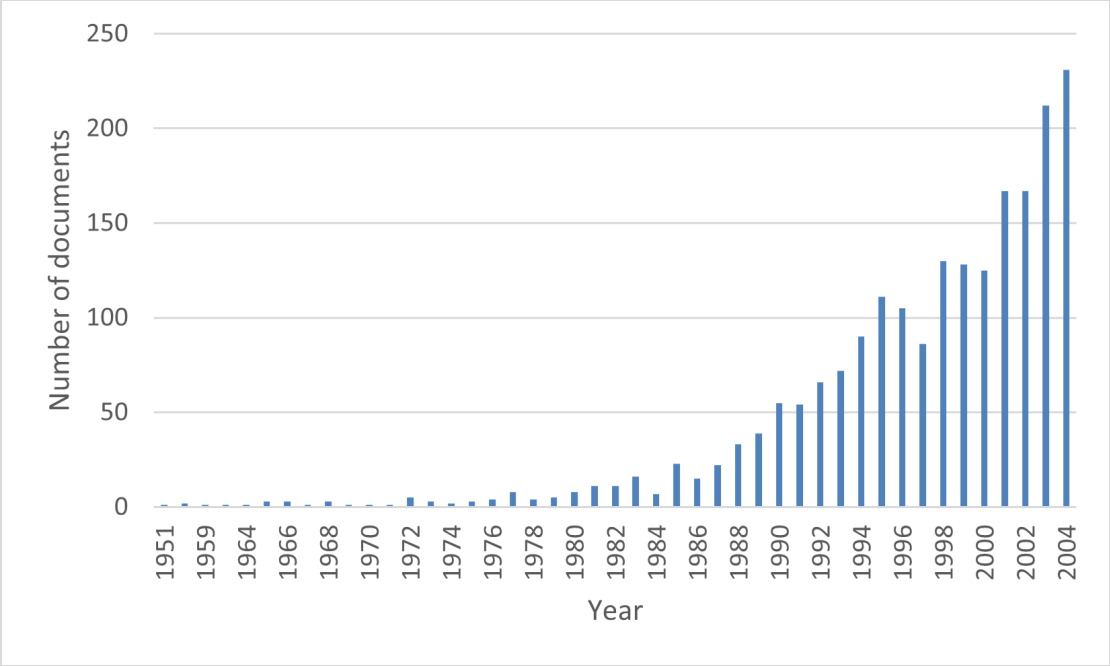
Antiviral peptides in the medical field have been developed to address virus infections, as reported in the literature (Supplementary Table 1). Recently, bibliometric analysis has been widely adopted as a novel method for examining scientific publications based on big data analysis. Bibliometric analysis is a quantitative approach utilized to scrutinize data in scientific publications within a specific time frame. This approach has been employed to analyze numerous health-related subjects, constituting a comprehensive tool to assess the incidence of monkeypox disease and the prevalence of chikungunya in ASEAN and South Asian countries. Furthermore, bibliometric analysis has been also applied to other research fields, including the utility of DNA barcoding in identifying botanical insecticides against lepidopteran plagues and for assessing biodiversity [15–19] highlighting the effectiveness and robustness of the approach. In the present study, we conducted a bibliometric analysis on antiviral peptides to assess the extent of research conducted from 1951 to 2022 and gain the future outlook for the field. This analysis may serve as a foundation for the advancement of future research.

