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A Bibliometric Analysis of Tea and Bone from 1989 to 2023

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Abstract

Background: An increasing body of research has demonstrated a close association between the timing, type, and quantity of tea consumption and bone metabolism and skeletal health. However, to date, there has been a scarcity of systematic literature reviews and quantitative analyses in this field. This project aims to employ a bibliometric approach to systematically analyze and summarize the research on tea and bone health from 1989 to 2023. By visualizing the research hotspots and trends, we seek to gain a comprehensive understanding of the current status of research in this area. ***Methods:*** Relevant research articles were retrieved from the Web of Science Core Collection (WoSCC). The collected articles were then subjected to statistical and visualization analyses using CiteSpace and VOSviewer. Key aspects analyzed included the annual publication output, active countries, prolific institutions, authors, core journals, references, and keywords. ***Results:*** In total, 932 articles were selected from the WOSCC database, showing an increasing trend in annual publication output. The highest number of publications originated from China (240 articles, accounting for 25.75%), followed by the USA (196 articles, accounting for 21.03%) and Japan (105 articles, accounting for 11.27%). Among institutions, Texas Tech University emerged as the most prolific in terms of productivity, while author Shen, Chwan-Li contributed the highest number of publications (27 articles). The research hotspots in the field of tea and bone studies were identified as osteogenic differentiation, inflammation, and mesenchymal stem cells. ***Conclusions:*** The field of tea and bone research is experiencing a vibrant expansion, with ongoing investigations focusing on the intricate connections between tea and inflammation, as well as the mechanisms underlying tea's impact on bone cell differentiation. However, further exploration is warranted to elucidate and delve deeper into these mechanisms in order to enhance our comprehension in this area.

Keywords: tea, bone, bibliometric

1. Background

Tea, an ancient and popular beverage originating from China, has swiftly spread worldwide, boasting a rich cultural heritage and a long history. Widely acknowledged as a health-promoting drink, tea is regarded as a beverage of immense significance (Zhu, J., X. Zhang, & H. Guo, 2017). Tea leaves encompass a diverse array of constituents, including tea polyphenols, caffeine, amino acids, vitamins, and minerals. These components exert beneficial effects on the human body, such as antioxidative properties, mitigation of cardiovascular risks, and enhancement of immune function (Newman, R. G., et al., 2023; Zhang, Y., et al., 2022). Skeletal health refers to the optimal condition of the skeletal system, encompassing factors such as bone density, bone strength, and bone quality. The maintenance of skeletal well-being plays a pivotal role in the prevention of skeletal disorders, including osteoporosis and fractures, highlighting the critical significance of preserving bone health (Choi, J. Y., 2020). In recent years, investigators have embarked upon studying the association between tea consumption and skeletal health. Although the current body of research remains relatively limited, preliminary findings suggest that tea may confer certain benefits to the skeletal system (Li, X., et al., 2019). For instance, several studies have indicated a close association between tea consumption and increased bone density, as well as a potential preventive effect against osteoporosis. Certain components found in tea have been implicated in modulating the balance between bone resorption and bone formation processes (McAlpine, M.D., et al., 2021; Li, J.-y., et al., 2021). Furthermore, experimental evidence has demonstrated that tea polyphenols exhibit inhibitory effects on bone degradation during the process of bone resorption while simultaneously promoting bone formation. This dual action contributes to the maintenance of skeletal health (Zhang, Y., et al., 2022; Lim, S., et al., 2020). In addition, there exists a close association between skeletal health and chronic inflammation. Tea polyphenols found in tea exhibit anti-inflammatory and antioxidant properties, thereby assisting in mitigating the detrimental impact of inflammatory responses on the skeletal system (Huang, H.T., et al., 2020). Several studies have revealed that tea polyphenols can modulate signaling pathways associated with inflammation, thereby reducing skeletal inflammation-related damage and contributing to the maintenance of skeletal health (Zhang, C., et al., 2021). However, it is important to note that current research is still in its early stages. Additionally, the effects of tea may vary depending on factors such as tea type (e.g., green tea, black tea, oolong tea), dosage, and frequency of consumption. Therefore, further research and in-depth mechanistic investigations are warranted to substantiate the link between tea and skeletal health.