2. Materials and Methods

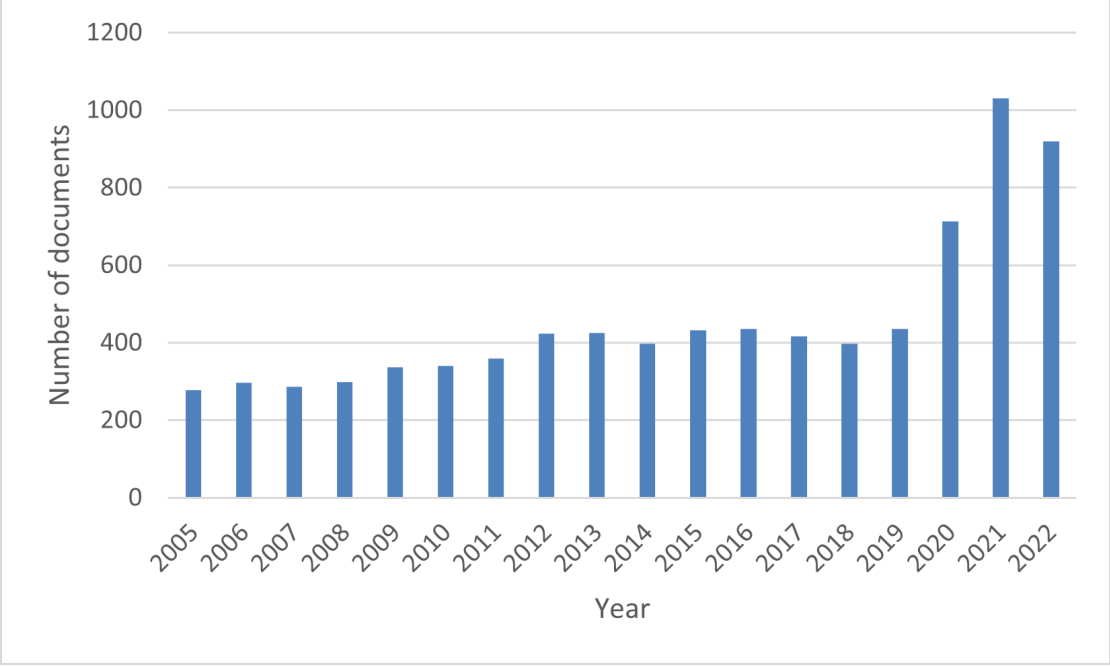
A bibliometric analysis was conducted to examine publication trends and research topic patterns in articles about AVPs published between the years 1951 and 2022. The Scopus database, a widely recognized primary source for bibliometric analysis across various disciplines [20], was utilized as the data source. A filter was established by utilizing key search terms such as "antiviral" and "peptide" in publication titles and abstract fields within the Scopus database in January 2023. The generated dataset was further processed to extract the following bibliometric indicators: publication year, citations, journal titles, institutions, countries, and keywords. To identify trends and patterns among AVPs studies, the data was run through the bibliometric software program VOSviewer [21].

3. Results

A total of 10.279 AVP publications from 1951 to 2022 were retrieved. **Fig. 1.** illustrates an increasing trend in global AVP publications. From 2001 onwards, we observed a steady rise in the number of AVP publications, with at least 150 per year, reaching a peak in 2021, with a cumulative total of 1.030 papers.



(a)



(b)

Figure 1. Global trend of Antiviral Peptide (AVP) Publications **(a)** 1951-2004, **(b)** 2005-2022: Steady Increase since 1988, reaching a peak in 2021.

The top ten articles used as references in AVP research, were cited at least 1.100 times as revealed in **Table 1**. The article titled "Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and coronavirus disease-2019 (COVID-19): The epidemic and the challenges" obtained the highest number of citations (3.191). It is particularly noteworthy that the document with the highest number of citations is not the oldest publication since it was published in 2020. It implies that researchers have recognized the urgent need to explore antiviral strategies, including the potential application of peptides, to combat this global health crisis. The oldest of the 10 most-cited publications was published in 1997 and is entitled "Vigorous HIV-1-specific CD4+ T cell responses associated with control of viremia".

Table 1. The top-cited articles on antiviral peptide-related research published between 1951 and 2022

SCR[a]	Title	Year	Authors	Journal	Volume	Citations
1	Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and coronavirus disease-2019 (COVID-19): The epidemic and the challenges	2020	Lai *et al.* [22]	International Journal of Antimicrobial Agents	55(3), 105924	3191
2	Peptide antimicrobial agents	2006	Jenssen *et al.* [23]	Clinical Microbiology Reviews	19(3), pp. 491-511	1889
3	Counting antigen-specific CD8 T cells: A reevaluation of bystander activation during viral infection	1998	Murali-Krishna *et al.* [24]	Immunity	8(2), pp. 177-187	1709
4	Vigorous HIV-1-specific CD4+ T cell responses associated with control of viremia	1997	Rosenberg *et al.* [25]	Science	278(5342), pp. 1447-1450	1677
5	Albumin as a drug carrier: Design of prodrugs, drug conjugates, and nanoparticles	2008	Kratz [26]	Journal of Controlled Release	132(3), pp. 171-183	1674
6	Broad and potent neutralizing antibodies from an African donor reveal a new HIV-1 vaccine target	2009	Burton *et al.* [27]	Science	326(5950), pp. 285-289	1386
7	Emergence of resistant human immunodeficiency virus type 1 in patients receiving fusion inhibitor (T-20) monotherapy	2002	Wei *et al.* [28]	Antimicrobial Agents and Chemotherapy	46(6), pp. 1896-1905	1338
8	Chloroquine is a potent inhibitor of SARS coronavirus infection and spread	2005	Vincent *et al.* [29]	Virology Journal		1259
9	APD3: The antimicrobial peptide database as a tool for research and education	2016	Wang *et al.* [30]	Nucleic Acids Research	44(D1), pp. D1087-D1093	1134
10	Cardiac Involvement in a Patient with Coronavirus Disease 2019 (COVID-19)	2020	Inciardi *et al.* [31]	JAMA Cardiology	5(7), pp. 819-824	1104

[a]SCR: standard competition ranking

Regarding author affiliations of AVP papers, **Table 2** lists the top ten institutions responsible for almost 16 % of all assessed publications linked to AVP. Within this top ten, the Chinese Academy of Sciences produced the most publications (233 articles), and the National Institute of Allergy and Infectious Diseases (NIAID) in the United States published 105 articles.