Bibliometrics, a discipline that employs statistical and mathematical methods to analyze literature and its citations, aims to quantitatively assess the production, dissemination, and impact of scientific publications. Its primary objective is to reveal research trends, collaborative networks, and scholarly influence within the academic community (Ge, Y., et al., 2022). Over the years, bibliometrics has been extensively employed in various related fields such as gynecology, orthopedics, complementary medicine, and alternative medicine. Its application has greatly facilitated the advancement of medical research and clinical practice (Wang, S., et al., 2021). However, currently, there is a dearth of bibliometric and visualization analyses in the research domain of tea and skeletal health. To address this knowledge gap, the present study aims to conduct a bibliometric analysis of publications on tea and skeletal health from 1989 to 2023, utilizing software such as CiteSpace and VOSviewer. By quantitatively and visually analyzing the annual publication output, active countries, prolific institutions, authors, core journals, references, and keywords, this project seeks to gain comprehensive insights into the developmental trajectory and cutting-edge trends in this field. The findings will contribute to advancing research in the realm of tea and skeletal health and facilitate further progress in related areas.

2. Materials and Methods

2.1 Data Source and Search Strategy

The research literature pertaining to tea and skeletal health was obtained from the Web of Science Core Collection (WoSCC). WoSCC is a comprehensive academic database covering a wide range of disciplines, widely recognized and extensively utilized by researchers for accessing scholarly information, conducting

literature searches, and evaluating research impact (Ding, X. & Z. Yang, 2022). The search query was set as (TS=("tea" OR "teas")) AND TS=(bone*). The selected literature had to meet the following criteria: (1) Reporting research on the relationship between tea and skeletal health; (2) English language, which holds a significant position as the universal language for scientific, technological, medical, and academic research. English is widely used for communication and publication in a substantial number of scientific papers, academic publications, and international conferences, offering standardization and reliability compared to other languages (Xin, X., et al., 2022). (3) The document types were limited to articles and reviews. To ensure consistency and avoid discrepancies resulting from database updates, the search was completed on June 5, 2023. The process of exporting the selected literature data is illustrated in Figure 1. Firstly, the predefined search query was entered into WoSCC, with a time span from January 1, 1989, to June 5, 2023. A total of 986 articles were retrieved, excluding 13 non-English publications and 41 conference proceedings, abstracts, and other document types not classified as articles or reviews. Ultimately, 932 articles were selected and imported into software such as VOSviewer and CiteSpace for visual analysis and prediction of research trends and hotspots.