The top ten journals with the most papers about AVPs are shown in **Table 3**. The Journal of Virology contained the most documents (500 articles), while Frontiers in Immunology had the least (129 articles) among the top ten institutions.

Countries having contributed papers on AVP research are shown in **Fig. 2.** Countries within this network have each contributed at least 25 AVP publications from 2010 to 2018. A total of 36 countries were included, falling into four publication clusters represented by a given color: blue, red, olive green, and green (Fig. 2a). Figure 2b reveals which countries have steadily contributed AVP papers in the 9-year period from 2010 to 2018; publications were clustered taking into account contributing country and publication year, whereby a gradient color from purple to yellow depicts old (2010) to recent (2018) publications. The United States has steadily led AVP publications, followed by Germany, gaining relevance in 2011, and China, emerging as a key contributor around 2016. The top ten countries with the most AVP publications are listed in **Table 4**. The country with the most publications is the United States (n = 3,639 documents) and the country with the least publications is Spain (n = 355 documents). The United States, China, Germany, and the United Kingdom have the most international collaborations, with 35 other countries, while Spain is connected with 31 other countries.

Table 2. The institutions with the most publications on Antiviral Peptides (AVP)published between 1951 and 2022

SCR[a]	Institution	Country	Number of publications and share (%)
1	Chinese Academy of Sciences	China	233 (2.26)
2	National Institutes of Health (NIH)	United States	217 (2.11)
3	Ministry of Education China	China	210 (2.04)
4	Inserm	France	190 (1.84)
5	Centre National de la Recherche Scientifique (CNRS)	France	170 (1.65)
6	Harvard Medical School	United States	152 (1.47)
7	KU Leuven	Belgium	118 (1.14)
8	Fudan University	China	114 (1.10)
9	Chinese Academy of Medical Sciences & Peking Union Medical College	China	113 (1.09)
10	National Institute of Allergy and Infectious Disease (NIAID)	United States	105 (1.02)

[a]SCR: standard competition ranking

Table 3. The top ten journals for Antiviral Peptides (AVP) published between 1951 and 2022

SCR[a]	Journal Name	Publisher	Number of publications and share (%)	SJR[b] 2021	Cite Score[c] 2021
1	Journal of Virology	American Society for Microbiology	500 (4.86)	2.049	10.2
2	PLOS One	PLOS (Public Library of Science)	223 (2.16)	0.852	5.6
3	Antiviral Research	Elsevier B.V.	207 (2.01)	2.213	15.0
4	Journal of Biological Chemistry	The American Society for Biochemistry and Molecular Biology	201 (1.95)	1.871	8.8
5	Journal of Immunology	American Association of Immunologists	184 (1.79)	1.964	8.9
6	Proceedings of the National Academy of Sciences of the United States of America	National Academy of Sciences	161 (1.56)	4.184	18.1
7	Viruses	Multidisciplinary Digital Publishing Institute (MDPI)	152 (1.47)	1.463	6.6
8	Journal of Medicinal Chemistry	American Chemical Society	133 (1.29)	1.888	11.5
9	Antimicrobial Agents and Chemotherapy	American Society for Microbiology	132 (1.28)	1.546	9.3
10	Frontiers in Immunology	Frontiers Media SA	129 (1.25)	2.331	9.8

[a]SCR: Standard competition ranking. [b]SJR: SCImago Journal Rank provides a journal's received weighted citations. Citation weighting is influenced by the citing journal's prestige (SJR) and subject area. [c]Cite Score: CiteScore calculates the typical number of citations per serially released document.