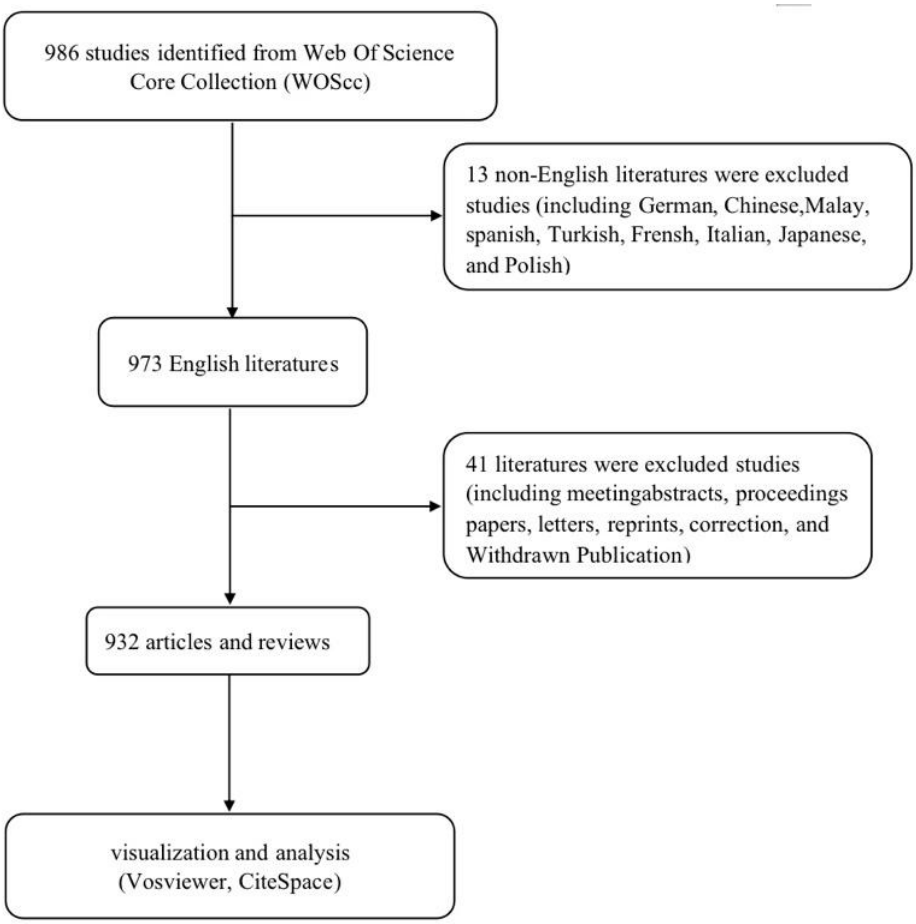


Figure 1. Literature search process

2.2 Data Analysis

VOSviewer, a freely available software, is widely used for visualizing and analyzing scientific literature. Developed by Loet Leydesdorff and Ludo Waltman at Leiden University in the Netherlands, it has gained substantial recognition and application in the field of scientific research and evaluation. VOSviewer offers several key functionalities. Firstly, it enables the visualization of literature networks by transforming metadata from scientific articles, such as titles, authors, keywords, and abstracts, into visual network maps. These maps illustrate the relationships among publications, facilitating researchers and scholars in quickly grasping the field distribution, thematic

clustering, and collaboration patterns within the literature. Secondly, VOSviewer facilitates frequency and thematic analysis. It assists researchers in identifying the importance and distribution of keywords and themes, generating visual outputs such as word clouds, thematic distribution maps, and thematic clustering maps. These visualizations aid researchers in comprehending and identifying the hotspots and trends in the research field. Thirdly, VOSviewer enables the analysis of collaboration relationships among authors, institutions, and countries. By visualizing collaboration networks, analysts can gain insights into collaboration patterns, core collaborators, and collaboration strength. Lastly, VOSviewer includes citation network analysis functionality, which transforms the citation relationships between publications into network maps. This enables researchers to understand citation patterns, influence, and the structure of citation chains. Overall, VOSviewer is a reliable tool for visualizing and analyzing scientific literature, empowering researchers to swiftly understand and analyze large-scale literature data, discover research hotspots and trends, and identify collaboration and citation patterns.

CiteSpace, a software tool designed specifically for scientific research, offers powerful features for visualizing and analyzing scientific literature. Researchers can leverage CiteSpace to delve deep into vast amounts of literature data, uncover research hotspots, track the evolution of keywords, and explore collaboration relationships among authors. The software employs graphical visualization to showcase relationships between publications, representing each document as a node and using links to indicate citation relationships. This visualization approach allows researchers to intuitively grasp the interplay and communication patterns among the literature. Additionally, CiteSpace provides keyword analysis functionality, enabling researchers to identify key hotspots and track the evolution of keywords in the research field by analyzing them within the literature. It also analyzes collaboration networks among authors, revealing collaboration patterns and core collaborators. Through CiteSpace's functionality for analyzing topic evolution, researchers can trace the development of research topics and gain insights into the evolution and trends of the research field. Thus, it is evident that CiteSpace is a powerful tool for visualizing and analyzing scientific literature, enabling researchers to comprehensively understand the dynamics of the research field, discover key information, and provide valuable insights for scientific research.

3. Result

3.1 General Statistic

Based on our selection criteria, a total of 932 articles were selected from the WoSCC database, with 780 (83.69%) categorized as "articles" and 152 (16.31%) categorized as "reviews." As shown in Figure 2, the number of annual publications between 1989 and 2023 may fluctuate from year to year, but the overall trend indicates an increasing quantity of publications. Particularly noteworthy is the exponential growth in the number of publications since 2008. The year 2018 witnessed the highest output, followed by 2021 and 2022. Regarding the citation frequency of the literature, an upward trend is observed as the years progress. After 2012, there was a remarkable surge in citation counts, possibly attributed to the surge in publication volume since 2008. These results demonstrate the rapid and increasingly prominent development of research fields related to tea and bone health over the past three decades, with the past decade experiencing a vibrant period of growth and heightened interest, garnering widespread attention from the academic community.