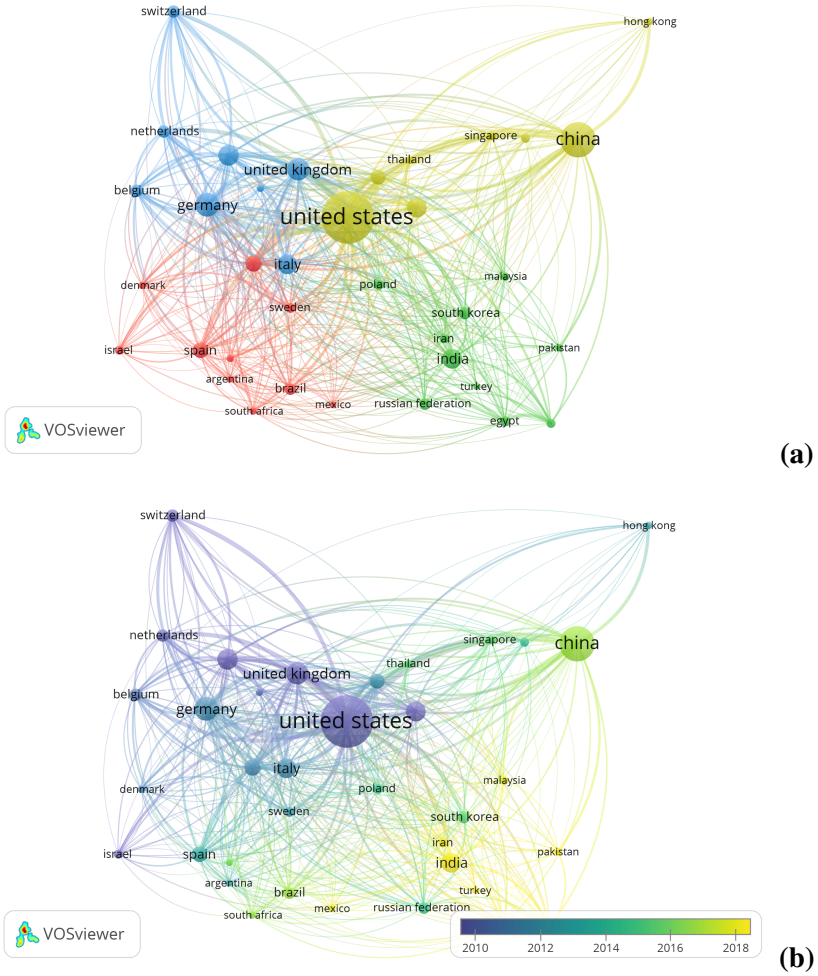


Figure 2. Country clusters (depicting collaborations) authoring AVP-related research. **(a)** Network visualization; **(b)** Overlay visualization. Link length and thickness reveal steady and strong publishing collaborations between countries; countries with a minimum of 25 AVP publications are shown in the clusters.

Leading authorship clusters are shown in **Fig. 3**, as visualized with VOSviewer. Five authorship clusters, marked with olive green, red, green, blue, and purple, were revealed (Figure 3a). In Figure 3b, author clusters are marked with a hue within the color gradient from purple to yellow, indicating the publication year from 2015 to 2018, respectively. Older authors, within this four-year period, formed purple-to-blue clusters, whereas recent authors tended to form clusters in lighter colors. Nevertheless, all authors were interconnected. **Table 5** shows the top ten authors who have contributed to AVP research. The author with the highest number of publications is Jiang, S., with 108 publications, while Lehrer, R.I. was the leading author with the least publications, namely 33 papers.

Table 4. Top ten countries involved in published work on Antiviral Peptides (AVP) between 2010 and 2018

SCR[a]	Country	Number of publications and share (%)	No. of Collaborating Countries[b]
1	United States	3639 (35.40)	35
2	China	1652 (16.07)	35
3	Germany	789 (7.67)	35
4	United Kingdom	662 (6.44)	35
5	France	561 (5.45)	34
6	India	543 (5.28)	34
7	Japan	538 (5.23)	32
8	Italy	534 (5.19)	35
9	Canada	376 (3.65)	33
10	Spain	355 (3.45)	31

[a]SCR: standard competition ranking. [b]Number of collaborating countries with a minimum of 50 shared publications.