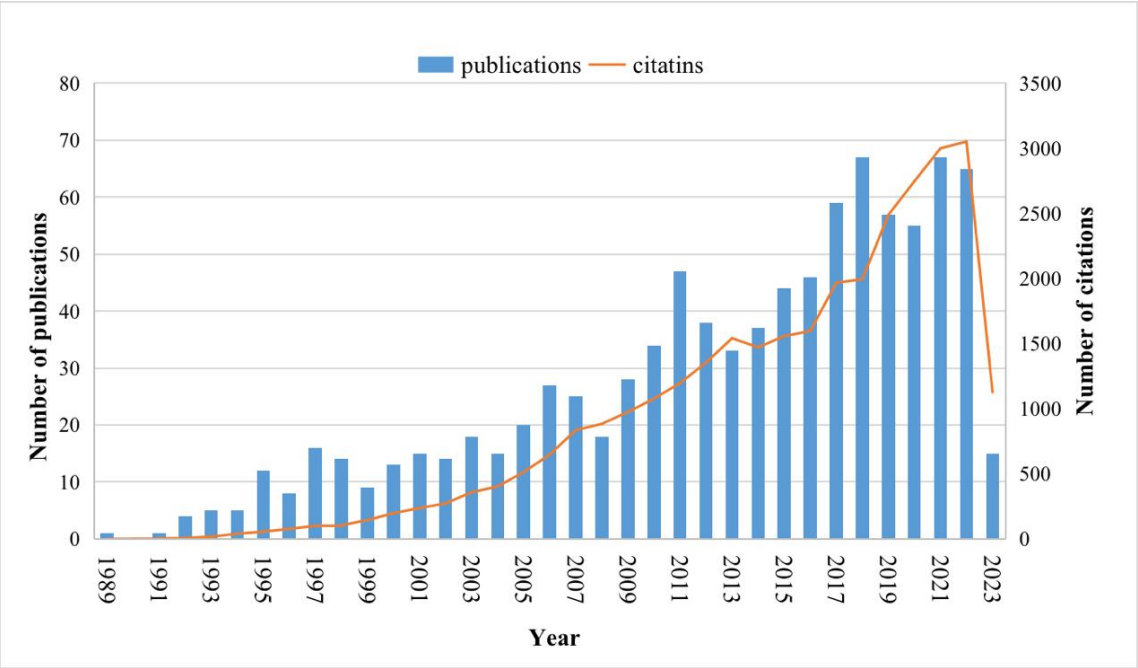
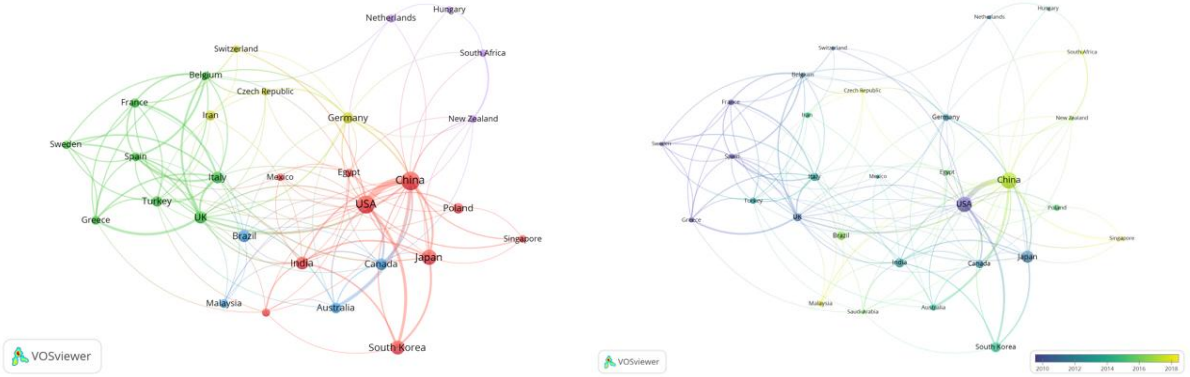


Figure 2. The annual number of publications and citations related to tea and bone

3.2 Analysis of Countries/Region and Institution

We conducted a comprehensive analysis of the total publication output in this field over the past three decades (1989-2023), focusing on countries and institutions. Figure 3A presents a visual analysis of the publication output by country, considering countries with a publication count greater than 5. In the graph, nodes represent countries, and the connecting lines indicate collaboration between countries. The size of a node reflects the country's publication output in this field, with larger nodes indicating higher output. Thicker lines between nodes represent closer collaboration and connections between countries. From the graph, we observe that the top five countries with the highest publication output are China (240 articles, 25.75%), USA (196 articles, 21.03%), Japan (105 articles, 11.27%), South Korea (68 articles, 7.30%), and India (54 articles, 5.79%). The graph also reveals the collaboration and connections between countries. China and the USA exhibit the closest ties and communication, with the USA being the country with the most extensive collaboration and cooperation with other nations, followed by China.

Figure 3B presents a visual analysis of the relationship between the publication output by country and year. From the graph, we observe that the USA had a concentrated publication output before 2010, Japan's output was concentrated before 2012, South Korea's output was concentrated before 2016, and China's publication output became more concentrated after 2016. Malaysia and Singapore, on the other hand, had their outputs concentrated after 2018. Thus, based on Figure 3 and Figure 4, we can conclude that China plays multiple roles in this field: being the country with the richest publication output, having the closest collaboration and communication with other countries in this field, and being a leading nation in recent years' vigorous research activities in this field.