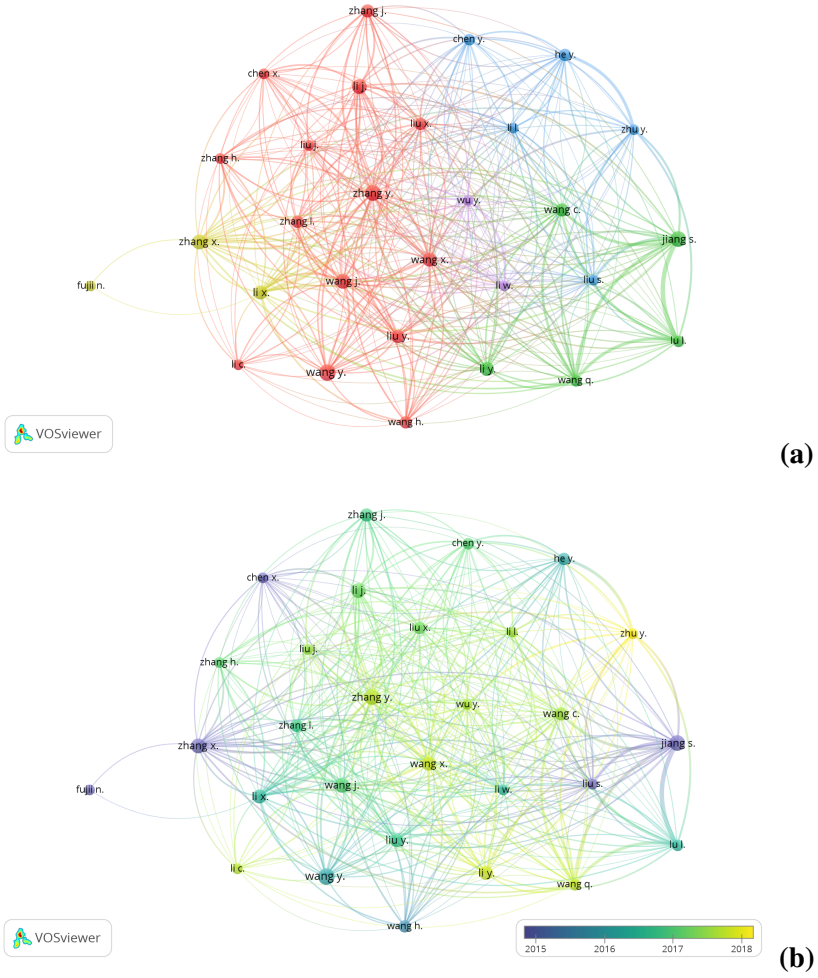


Figure 3. AVP-related publications leading authorship clusters. (**a**) Network visualization; (**b**) Overlay visualization. Link length and thickness reveal steady and strong publishing collaborations between authors; authors with a minimum of 50 AVP publications are shown in the clusters.

Table 5. Top ten authors publishing work on Antiviral Peptides (AVP) between 2015 and 2018

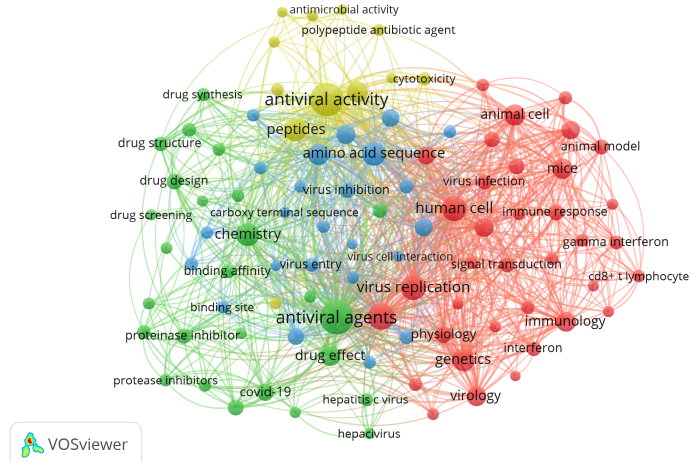
SCR[a]	Author	Number of publications and share (%)	Scopus ID[b]	H-index[c]
1	Jiang, S.	108 (1.05)	56491898300	85
2	Lu, L.	60 (0.58)	55715616400	46
3	Fujii, N.	49 (0.47)	7401762572	82
4	He, Y	49 (0.47)	8742157400	48
5	Tamamura, H.	45 (0.43)	7006121338	53
6	Yamamoto, N.	38 (0.36)	56705814400	85
7	Chong, H.	35 (0.34)	23034077600	21
8	Johnson, H.M.	34 (0.33)	7403243838	53
9	Stein, D.A.	34 (0.33)	7401615537	38
10	Lehrer, R.I.	33 (0.32)	7102432216	102

[a]SCR: standard competition ranking. [b]Scopus ID: Scopus Author Identifier is a unique number that matches authorship to publication groups. [c]H-index: The h-index is an author-level metric that measures both publication productivity and citation impact.

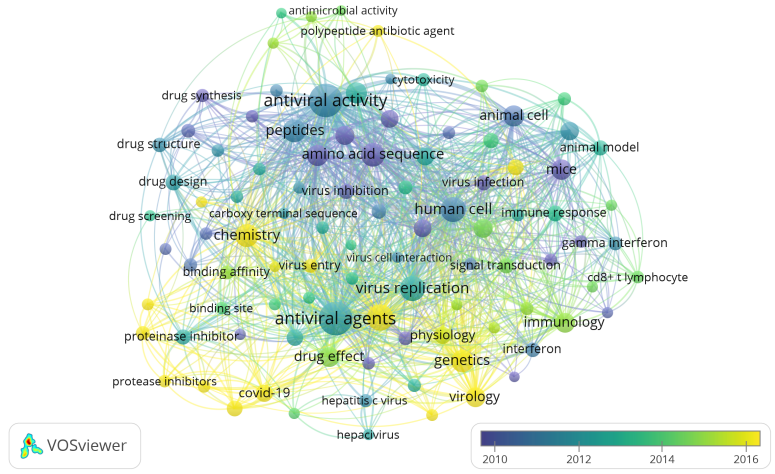
The clusters of keywords employed in AVP-related publications are shown in **Fig. 4.** These keywords revealed the topics or themes used in AVP research among the assessed publications. After being analyzed with VOSviewer, four keyword clusters emerged involving 122 keywords. In Fig. 4, clusters in red contain keywords related to viral activity and host cells), yellow clusters address antiviral and peptide activity, green clusters are relevant to drug structure, and blue clusters deal with AVP amino acid sequences. Keyword clusters, shown in Fig. 4b, highlight the change in AVP topics through time, as revealed by publications from 2010 to 2016. Keyword clusters have colors in hues from purple to yellow; keywords before 2010 had purple-to-bluish colors, whereas keywords in publications closer to 2016 constituted clusters of green-to-yellowish colors and keywords after 2016 had yellow and lighter colors. Fig. 4c shows the frequency with which AVP-related research topics appeared in the assessed literature; color intensity is positively related to keyword use in publications. For instance, antiviral activity, unclassified drugs, and drug effects are the most commonly used keywords in AVP research papers.