(**A**) (**B**)

Figure 3. Co-authorship analysis of countries

(A) Cooperation networks across countries. **(B)** Overlay Visualization of countries.

Figure 4A provides a visual analysis of the publication output by institutions (considering institutions with a publication count greater than 7). From the graph, we observe that eight out of the top ten productive institutions come from the top five countries in terms of publication output. Specifically, four institutions are from the USA, three from China, and one from Japan. The top three institutions with the highest productivity are Texas Tech University, University of Georgia, and Winthrop University Hospital (NYU Winthrop Hospital). Texas Tech University not only has the highest productivity but also exhibits the closest collaboration and communication with other institutions, demonstrating strong centrality. Figure 4B presents a visual analysis of the relationship between the publication output by institutions and year. From the graph, we observe that the publication outputs of University of Georgia and Winthrop University Hospital (NYU Winthrop Hospital) were concentrated before 2012, while Texas Tech University's output was concentrated around 2014. Institutions such as Zhejiang University and Sichuan University had their publication outputs more concentrated after 2018, which aligns with the analysis of the relationship between publication output by country and year.

(**A**) (**B**)

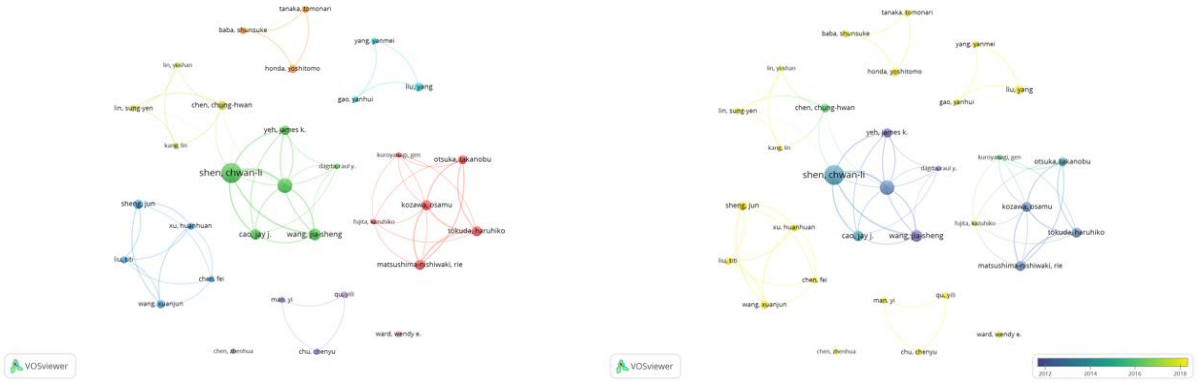
Figure 4. Co-authorship analysis of institutions.

(A) Cooperation networks across institutions. **(B)** Overlay Visualization of institutions.

Therefore, through the examination of Figure 3, Figure 4, we gain insights into the multi-faceted role China plays in this field, as the country with the highest publication and output, the closest collaborations and connections with other countries, and a leading force in recent years' research endeavors.

3.3 Analysis of Authors and Co-Cited Authors

Figure 5A presents a visual analysis based on the publication output of authors over the past three decades (1989-2023), considering authors with a publication count greater than 5. According to the graph, the top 10 authors collectively published 122 articles, accounting for 13.09% of the total output. Among them, the top three authors with the highest publication count are Shen, Chwan-Li (27 articles), Chyu, Ming-Chien (18 articles), and Wang, Jia-Sheng (13 articles). Figure 5B provides a visual analysis of the relationship between authors and publication time. From the graph, we observe that the publication output of author Wang, Jia-Sheng was concentrated before 2012, while Shen, Chwan-Li's output was concentrated around 2014. Additionally, authors such as Sheng, Jun and Man, Yi, who are from China, have relatively limited current output but are among the most active researchers in this field in recent years, demonstrating their vibrant exploration in this domain.



(**A**) (**B**)

Figure 5. Co-authorship analysis of authors

(A) Cooperation networks across authors. **(B)** Overlay Visualization of authors.

3.4 Analysis of Research Hotspots

Keywords play a crucial role in scientific articles as they encapsulate the core themes and essential points of the content. These terms serve to highlight and guide readers and researchers, enabling them to quickly grasp the main content of the article. In academic research, keywords are commonly used for literature indexing and database searches, facilitating the classification and organization of related literature. By selecting appropriate keywords, authors can effectively convey their intentions and assist readers in efficiently obtaining the desired information. Analyzing keywords provides insights into the research hotspots and trends in the field of tea and bone-related studies.