4. Discussion

This study investigated the global AVP research profile from 1951 to 2022. Spanning nearly seven decades, the use of AVPs to treat viral infections began in 1951 and grew significantly until 2021. Since the early 2000s, the number of publications within this field experienced a drastic surge, corroborated by the increase in instances of Severe Acute Respiratory Syndrome (SARS) from 2002 to 2003 in North America, South America, Europe, and Asia, particularly in China [32, 33]. While in 2021, we detected a significant increase in research on antiviral peptides due to the COVID-19 pandemic. The WHO stated that this pandemic, which began in 2019, affected the body's immune system and led to a significant number of deaths, with 14.9 million fatalities reported during 2020 and 2021 [34]. Therefore, various efforts have been made to identify effective treatments for COVID-19. Mahendran *et al*. (2020) suggested that AVP constitute potential therapeutics against COVID-19 [35].



(a)



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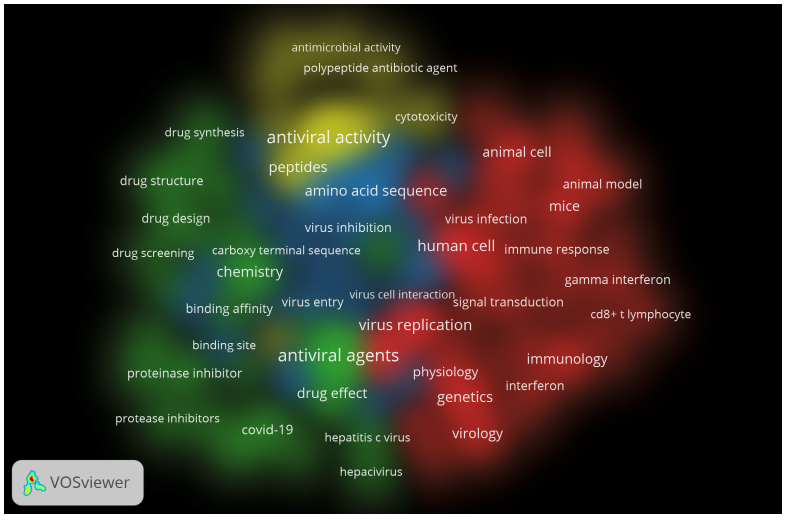

(c)

Figure 4. AVP publications' keyword clusters. (**a**) Network visualization; (**b**) Overlay visualization, the purple and darker shades indicate keywords from before 2010, while the yellow and lighter shades represent keywords appearing after 2016; (**c**) density cluster visualization. The distance between the connection and the 300 occurrences is shown by its length.

As of 2022, the Journal of Virology became the leading publication for antiviral peptide research, with 500 papers available through the Scopus database. In 1979, the Journal of Virology published its first recorded work on antiviral peptides titled, "Novel antiviral activity observed in the medium of Sindbis virus-persistently infected mosquito (*Aedes albopictus*) cell cultures" [36], reflecting the journal's significant role in the communication of AVP research. Among the AVP papers assessed, 34 publications dealt with the SARS-CoV-2 topic. The article: "Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) and Coronavirus disease-2019 (COVID-19): The epidemic and the challenges" [22], published in the International Journal of Antimicrobial Agents, has received 3.191 citations, making it the most frequently cited source in AVP research. Meanwhile, the author with the most publications is Jiang, S., from Fudan University, China, with 108 papers. This was in line with the country's analysis, which found that China was the second most productive country in this field.