Before conducting keyword analysis, we merged keywords with similar meanings but different versions. The merging criteria included treating keywords with similar meanings as synonyms, considering abbreviations as equivalent to their full forms, and treating singular and plural forms of keywords as the same concept. This approach helped standardize the use of keywords, resulting in more accurate and consistent analysis results. After merging and determining the keywords, we performed a visual analysis using VOSviewer. However, keyword filtering was necessary during this process. The filtering criterion was to include keywords with a frequency greater than 40 (>40). As illustrated in Figure 6, the graph reveals that before 2018, the bursting keywords mainly included "mechanism," "green tea polyphenol," "bone resorption," and "inhibition." From 2018 until the present, the latest bursting keywords encompass "osteogenic differentiation," "inflammation," "mesenchymal stem cell," and others.

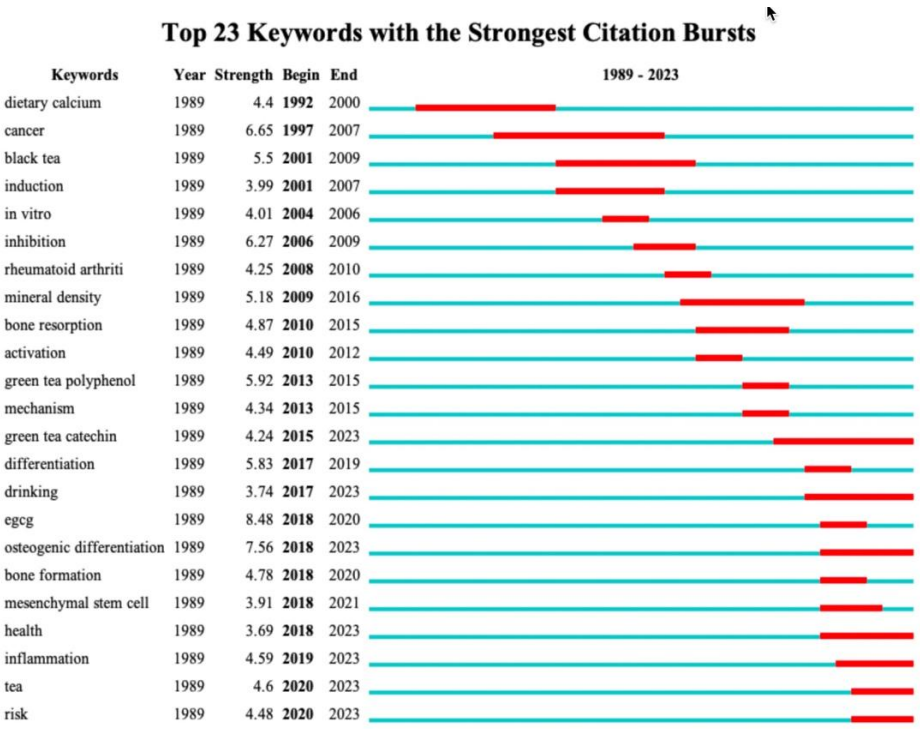


Figure 6. The top 25 keywords with the strongest citation bursts.

4. Discussion

To the best of our knowledge, this is the first bibliometric analysis focusing on the intersection of tea and bone research. In this study, we identified the global hotspots and trends in this field. Our results indicate a steady increase in cumulative publications on tea and bone from 1989 to 2023. Particularly, there was an explosive growth in the number of annual publications after 2008, with 2018 being the year of highest output, followed by 2021 and 2022. These findings suggest a flourishing development in research related to tea and bone.

We found that China not only holds the highest productivity in this field but also exhibits the closest collaborations and exchanges with other countries. Moreover, China has witnessed the most rapid research advancements in this domain in recent years. Consequently, China assumes a leading position in tea and bone-related research. Among the top ten publishing institutions, nine are from China; however, their collaborative levels remain relatively low. In contrast, the Texas Tech University from the United States stands out as the most productive institution, displaying the highest level of collaboration and exchange with other institutions. Therefore, it is crucial to encourage enhanced collaboration and communication among institutions across different regions. Furthermore, it is worth mentioning that Shen, Chwan-Li emerges as the most productive author in this field.