By 2022, the United States had the most AVP publications, with 3.639 papers, followed by China with 1.652 documents. The number of institutions in these two countries investigating AVP explains their high publication output. In the United States, the institutions with the most significant number of publications in this field are the National Institutes of Health (n = 217), Harvard Medical School (n = 152), and the National Institute of Allergy and Infectious Disease (n = 105). In China, the institutions with the highest number of AVP publications are the Chinese Academy of Sciences (n = 233), the Ministry of Education China (n = 210), Fridam University (n = 114), and the Chinese Academy of Medical Sciences & Peking Union Medical College (n = 113).

Widely researched topics in AVP research include virology, genetics, protease inhibitors, polypeptide antibiotic agents, and virus entry. These topics are all related to the capability of antiviral peptides to prevent viral activity and replication. The COVID-19 pandemic has caused a significant shift in research topics, resulting in a substantial increase in research concerning the utilization of AVPs for COVID-19 treatment-related studies while temporarily slowing down research efforts in other areas. The pandemic has also sparked a renewed focus on infectious diseases and pandemic preparedness. As the world continues to navigate the challenges posed by the pandemic, research priorities are likely to evolve further, reflecting the ongoing impact of COVID-19 on the scientific community.

Antiviral peptide development as drugs begins with determining protein targets through molecular docking and *in silico* testing [32]. In addition, proper drug design ensures that peptides are more effective in reaching the viral targets and do not cause any other disruptions [37]. For example, lactoferrin-derived peptides from *Bos taurus* were identified via *in silico* analysis as potential inhibitors against SARS-CoV-2. The peptide GSRY can be a prospective candidate developed as a novel SARS-CoV-2 inhibitor [38]. Antiviral peptides bind to proteins on the surface of the target virus capsid, leading to changes in the integrity of the viral membrane. In addition, AVPs can also impact how a virus expresses its genetic material and enzyme synthesis during the transcription process, thereby inhibiting virus replication [3, 39].

Antivirals suppress proteases and impact viral replication. The proteolytic enzyme protease is responsible for catalyzing the cleavage of proteins. This enzyme is crucial to the process of viral replication. The primary goal of antiviral medication development is to inhibit proteases [40, 41]. AVPs inhibit virus binding, attachment, and entrance and hinder viral enzyme activity and reproduction. The first stage of viral infection is its binding to host cells. The virucidal effect alters the virus membrane, preventing genetic material transmission and stopping its attachment to host cells. For instance, Papuamide A achieved a virucidal inhibition impact by suppressing

HIV-1. Inhibition of the host surface targets involved changes in interactions with functional viral surface proteins. Antivirals can block viral fusion, such as the ability of HNP-1 in HIV. In influenza, AVPs can also imitate viral receptors, thus obstructing intracellular entry. AVPs also inhibit viral enzymes and replication by blocking the transport of a primary viral protein and prohibiting the polymerase complex in HSV-2 and influenza.

In SARS-CoV-2, AVPs block the interaction with angiotensin-converting enzyme-2 (ACE2) in host cells by binding to the viral spike glycoprotein and preventing endosomal acidification to facilitate uncoating during the first stage of the viral life cycle [4]. The IRW peptide has a stronger affinity for the receptor-binding domain (RBD) and may prevent the SARS-CoV-2 spike (S) protein from interacting with ACE2 [42]. By stopping SARS-CoV-2 from entering, fusing its membrane, and releasing, a 4H30 peptide protects against the virus and lowers its in vivo concentration [43]. Based on bibliometric analysis, antiviral peptides have been identified as a topic of interest for the past seven decades. The results of the bibliometric analysis provide an overview of progress in the antiviral peptides research, thus enabling further development in future research.

5. Future Perspective

Given the lack of effective treatments for many viral infections and the recurring emergence and re-emergence of certain virus strains, the threat of further viral pandemics remains, as exemplified by the recent COVID-19 pandemic. In today's highly interconnected world, infected individuals can propagate diseases at a pace far surpassing that in the past. An example is the 2019 outbreak of SARS-CoV-2, which eluded containment in Wuhan and rapidly spread to other regions of Asia before unfolding into a global crisis in 2020. Hence, the development of novel antiviral molecules for clinical treatments is imperative. Peptides to inhibit the SARS-CoV-2 virus continue to be developed. In phase I clinical trials, the peptide P-pVAC-SARS-CoV-2 was developed from SARS-CoV-2 specific HLA class II peptides, and the UB-612 vaccine arose from S1-RBD protein-based vaccine incorporating a Th/CTL epitope peptide pool. The peptide COVEPIT-3:OSE-13E was developed from the CoVepiT vaccine against 11 proteins of the SARS-CoV-2 virus. In phase II, the peptide B-pVAAC-SARS-CoV-2 was derived from the SARS-CoV-2-derived multi-peptide vaccine. In phase III-IV, the Epi VacCorona Peptide Antigen-based Vaccine was developed from SARS-CoV-2 protein conjugated to a carrier protein [44].

Numerous peptides arise due to their antiviral properties; however, only a fraction of these molecules progress to the clinical trial stage. Despite the inherent advantages of these compounds, several issues still require resolution. Some key challenges include (1) Specificity and selectivity: designing peptides that target viruses while sparing healthy cells can be difficult. Achieving a balance between specificity for the virus and minimal impact on host cells is crucial to avoid unintended side effects. (2) Resistance: as in antibiotics, viruses can develop resistance to antiviral peptides. The high mutation rates of viruses can lead to the emergence of strains that are less susceptible to peptide effects. (3) Delivery and stability: peptides can be easily degraded by enzymes in the body, limiting their effectiveness. Ensuring stability and proper delivery mechanisms is essential so that antiviral peptides reach their target cells in sufficient concentrations for their efficacy. (4) Production cost: producing peptides on a large scale can be costly, affecting their accessibility as treatments. (5) Combination therapies: viruses can adapt quickly, so using a single antiviral peptide might not be sufficient for long-term treatment. Developing effective combination therapies targeting multiple stages of the viral life cycle is

challenging. (6) Limited spectrum: some antiviral peptides might only be effective against specific viruses, limiting their usefulness to broader viral infections. Despite these challenges, antiviral peptide research progresses, leading to the constant identification of peptides against various viral infections. Advances in peptide design, delivery methods, and our understanding of viral biology are helping to address these obstacles and pave the way for potential antiviral peptide therapies.

6. Conclusions

From 1951 to 2022, antiviral peptide-related research grew steadily and experienced a steep rise following the early 2000s. In the last three decades, antiviral peptide research has become one of the most popular research topics in the medical sciences. Our observations highlight the utility of bibliometric analysis in revealing the trend of antiviral peptide research and the hottest themes for the growth of future studies.

7. Conflict of Interest

The authors have no conflict of interest to declare.

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Investigación Global sobre Péptidos Antivirales: Un Análisis Bibliométrico de 1951 a 2022

Resumen: Los péptidos antivirales (AVPs) son pequeñas moléculas que inhiben la replicación de virus en células vivas. Los AVPs están siendo investigados como posibles alternativas a los medicamentos antivirales tradicionales. El desarrollo de nuevos agentes antivirales es de gran relevancia, ya que algunos medicamentos antivirales tradicionales pueden tener baja eficacia y llevar a la aparición de virus resistentes. Llevamos a cabo un estudio bibliométrico sobre la distribución global de la investigación en AVPs para comprender las tendencias y patrones en el campo. Para este análisis, obtuvimos datos de la base de datos Scopus sobre publicaciones relacionadas con AVPs entre 1951 y 2022, incluyendo el número de publicaciones, citas y autores. En total, se publicaron 10.279 artículos, con un promedio anual de 146 publicaciones. Estados Unidos publicó el mayor número de documentos, seguido de China, Alemania y el Reino Unido. Desde 2001, ha habido un aumento sustancial en las publicaciones globales sobre AVPs, con temas prominentes que incluyen virología, genética, inhibidores de proteasas, agentes antimicrobianos polipeptídicos y entrada viral. Este análisis bibliométrico puede ser utilizado para guiar futuras investigaciones en este campo.

Palabras Clave: Análisis bibliométrico; base de datos Scopus; patrones y tendencias de investigación; péptidos antivirales; publicaciones globales.

Pesquisa Global sobre Peptídeos Antivirais: Uma Análise Bibliométrica de 1951 a 2022

Resumo: Os peptídeos antivirais (AVPs) são pequenas moléculas que inibem a replicação de vírus em células vivas. Os AVPs estão sendo investigados como possíveis alternativas aos medicamentos antivirais tradicionais. O desenvolvimento de novos agentes antivirais é de grande relevância, pois alguns medicamentos antivirais tradicionais podem ter baixa eficácia e levar ao surgimento de vírus resistentes. Realizamos um estudo bibliométrico sobre a distribuição global da pesquisa em AVPs para compreender as tendências e padrões na área. Para esta análise, obtivemos dados da base de dados Scopus sobre publicações relacionadas com AVPs entre 1951 e 2022, incluindo o número de publicações, citações e autores. No total, foram publicados 10.279 artigos, com uma média anual de 146 publicações. Os Estados Unidos publicaram o maior número de documentos, seguidos por China, Alemanha e Reino Unido. Desde 2001, houve um aumento significativo nas publicações globais sobre AVPs, com temas proeminentes incluindo virologia, genética, inibidores de proteases, agentes antimicrobianos polipeptídicos e entrada viral. Esta análise bibliométrica pode ser usada para orientar futuras pesquisas nesta área.

Palavras-chave: Análise bibliométrica; base de dados Scopus; padrões e tendências de pesquisa; peptídeos antivirais; publicações globais.

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