5. Hotspots and Frontiers

5.1 Tea and Osteogenic Differentiation

Tea is rich in various bioactive compounds, including tea polyphenols, catechins, and caffeine (Wang, N., et al., 2023; Hong, Y., et al., 2023; Gancar, M., et al., 2023). Recent studies have indicated their potential positive impact on bone health. Among these bioactive constituents, tea polyphenols are considered one of the most significant components. Multiple investigations have shown that tea polyphenols can promote the proliferation and osteogenic differentiation of bone cells, as well as enhance bone matrix deposition. By modulating various signaling pathways such as Wnt/β-catenin, BMP/Smad, and MAPK, tea polyphenols facilitate the expression of osteogenesis-related genes, thereby promoting the osteogenic differentiation of bone cells (Shen, C.-L., et al., 2009; Shen, C.-L., et al., 2009). Catechins, another important bioactive compound in tea, have also been extensively studied. It has been found that catechins can inhibit the activity of osteoclasts, the bone-resorbing cells, thereby reducing the occurrence of osteoporosis. Moreover, catechins

can promote the proliferation and osteogenic differentiation of osteoblasts, leading to increased bone density and strength (Huang, H.-T., et al., 2020). The combined application of polyphenols and catechins further enhances their synergistic effect on osteogenic differentiation of bone cells. This synergistic effect may involve various molecular mechanisms, including the modulation of cell signaling pathways, enhanced antioxidant capacity, and alleviation of inflammatory responses. The influence of bioactive compounds in tea on mesenchymal stem cells (MSCs) has emerged as a recent hotspot. For instance, Epigallocatechin-3-gallate (EGCG), a green tea polyphenol, has been shown to promote osteogenic differentiation and mineralization in human bone marrow mesenchymal stem cells (BMSCs), suggesting its potential role in the prevention and treatment of osteoporosis (Lin, S.-Y., et al., 2018). Furthermore, this study provides evidence that exposure to caffeine during pregnancy and lactation reduces the osteogenic differentiation of mesenchymal stem cells (MSCs) in offspring, implying a possible connection between caffeine consumption and the development of osteopenia (Reis, A.M.S., et al., 2016).

5.2 Tea, Inflammation and Bone

Bioactive components in tea have been demonstrated to possess inhibitory effects on oxidation and inflammation. Notably, green tea polyphenols, especially epigallocatechin-3-gallate (EGCG), exhibit protective properties against lipopolysaccharide (LPS)-induced inflammation. They achieve this by reducing the population of M1 macrophages and increasing the presence of Treg cells, thereby restoring immune system homeostasis and preventing inflammatory damage (Azambuja, J.H., et al., 2022). Additionally, EGCG has been shown to inhibit the secretion of caspase-1 and IL-1β by suppressing NLRP3 inflammasome activation in mouse bone marrow-derived macrophages (bMDMs) (Zhang, C., et al., 2021). However, further investigation is still warranted to elucidate the underlying mechanisms involved in the anti-inflammatory effects of EGCG.

Moreover, the optimization of the antioxidant capacity of tea for enhancing the performance of biological materials is a current research hotspot. A recent study aims to develop a multifunctional bone implant by grafting polyphenols derived from green tea extract onto a calcium titanate-coated titanium surface. This strategy aims to enhance the implant's antioxidant ability without compromising its bioactivity, antibacterial properties, and osseointegration potential (Gamna, F., et al., 2023). The functionalized surface effectively prevents chronic inflammation and maintains the overall functionality of the implant. Furthermore, another study highlights the potential of programmed core-shell nanofibers that sequentially release tea polyphenols and AdipoRon. This innovative approach holds promise in controlling inflammation and promoting bone regeneration for the repair of alveolar bone defects associated with periodontitis (He, Z., et al., 2022).

6. Conclusion

To the best of our knowledge, this is the first bibliometric analysis focusing on the relationship between tea and bone. The research interest in this field has been steadily increasing over the years. China emerges as the most influential country in terms of research output. Texas Tech University stands out as the most productive institution, while Shen, Chwan-Li is the most prolific author. The latest hotspots in research primarily revolve around the topics of tea and osteogenic differentiation, as well as tea, inflammation, and bone.

References

Azambuja, J. H., et al. (2022). Protective effect of green tea and epigallocatechin-3-gallate in a LPS-induced systemic inflammation model. *The Journal of Nutritional Biochemistry, 101*, 108920.

Choi, J. Y. (2020). Healthy bone tissue homeostasis. *Exp Mol Med., 52*(8), 1165.

Ding, X. and Z. Yang. (2022). Knowledge mapping of platform research: a visual analysis using VOSviewer and CiteSpace. *Electronic Commerce Research, 22*(3), 787-809.

Gamna, F., et al. (2023). Conferring Antioxidant Activity to an Antibacterial and Bioactive Titanium Surface through the Grafting of a Natural Extract. *Nanomaterials* (Basel, Switzerland), *13*(3).

Gancar, M., et al. (2023). Green tea leaf constituents inhibit the formation of lysozyme amyloid aggregates: An effect of mutual interactions. *International Journal of Biological Macromolecules, 242*(Pt 2), 124856.

Ge, Y., et al. (2022). Frontiers and Hotspots Evolution in Psycho-cardiology: A Bibliometric Analysis from 2004 to 2022. *Curr Probl Cardiol., 47*(12), 101361.

He, Z., et al. (2022). Coaxial TP/APR electrospun nanofibers for programmed controlling inflammation and promoting bone regeneration in periodontitis-related alveolar bone defect models. Materials Today. *Bio., 16*, 100438.

Hong, Y., et al. (2023). Epigallocatechin gallate alleviates mono-2-ethylhexyl phthalate-induced male germ cell pyroptosis by inhibiting the ROS/mTOR/NLRP3 pathway. *Toxicology in Vitro: An International Journal Published in Association with BIBRA*, 105626.

Huang, H. T., et al. (2020). Osteoprotective Roles of Green Tea Catechins. *Antioxidants (Basel), 9*(11).

Huang, H.-T., et al. (2020). Osteoprotective Roles of Green Tea Catechins. *Antioxidants* (Basel, Switzerland), *9*(11).

Li, J.-y., et al. (2021). Clinical study on the influence of tea drinking habits on bone mineral density and osteoporosis in postmenopausal women in Fuzhou city, China. *Progress in Nutrition, 23*(1).

Li, X., et al. (2019). Tea consumption and bone health in Chinese adults: a population-based study. *Osteoporos Int., 30*(2), 333-341.

Lim, S., et al. (2020). Inhibitory effect of oolonghomobisflavan B on osteoclastogenesis by suppressing p38 MAPK activation. *Bioorg Med Chem Lett., 30*(18), 127429.

Lin, S.-Y., et al. (2018). (-)-Epigallocatechin-3-Gallate (EGCG) Enhances Osteogenic Differentiation of Human Bone Marrow Mesenchymal Stem Cells. *Molecules* (Basel, Switzerland), *23*(12).

McAlpine, M. D., et al. (2021). Black and Green Tea as Well as Specialty Teas Increase Osteoblast Mineralization with Varying Effectiveness. *J Med Food., 24*(8), 866-872.

Newman, R. G., et al. (2023). Harvest Stage and Brewing Conditions Impact Mineral Content, Phenolic Compounds, and Antioxidant Capacity of Lemon Balm (Melissa officinalis L.) Herbal Tea. *Plant Foods for Human Nutrition*.

Reis, A.M.S., et al. (2016). Inhibition of the osteogenic differentiation of mesenchymal stem cells derived from the offspring of rats treated with caffeine during pregnancy and lactation. *Connective Tissue Research, 57*(2), 131-142.

Shen, C.-L., et al. (2009). Green tea and bone metabolism. *Nutrition Research* (New York, N.Y.), *29*(7), 437-456.

Shen, C.-L., et al. (2009). Green tea polyphenols mitigate deterioration of bone microarchitecture in middle-aged female rats. *Bone, 44*(4), 684-690.

Wang, N., et al. (2023). Effects of Pu-erh and Dian Hong tea polyphenols on the gut-liver axis in mice. *AMB Express, 13*(1), 53.

Wang, S., et al. (2021). Global Trends in Research of Macrophages Associated with Acute Lung Injury Over Past 10 Years: A Bibliometric Analysis. *Front Immunol., 12*, 669539.

Xin, X., et al. (2022). Global trends in research on oxidative stress associated with periodontitis from 1987 to 2022: A bibliometric analysis. *Front Immunol., 13*, 979675.

Zhang, C., et al. (2021). Epigallocatechin-3-gallate prevents inflammation and diabetes -Induced glucose tolerance through inhibition of NLRP3 inflammasome activation. *Int Immunopharmacol, 93*, 107412.

Zhang, C., et al. (2021). Epigallocatechin-3-gallate prevents inflammation and diabetes -Induced glucose tolerance through inhibition of NLRP3 inflammasome activation. *International Immunopharmacology, 93*, 107412.

Zhang, Y., et al. (2022). Purple tea water extract blocks RANKL-induced osteoclastogenesis through modulation of Akt/GSK3β and Blimp1-Irf8 pathways. *Food Funct., 13*(17), 8850-8859.

Zhu, J., X. Zhang, and H. Guo. (2017). Retrospect of Chinese herbs taken as tea drinking. *Chinese Journal of Medical History* (Beijing, China: 1980), *47*(1), 24-26.